APPENDIX A:
NOTICE OF PREPARATION AND SCOPING COMMENTS

NOTICE OF PREPARATION
ENVIRONMENTAL IMPACT REPORT
CITY OF MENLO PARK

Date: June 18, 2015

To:	State Clearinghouse State Responsible Agencies State Trustee Agencies Other Public Agencies Interested Organizations	**From:**	Deanna Chow Senior Planner City of Menlo Park 701 Laurel Street Menlo Park, CA 94025

Subject: **Notice of Preparation (NOP) of the Draft Environmental Impact Report (EIR) for the Menlo Park General Plan (Land Use & Circulation Elements) and M-2 Area Zoning Update**

Lead Agency: City of Menlo Park Planning Division

Project Title: Menlo Park General Plan (Land Use & Circulation Elements) and M-2 Area Zoning Update, also known as ConnectMenlo

Project Area: City of Menlo Park

Notice is hereby given that the City of Menlo Park (the City) will be the Lead Agency and will prepare a program level environmental impact report (EIR) for the Menlo Park General Plan (Land Use & Circulation Elements) and M-2 Area Zoning Update, also known as ConnectMenlo ("proposed Project" or "Project"). The proposed Project, its location, and potential environmental effects are described below. Pursuant to the California Environmental Quality Act (CEQA) Guidelines (14 California Code of Regulations Section15060(d)), the City has determined that an EIR is required for the proposed Project, and therefore an Initial Study will not be prepared and the City will begin work directly on the EIR.

Even though ConnectMenlo is technically a "project" that requires environmental review under CEQA, as a collection of City policies and regulations it qualifies for program level analysis, which evaluates total potential effects on the environment due to anticipated growth and change, but does not require the kind of building-by-building mitigation activities that may be assigned to individual construction and development projects that follow adoption of the General Plan and Zoning Ordinance updates. The level of review and associated processing time needed for those individual activities may be streamlined if they comply with overarching rules prescribed in the ConnectMenlo Update and EIR.

The City is requesting comments and guidance on the scope and content of the EIR from interested public agencies, organizations and individuals. With respect to the views of Responsible and Trustee Agencies as to significant environmental issues, the City needs to know the reasonable alternatives and mitigation measures that are germane to each agency's statutory responsibilities in connection with the Project. Responsible agencies may need to use the EIR prepared by the City when considering permitting or other approvals for the Project.

Comments on the NOP are due no later than the close of the NOP review period 5:00 p.m. on **Monday, July 20, 2015**. However, we would appreciate your response at the earliest possible date. Please send your written comments to Deanna Chow at the address shown above or email to connectmenlo@menlopark.org with "Menlo Park General Plan Update EIR" as the subject. Public agencies providing comments are asked to include a contact person for the agency.
A Scoping Session is currently tentatively scheduled to be held by the Planning Commission at its regular meeting on:

September 21, 2015, 7:00 p.m.
Menlo Park City Council Chambers
701 Laurel Street
Menlo Park, CA 94025

The scoping meeting will provide an opportunity for the City to summarize the General Plan and Zoning Code Update process. **The focus of the scoping meeting will be on the content to be studied in the EIR.** The Scoping Meeting is purposely being held several months after release of this Notice of Preparation to allow the community to participate in the development and review of proposed General Plan Land Use and Circulation Element goals, policies, and programs, and M-2 Area Zoning Ordinance provisions and Design Standards, as those are expected to provide mitigation of environmental effects, in addition to any mitigation measures prescribed in the EIR.

INTRODUCTION

The purpose of an EIR is to inform decision-makers and the public of the potential environmental effects of a proposed project. The EIR process is intended to provide environmental information sufficient to evaluate a proposed project and its potential to cause significant effects on the environment; examine methods of reducing adverse environmental impacts; and consider alternatives to a proposed project. A Fiscal Impact Analysis (FIA) is also being prepared to evaluate fiscal impacts on the City of Menlo Park and special districts from the proposed project.

The Menlo Park General Plan (Land Use & Circulation Elements) and M-2 Area Zoning Update EIR, also known as ConnectMenlo, will be prepared as a program EIR in accordance with CEQA and the CEQA Guidelines. The project location, project description, and the potential environmental effects that will be evaluated in the EIR are described generally below. As mentioned above, subsequent projects to General Plan and Zoning changes will be subject to a separate environmental review process.

PROJECT LOCATION

The Project Study Area consists of all land within the city of Menlo Park, its Sphere of Influence (where the City maintains a role in land use and transportation decisions through future annexations of unincorporated areas), and a proposed Planning Area (where the City believes the Menlo Park community should be able to participate in influencing land use and transportation decisions). As shown in Figure 1, Menlo Park is located at the southern edge of San Mateo County. The City is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest. The City is accessed by Interstate 280 (I-280), U.S. Highway 101 (US 101), Caltrain, State Route 84 via the Dumbarton Bridge, and a variety of arterial, collector and residential streets, as well as regional and local pedestrian and bicycles routes. The majority of land in Menlo Park is designated for residential use; other General Plan land use categories include Industrial/Business Park, Open Space/Recreation, Commercial, and Public Facilities/Institutional.

The M-2 Area, which is the focus of future land use change under the Project, comprises the northern-most portion of Menlo Park. The M-2 Area (see Figure 2) is generally bounded by San Francisco Bay to the north; Redwood City to the west; East Palo Alto to the southeast; and the Menlo Park neighborhoods of Belle Haven, Flood Triangle, Suburban Park, and Lorelei Manor to the south. Currently, most land in the M-2 Area is designated for industrial/business park use. The M-2 Area contains major regional transportation links, including Bayfront Expressway (State Route 84), Willow Road (State Route 114), and University Avenue (State Route 109) all of which are utilized heavily to provide access to the Dumbarton Bridge.

PROJECT DESCRIPTION

Often described as each city's "constitution," general plans are required by State law to guide land use and development, usually for a period of 20 years. With the Menlo Park Housing, Open Space/Conservation, Noise, and Safety Elements having been recently updated, the focus of the Project is on the Land Use and Circulation Elements (as well as zoning provisions to implement any land use changes in the M-2 Area). These two elements are central components of the General Plan because they describe which land uses should be allowed in the City, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the City and its residents.

The Land Use Element frames the type and scale of potential development that may occur over the next 20 years, particularly in the M-2 Area. The Circulation Element will address transportation issues throughout the City, and both updated Elements will be consistent with the other General Plan Elements and the El Camino Real/Downtown Specific Plan.
The Project also includes an update to the City's Zoning Ordinance provisions for the M-2 Area to implement the updated General Plan programs, as well as Design Standards for development in the M-2 Area.

Community engagement is the foundation of the Project. Updated planning policy language will only be meaningful if it helps achieve the community's vision for the future. The in-person public outreach and participation process has included workshops and open houses; mobile tours of Menlo Park and nearby communities; informational symposia; stakeholder interviews; focus groups; recommendations by a General Plan Advisory Committee (GPAC) composed of City commissioners, elected officials, and community members; and consideration by the City Council and Planning Commission at public meetings. Many more opportunities will occur throughout the process to ensure that community members play a central role in guiding the General Plan and Zoning Ordinance updates. In addition, the Project features a comprehensive website, online surveys, and a mobile app that provides access to information and documents.
The Menlo Park General Plan and M-2 Area Zoning Update will be evaluated using a program EIR that determines whether potential future land use and circulation system changes may result in impacts that need to be mitigated. By incorporating implementation provisions that purposely reduce environmental impacts, the proposed updates can be made largely "self-mitigating," which reduces the need for separate EIR mitigation measures, improves the efficiency of implementation, and increases the likelihood that development will be environmentally sustainable.

Given the potential for change in Menlo Park and especially the M-2 Area, the City Council established the following objectives for the Project:

- Establish and achieve the community's vision
- Realize economic and revenue potential
- Assume that changes to General Plan Land Use Designations and Zoning will occur only in M-2 Area
- Streamline the development review process
- Improve mobility for all travel modes

- Preserve neighborhood character throughout the city
- Reduce emissions and adapt sustainably

In pursuit of these goals, the Menlo Park General Plan and M-2 Area Zoning Update is making use of the following Guiding Principles, which reflect the stated goals of members of the public, elected officials, and various stakeholders who have participated in the Project, to date. These aspirational statements, accepted by the City Council in December 2014, describe the kind of place that community members want Menlo Park to be. City representatives and community members developed them in a collaborative public process for consideration in guiding growth and preserving the City's unique features over the next 20 years.

- **Citywide Equity:** Menlo Park neighborhoods are protected from unreasonable development and unreasonable cut-through traffic, share the benefits and impacts of local growth, and enjoy equal access to quality services, education, public open space, housing that complements local job opportunities with affordability that limits displacement of current residents, and convenient daily shopping such as grocery stores and pharmacies.
- **Healthy Community:** Everyone in Menlo Park enjoys healthy living spaces, high quality of life, and can safely walk or bike to fresh food, medical services, employment, recreational facilities, and other daily destinations; land owners and occupants take pride in the appearance of property; Menlo Park achieves code compliance and prioritizes improvements that promote safety and healthy living; and the entire city is well-served by emergency services and community policing.
- **Competitive and Innovative Business Destination:** Menlo Park embraces emerging technologies, local intelligence, and entrepreneurship, and welcomes reasonable development without excessive traffic congestion that will grow and attract successful companies and innovators that generate local economic activity and tax revenue for the entire community.
- **Corporate Contribution:** In exchange for added development potential, construction projects provide physical benefits in the adjacent neighborhood (such as Belle Haven for growth north of US 101), including jobs, housing, schools, libraries, neighborhood retail, childcare, public open space, high speed internet access, and transportation choices.
- **Youth Support and Education Excellence:** Menlo Park children and young adults have equal access to excellent childcare, education, meaningful employment opportunities, and useful training, including internship opportunities at local companies.
- **Great Transportation Options:** Menlo Park provides thoroughly-connected, safe and convenient transportation, adequate emergency vehicle access, and multiple options for people traveling by foot, bicycle, shuttle, bus, car, and train, including daily service along the Dumbarton Rail Corridor.
- **Complete Neighborhoods and Commercial Corridors:** Menlo Park neighborhoods are complete communities, featuring well integrated and designed development along vibrant

commercial corridors with a live-work-play mix of community-focused businesses that conveniently serve adjacent neighborhoods while respecting their residential character.

- **Accessible Open Space and Recreation:** Menlo Park provides safe and convenient access to an ample amount of local and regional parks and a range of public open space types, recreational facilities, trails, and enhancements to wetlands and the Bay.
- **Sustainable Environmental Planning:** Menlo Park is a leader in efforts to address climate change, adapt to sea-level rise, protect natural and built resources, conserve energy, manage water, utilize renewable energy, and promote green building.

The Guiding Principles will help chart future change throughout Menlo Park through a careful balance of benefits and impacts, as charted in the General Plan goals, policies, and programs, whether applied to expanding transportation options citywide, to protecting the character of the city's residential neighborhoods, or to managing the growth expected to occur in the M-2 Area. How much the M-2 Area might grow has also been established through an intensive process of community workshops, public meetings, and surveys. Based on this significant body of community input, GPAC recommendations, and Planning Commission and City Council review, a theoretical level of maximum potential development that could be accommodated by the Project has been established (as depicted in Figure 3).

This maximum potential development would consist of approximately 2.1 million additional square feet of nonresidential building space and 4,500 additional multifamily dwelling units beyond what is already realistically achievable under the current Menlo Park General Plan Land Use Element. About 1.4 million square feet of the added nonresidential development would be concentrated in the area between Willow Road and University Avenue (primarily for new and expanded life sciences uses). About 2,000 of the additional dwelling units would be located in that same area, with another 1,000 units in the Jefferson Drive area, and 1,500 units on the Facebook East campus.

The nonresidential development would also include ground floor retail in a number of locations and roughly 500,000 square feet for three hotels with 200 rooms each, one in the Haven area, one in the Jefferson Drive area, and one on the Facebook West campus. The anticipated development would be estimated to increase the number of jobs in the M-2 Area by about 5,500 beyond the amount accommodated by the current General Plan.

In addition to the potential buildout of the Project, development capacity currently exists in the M-2 Area based on the current 1994 General Plan Land Use Element and existing zoning. This current buildout potential, estimated at 1.8 million square feet of nonresidential uses, will be included in the No Project Alternative required to be characterized in conjunction with analysis of the Project. Therefore, the theoretical potential maximum buildout in the M-2 Area, combining development capacities under the No Project condition plus the Project, would be about 3.9 million square feet of nonresidential development beyond what currently exists on the ground.

The No Project alternative will also include development potential in the rest of Menlo Park that also currently exists under the General Plan and zoning in place, an amount that is not proposed to change under the Project.

LAND USE ELEMENT UPDATE

The updated Land Use Element will reflect the Guiding Principles to ensure that goals, policies and programs integrate the extensive community input on the Project. Where appropriate, policies and programs will also respond to State legislation established since adoption of the 1994 General Plan. These actions range from items such as updating maps of flood prone areas to exercising the ability to adopt “Uniformly Applicable Development Standards” for reducing potential environmental impacts that then may allow individual “infill” development projects to undergo streamlined environmental review per recent changes in State Law.

In addition to reinforcing the community’s vision for the city, the updated Land Use Element primarily will describe the changes shown in Figure 3 for future development in the M-2 Area, including any needed new Land Use Designations and changes in designations for individual parcels. The Land Use Element will also summarize the new pedestrian and bicycle improvements shown in Figure 3 to be installed as development occurs in the M-2 Area.

As with the updated Circulation Element, the updated Land Use Element will include programs that require new or expanded development to provide community amenities such as transportation and quality-of-life improvements, and others that describe how the City will utilize its Capital Improvement Program to prioritize needed infrastructure and physical projects throughout Menlo Park.

CIRCULATION ELEMENT UPDATE

Goals, policies, and programs in the updated Circulation Element will describe a variety of strategies and requirements to improve mobility and address congestion citywide, including Transportation Impact Analysis, Complete Streets, Transportation Demand Management (TDM), Traffic Management Associations, and the Neighborhood Traffic Management Program. It is important to note that a Complete Streets approach – where bicycle, pedestrian and transit usage are considered in evaluating the effectiveness and performance of a street or intersection – does not assume that all modes of travel can be well accommodated on every street, nor that sidewalks are appropriate in residential neighborhoods where they do not currently exist.

The updated Circulation Element will identify needed transportation system changes to address both existing issues and anticipated development, ranging from physical improvements such as right-of-way modifications, to transit service enhancements, to adjustments to regulations such as parking standards. A summary description of needed improvements and implementation mechanisms for updating the 2009 Transportation Impact Fee Study as an implementation program will specifically be included.

The Circulation Element Update will also specifically evaluate current off-street and on-street parking policies and requirements in the M-2 Area as they relate to providing an appropriate supply of parking and regulating the intensity of land uses. Parking impacts associated with the M-2 Area Zoning Update will be discussed qualitatively based on the proposed parking requirements.

M-2 AREA ZONING ORDINANCE UPDATE

The Project also includes an update to the City Zoning Ordinance for the M-2 Area to ensure consistency with the General Plan Update and previously adopted ordinances and policies. Zoning changes may be needed for any of the districts in the M-2 Area (M2, M3, C4, C2S, C2B, FP, PF, and U), and new districts within the M-2 Area may be created to reflect the community's preferences as established in the Guiding Principles and through additional input during the ConnectMenlo process. Modifications to zoning standards will also be recommended as needed to respond to updated State requirements.
Updates to zoning will also address the following topics, among others:

- Site standards, such as height, bulk, and building design; sidewalk and bike route dimensions; streetscape design; outdoor lighting; and operational issues (e.g., air quality, glare, vibration, and use and storage of hazardous materials);
- Types and mix of land uses;
- Potential affordable housing requirements, housing density bonus provisions, and related incentives, consistent with the City's Municipal Code and State law;
- Landscaping standards, including specific requirements for preliminary and final landscape plan submittal and review;
- TDM, off-street car parking, bicycle parking, and loading standards;
- Development contributions to community amenities and city programs and services;
- Best practices to ensure protection of wildlife and habitat; and
- Energy and water conservation construction and operation practices.

A Water Supply Assessment will be developed as part of the EIR to determine which, if any, strategies may be needed to ensure adequate water supply for anticipated development.

PUBLIC AGENCY APPROVALS

The EIR will evaluate the Project for potential impacts on the environment and analyze proposed goals, policies, and programs, as well as Zoning provisions and Design Standards, to determine the potential environmental consequences of future change under the updated General Plan Land Use and Circulation Elements and M-2 Area Zoning. The cumulative impacts discussion required per CEQA will consider relevant projects in and around the Planning Area that are not included as part of the Project.

CEQA requires that an EIR evaluate alternatives to a project that could reasonably attain the project objectives while reducing any significant impact of the project, as well as considering the "No Project" Alternative (i.e., what could happen if the Project were not to occur). With the establishment of a Maximum Potential Development alternative for the M-2 Area to ensure that adequate mitigation for any potential environmental is identified, it is expected that other EIR alternatives might describe some lesser subset of development to be considered by the City Council.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The EIR will analyze whether development anticipated pursuant to the proposed Project would have significant environmental effects in the following areas:

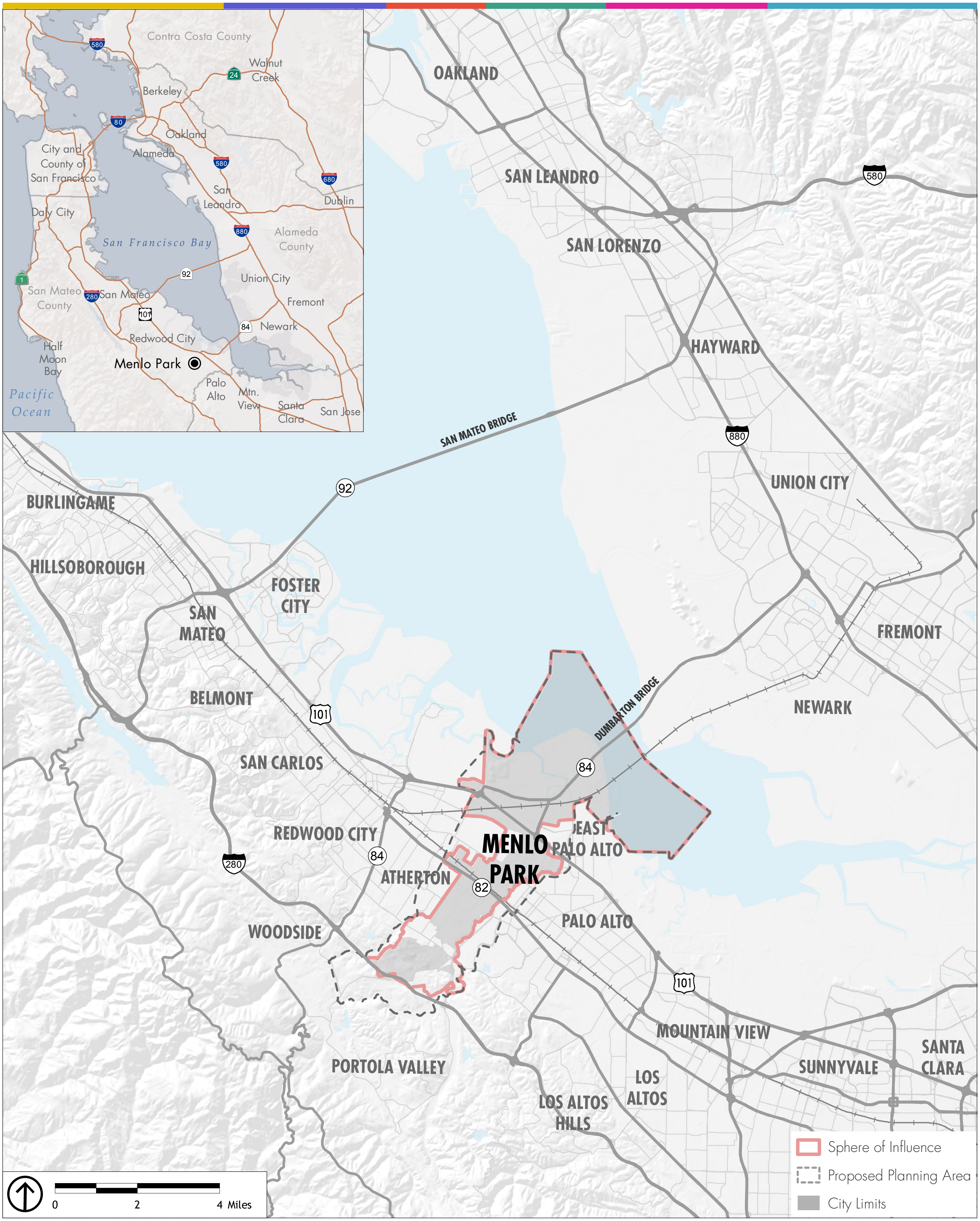
- **Aesthetic Resources:** the analysis will discuss potential impacts in terms of height and intensity, and the potential for increased light and glare impacts on the existing setting.
- **Air Quality:** the analysis will discuss the potential for local and regional air quality impacts from construction and demolition, and impacts from new development and traffic.
- **Biological Resources:** the analysis will discuss potential impacts on nesting birds, heritage and/or mature trees, and waterways, marshlands and other wildlife habitat.
- **Cultural Resources:** the analysis will discuss potential impacts on known historic buildings and cultural resources.
- **Geology, Soils, and Seismicity:** the analysis will discuss the potential for soil erosion and exposure to seismic risk, including liquefaction.
- **Greenhouse Gas Emissions:** the analysis will discuss the potential to generate greenhouse gases and for conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing emissions of greenhouse gases.
- **Hazardous Materials and Hazards:** the analysis will discuss areas of potential soil or groundwater contamination, and the potential for exposure to hazardous materials.

- **Hydrology and Water Quality:** the analysis will discuss the potential for impacts on waterways, or exceedance of the capacity of stormwater drainage systems or violation of water quality standards or waste discharge requirements.
- **Land Use and Planning Policy:** the analysis will discuss the potential for anticipated development to divide an existing community or conflict with applicable land use policy and plans.
- **Noise:** the analysis will discuss potential impacts from demolition, construction, and operational activities.
- **Population and Housing:** the analysis will discuss the potential for inducing substantial population growth or displacing existing housing, businesses, or people.
- **Public Services and Utilities:** the analysis will discuss the potential for an increase in public services such as fire and police protection, solid waste, water supply, and wastewater disposal services. A Water Supply Assessment will determine whether any strategies may be needed to ensure adequate water supply for anticipated development.
- **Recreation:** the analysis will discuss the potential for an increase in the use of existing recreational facilities to the detriment of those facilities, or the need to create new recreational facilities.
- **Transportation and Circulation:** the analysis will discuss potential increases in traffic load on the circulation system that could result in inadequate emergency access, parking capacity, or travel efficiency for vehicles, transit and pedestrians and bicyclists.

The following topics are likely to be associated with less-than-significant impacts and are not expected to be evaluated in detail in the EIR:

- Agriculture and Forestry Resources
- Mineral Resources

ATTACHMENTS:
Figure 1: Menlo Park Regional Location
Figure 2: M-2 Area
Figure 3: M-2 Area Maximum Potential Development

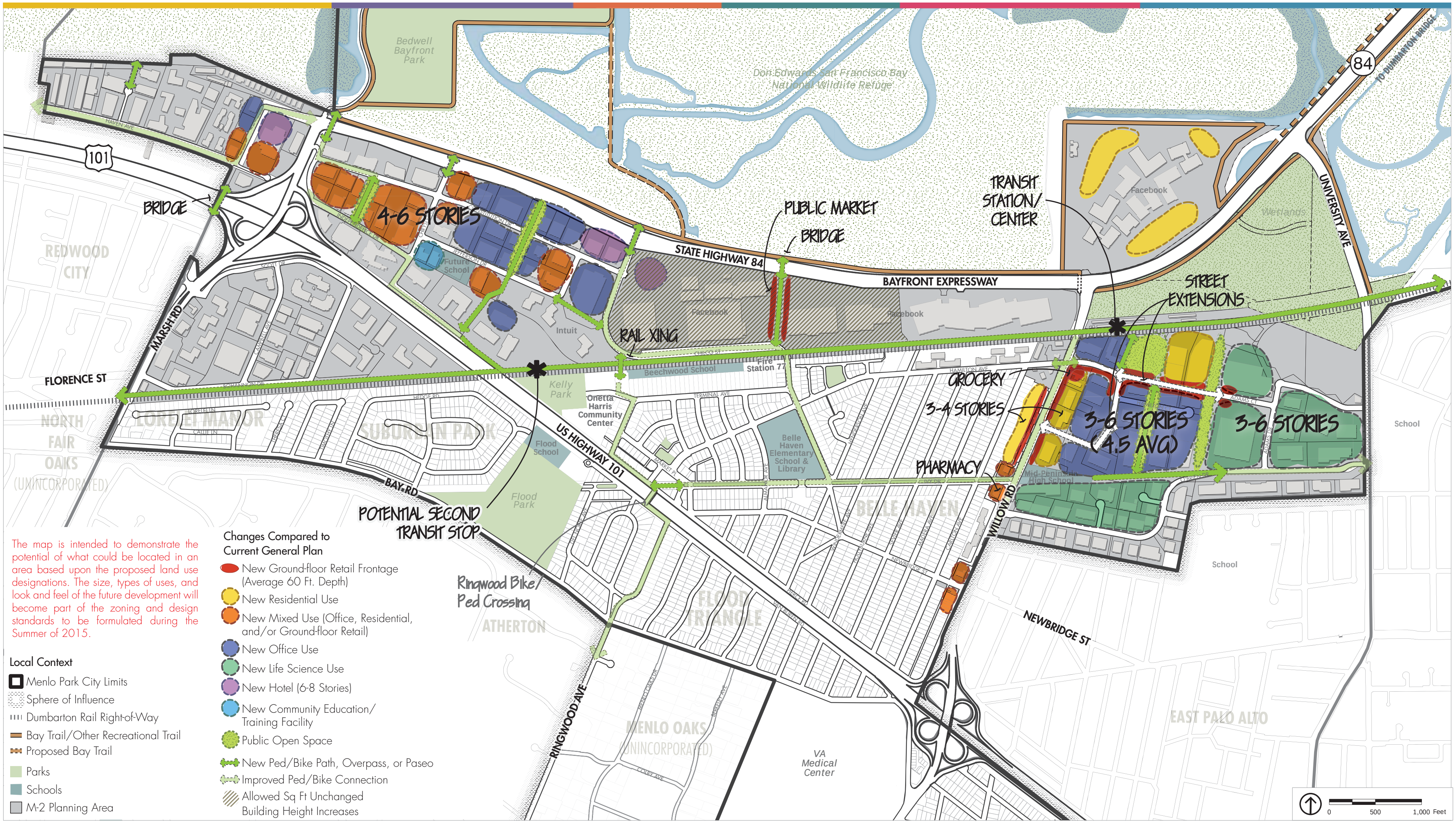


CONNECTMENLO
menlo park land use & mobility update

FIGURE 1: MENLO PARK REGIONAL LOCATION

CONNECTMENLO
menlo park land use & mobility update

FIGURE 2: M-2 AREA



DRAFT M-2 AREA MAXIMUM POTENTIAL DEVELOPMENT

CONNECTMENLO
menlo park land use & mobility update

San Francisco Bay Conservation and Development Commission
455 Golden Gate Avenue, Suite 10600, San Francisco, California 94102 tel 415 352 3600 fax 415 352 3606

July 8, 2015

RECEIVED

JUL 13 2015

CITY OF MENLO PARK
BUILDING

Deanna Chow
Senior Planner
City of Menlo Park
701 Laurel Street
Menlo Park, CA 924025

SUBJECT: Notice of Preparation for the Menlo Park General Plan (Land Use & Circulation Elements) and M-2 Area Zoning (ConnectMenlo) Update draft Environmental Impact Report, SCH# 2015062054; BCDC Inquiry File No. SM.MP.7232.1

Dear Ms. Chow:

Thank you for the opportunity to comment on the notice of preparation (NOP) of a Draft Environment Impact Report (DEIR) for the Menlo Park General Plan (Land Use & Circulation Elements) and M-2 Area Zoning (ConnectMenlo) Update, State Clearinghouse Number 2015062054. The NOP is dated June 18, 2015 and was received in our office on June 23, 2015. The Commission has not reviewed the NOP, and the staff comments below are based on the Commission's law, the *McAteer-Petris Act*, the Commission's *San Francisco Bay Plan* (Bay Plan), which serves as the Commission's federally approved management plan for the San Francisco Bay, and staff review of the NOP.

Jurisdiction. The Commission exercises permitting authority over San Francisco Bay up to the mean high tide line including all sloughs and marshlands up to five feet above mean sea level. The Commission also has jurisdiction within a shoreline band that extends 100 feet landward of and parallel with the Bay shoreline, as well as over managed wetlands, salt ponds, and certain waterways, as identified in the McAteer-Petris Act. The Commission also has land use authority over shoreline areas designated for priority uses in the Bay Plan. Commission permits are required for activities including dredging, fill placement, shoreline development, and substantial changes in use to any land, water or structure within the Commission's jurisdiction. For additional information on policies and permit requirements, please visit BCDC's website at www.bcdc.ca.gov.

In Menlo Park, the Commission's Bay Plan Maps designate two priority use areas, one is a portion of the Don Edwards San Francisco Bay National Wildlife Refuge along the Bay shoreline, the other is Menlo Park Bayfront Park as noted in Bay Plan Map No. 7. The EIR should discuss the consistency of land uses proposed for this area with the Commission's Bay Plan land use designations, and the applicable Bay Plan policies, including the recreation policies regarding Bayfront Park. The San Francisco Bay Plan and Maps can be accessed online at: http://www.bcdc.ca.gov/laws_plans/plans/sfbay_plan.shtml.

Climate Change. The Bay Plan policies on climate change state, in part that "when planning shoreline areas or designing larger shoreline projects, a risk assessment should be prepared by a qualified engineer and should be based on the estimated 100-year flood elevation that takes into account the best estimates of future sea level rise and current flood protection and planned flood protection that will be funded and constructed when needed to provide protection for the proposed project or shoreline area. A range of sea level rise projections for mid-century and end of century based on the best scientific data available should be used in the risk assessment. Inundation maps used for the risk assessment should be prepared under the direction of a qualified engineer. The risk assessment should identify all types of potential flooding, degrees of uncertainty, consequences of defense failure, and risks to existing habitat from proposed flood protection devices."

Climate Change Policy 3 states, in part: "[S]mall projects that do not increase risks to public safety, interim projects and infill projects within existing urbanized areas – should be designed to be resilient to mid-century sea level rise projection." Climate Change Policy 4 further states: "[U]ndeveloped areas that are both vulnerable to future flooding and currently sustain significant habitats or species, or possess conditions that make the areas especially suitable for ecosystem enhancement, should be given special consideration for preservation and habitat enhancement and should be encouraged to be used for those purposes."

The DEIR should assess how elements or portions of the General Plan Update could affect land that is potentially vulnerable to projected sea level rise. The assessment should use the best available sea level rise projections consistent with the Bay Plan Climate Change Policies. A number of publically available mapping tools are available that can assist in evaluating the impacts of sea level rise, including the NOAA's SLR Viewer.

Safety of Fills. If the General Plan envisions the need for Bay fill, the DEIR should discuss Bay Plan Safety of Fills findings and policies that state, in part that "Adequate measures should be provided to prevent damage from sea level rise and storm activity that may occur on fill or near the shoreline over the expected life of a project." In addition "New projects on fill or near the shoreline should either be set back from the edge of the shore so that the project will not be subject to dynamic wave energy, be built so the bottom floor level of structures will be above a 100-year flood elevation that takes future sea level rise into account for the expected life of the project, be specifically designed to tolerate periodic flooding, or employ other effective means of addressing the impacts of future sea level rise and storm activity."

Shoreline Protection. If the General Plan envisions the need for shoreline protection then the DEIR should consider the Bay Plan policies that require shoreline protection to be designed to withstand the effects of projected sea level rise and to be integrated with adjacent shoreline protection. Whenever feasible, projects must integrate hard shoreline protection structures with natural features that enhance the Bay ecosystem, e.g., by including marsh or upland vegetation in the design. Where it is feasible, ecosystem restoration projects must be designed to provide space for marsh migration as sea level rises.

Appearance, Design, and Scenic Views. The Bay Plan policies on appearance, design, and scenic views state, in part, "All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay. Maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shoreline." The DEIR should discuss the impact to views along shoreline trails and recreational spaces, and any features that would enable or discourage views of the Bay from public access points.

Public Access. The Bay Plan policies require that any project built either on fill or in the 100-foot shoreline band provide public access to the maximum extent feasible. In addition, the Bay Plan policies require that public access be designed and maintained to avoid flood damage due to sea level rise and storms. Any public access provided as a condition of development must either remain viable in the event of future sea level rise or flooding, or equivalent access consistent with the project must be provided nearby. As there are significant biological resources along the shoreline of the General Plan Area, the DEIR should consider the Bay Plan policies that aim to maximize public access opportunities while minimizing significant adverse impacts upon wildlife.

Recreation. The Bay Plan policies on recreation state, in part, that "Diverse and accessible water-oriented recreational facilities, such as marinas, launch ramps, beaches, and fishing piers, should be provided to meet the needs of a growing and diversifying population, and should be well distributed around the Bay and improved to accommodate a broad range of water-oriented recreational activities for people of all races, cultures, ages and income levels." The DEIR should discuss whether the General Plan elements would be consistent with the Bay Plan Recreation policies.

Transportation. The Bay Plan policies on transportation state, in part, that "Transportation projects... should include pedestrian and bicycle paths that will either be a part of the Bay Trail or connect the Bay Trail with other regional and community trails. Transportation projects should be designed to maintain and enhance visual and physical access to the Bay and along the Bay shoreline." The DEIR should discuss how the proposed plan will integrate the Bay Plan Transportation policies.

Fish, Other Aquatic Organisms and Wildlife. The Bay Plan policies on fish, other aquatic organisms and wildlife state, in part, that "to the greatest extent feasible, the Bay's tidal marshes, tidal flats, and subtidal habitat should be conserved, restored and increased." Futher, "[s]pecific habitats that are needed to conserve, increase or prevent the extinction of any native species, species threatened or endangered, species that the California Department of Fish and Game has determined are candidates for listing as enddangered or threatened under the California Endangered Species Act, or any species that provides substantial public benefits, should be protected, whether in the Bay or behid dikes." The DEIR should discuss the effect the proposed plan would have on fish, other aquatic organisms and wildlife, and whether the propsed project elements would be consistent with the Bay Plan policies on these resources.

Existing BCDC Permits. The DEIR should analyze whether any of the proposed plan would conflict with any existing BCDC permits within the proposed planning area.

Thank you for considering staff comments on the NOP. If you have any questions regarding this letter please contact me by phone at 415/352-3542 or email hannah.cha@bcdc.ca.gov.

Sincerely,

Hannah Cha
Civic Spark Planner

cc: State Clearinghouse

United States Department of the Interior

FISH AND WILDLIFE SERVICE
San Francisco Bay National Wildlife Refuge Complex
1 Marshlands Road
Fremont, California 94555

July 17, 2015

Ms. Deanna Chow
Senior Planner
City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

SUBJECT: Comments regarding the Notice of Preparation of a Draft Environmental Impact Report for the Menlo Park General Plan (Land Use and Circulation Elements) and M-2 Area Zoning Update

Dear Ms. Chow:

The U.S. Fish and Wildlife Service, Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) appreciates the opportunity to comment on the Notice of Preparation of a Draft Environmental Impact Report for the Menlo Park General Plan and M-2 Area Zoning Update. The Refuge has several recommendations and concerns we would like the City to consider in this planning process as described below.

- Assess impacts to nearby water quality, hydrology, wildlife, wetland habitat, and sub-tidal habitat along with associated wildlife as you define the development. What is the stormwater runoff plan for the increased development?
- With an increase in pedestrian and cyclist commuters using the Bay Trail based on this development expansion, we are concerned with the additional noise, light, and disturbance to wildlife and habitat that may result, particularly at night when much of the wildlife are at rest. We request that the EIR thoroughly analyze the expected increase and its affects to nearby wildlife habitat, including our properties on the northern side of State Highway 84. Fencing should be installed or improved along this northern side to reduce negative effects to habitat and wildlife.
- Any lighting and infrastructure for the development, including enhancement for pedestrian and cyclist commuting, must be designed to reduce ambient lighting to nearby wildlife habitats, as well as discourage perching of avian predators (e.g., raptors and ravens). Lighting and infrastructure such as pedestrian bridges, could increase predation to native and endangered species in nearby wildlife habitats.
- Coordinate with the Refuge, San Francisco Bay Trail (managed by the Association of

Bay Area Governments), and the San Francisco Bay Conservation and Development Commission on any additions or changes that affect the Bay Trail, including increased users.
- Endangered species should be assessed in the biological resources portion of the EIR.
- Assess and address potential impacts of pets on wildlife (e.g., dogs on and off leash, outdoor cats) from the Bay Trail and residential areas.

We are deeply concerned about the development, particularly the residential aspect, proposed for the M-2 Area. Residential development has a host of implications for wildlife resources and habitats in the area. We met with Facebook several months ago regarding their desire to provide housing on their East campus and expressed opposition to this residential concept. We have already experienced trespassing by Facebook staff through our lands neighboring the East campus. Housing on this campus will no doubt increase trespassing to our properties at all hours. Furthermore, housing near wildlife habitat generally has other negative implications including increases in noise, ambient lighting that will attract predators and disturb nesting endangered species, presence of free-roaming domestic animals that will predate on native wildlife, attracting nuisance animals (e.g., raccoon, skunk, crows), and garbage issues.

Further, we oppose the expansion of development to the M-2 Area. Traffic circulation is already saturated on both sides of State Highway 84 due to recent expansion of commercial buildings on the west side of State Highway 84. Any approval of rezoning to this area must include an extensive, comprehensive, and funded transportation plan and design.

Also, planning for long-term restoration of Refuge properties under the South Bay Salt Pond Restoration Project Phase 2 along the north side of State Highway 84 has begun and we are concerned about how the proposed development will affect the restoration plans. Under Phase 2, the pond directly adjacent to the East campus will be enhanced for nesting habitat of the federally- and state-listed western snowy plover. These ground nesting birds are particularly vulnerable to predation. In addition, the Refuge and the South Bay Salt Pond Restoration Project support tidal marsh restoration to further benefit endangered species recovery along the borders of the East campus. Impacts from the housing development would negatively impact this goal. We request that you coordinate with the South Bay Salt Pond Restoration Project (John Bourgeois, Executive Project Manager, John.Bourgeois@scc.ca.gov) in your planning effort.

Thank you for considering our comments. If you have questions regarding our comments, please contact Refuge Planner, Winnie Chan at winnie_chan@fws.gov or (510) 792-0222 (Ext. 145).

Sincerely,

Anne Morkill
Project Leader
San Francisco Bay National Wildlife
Refuge Complex

cc:
Kim Turner, U.S. Fish and Wildlife Service, Endangered Species Division (email)
Brian Wines, San Francisco Bay Regional Water Quality Control Board (email)
John Bourgeois, South Bay Salt Pond Restoration Project (email)

Deanna Chow
Planning Dept., City of Menlo Park 7/17/15
701 Laurel Street, Menlo Park, CA 94025

SUB: <u>Connect Menlo -- NOP for the EIR</u>

As an immediate neighbor of the M2 Area, I have attended a number of the Connect Menlo public workshops and meetings, and have the following comments.

The project description in the staff report was thorough. It appears that a program-level EIR is appropriate. It is wise to include a Fiscal Impacts Analysis as part of the process. The City Council objectives are excellent, especially "to improve mobility for all travel modes".

The guiding principles are well written and appropriate for Menlo Park. An important principle is Corporate Contribution, and I hope that there will be a very high level of investment expected of and volunteered by corporations interested in developing here. The challenges of affordable housing and traffic congestion locally will continue to worsen dramatically if our planning and development processes in Menlo Park do not include wise and <u>substantial</u> investment in addressing these two problems.

The GPAC process has been very productive. Thank you to the members and local citizens who participated. They are part of a robust level of community dedication and professionalism by both volunteers and city staff. Our community's planning efforts over the past half-dozen years have been very effective to help Menlo Park achieve its best future through smart growth, to keep up with the modern world. In the M2 planning, the balance of residential, non-residential and retail development seems well-done.

<u>A concern</u>: Though the concept of a theoretical level of maximum potential development is a good step, I suggest that a more conservative approach to projected office occupancy is needed. I have heard that the 'maximum potential development' modeling data includes that bio-med commercial buildings are part of the worker loading calculations. Bio-med occupancy is lighter loaded than general office. If bio-med office trends change, and they don't invest as anticipated, the M2 offices may become general offices. Modern general-population workplaces assign employees at a much higher density per square foot than was the norm even five years ago.

The EIR consultants need to use realistic, <u>current</u>, facility-use data. If they do use this more conservative approach, the transportation planning process and resulting mitigations will be better for the city and its residents, regardless of how the area happens to develop over the coming 30 years.

<u>Housing</u>: It is time for the development community to partner with local cities at a much higher level of investment in affordable housing than has been the norm in the past. Land use and planning policy needs to reflect this changing societal need here in the Bay Area and especially on the Peninsula. I hope that the development community is thinking about the future of this housing crisis as seriously as they are about the future of their businesses and their portfolio.

Overall, this M2 General Plan update process has been excellent so far. Thank you to the City's Planning team.

C Molony

Clem Molony
1966 Menalto Ave.
Menlo Park, CA 94025
clemolony@msn.com

SANTA CLARA
Valley Transportation Authority

July 20, 2015

City of Menlo Park
Planning Division
701 Laurel Street
Menlo Park, CA 94025

Attention: Deanna Chow

Subject: Menlo Park General Plan Update

Dear Ms. Chow:

Santa Clara Valley Transportation Authority (VTA) staff have reviewed the NOP for updates to the General Plan Land Use and Circulation Elements and M-2 Area Zoning. We have the following comments.

<u>Transportation Analysis – Relationship to Santa Clara County Congestion Management Program</u>
As the Congestion Management Agency for Santa Clara County, we recommend that the transportation analysis include an analysis of the effects of the General Plan Update on key roadway segments in the Santa Clara County CMP near the San Mateo County border, such as US 101 and I 280.

The General Plan update needs to take into consideration that express lanes are planned to be constructed and implemented in Santa Clara and San Mateo Counties. Express lane projects are included in the RTP (RTPID #240741 and #240742) and the General Plan update should not preclude these projects.

Thank you for the opportunity to review this project. If you have any questions, please call me at (408) 321-5784.

Sincerely,

Roy Molseed

Roy Molseed
Senior Environmental Planner

MP0501

COUNTY OF SAN MATEO
PLANNING AND BUILDING

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455 County Center, 2nd Floor
Redwood City, CA 94063
650-363-4161 T
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July 20, 2015

Deanna Chow, Senior Planner
City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

Dear Ms. Chow:

SUBJECT: Notice of Preparation (NOP) of the Draft Environmental Impact Report (EIR) for the Menlo Park General Plan (Land Use and Circulation Elements) and M-2 Area Zoning Update

The San Mateo County Planning and Building Department has reviewed the NOP for the Menlo Park General Plan and M-2 Area Zoning Update. We would like to encourage that in the EIR, examination of potential impacts on surrounding communities includes an analysis of impacts to the unincorporated North Fair Oaks community, and particularly the potential impacts on automobile, bicycle, and pedestrian traffic and circulation, and the potential impacts on housing affordability.

Sincerely,

William Gibson
Planner, Long Range Planning Division
San Mateo County Planning and Building Department

WS:fc – WSGZ0522_WFN.DOCX

CITIZENS COMMITTEE TO COMPLETE THE REFUGE

453 Tennessee Lane, Palo Alto, CA 94306 650.493.5540 www.cccrrefuge.org cccrrefuge@gmail.com

July 20, 2015 *Via E-mail*

Deanna Chow
Senior Planner
City of Menlo Park
701 Laurel St.
Menlo Park, CA 94025
Submitted via connectmenlo@menlopark.org

RE: NOP of the Draft EIR for the Menlo Park General Plan and M-2 Zoning Update

Dear Ms. Chow:

The Citizens Committee to Complete the Refuge (CCCR) appreciates this opportunity to respond to the Notice of Preparation (NOP) for a Draft Environmental Impact Report (DEIR) for the Menlo Park (City) General Plan (GP) and M-2 Zoning Update.

CCCR has its roots in the citizens who led the campaign that founded the Don Edwards San Francisco Bay National Wildlife Refuge (Refuge) in 1972. For the decades since, we have been active pursuing Refuge expansion and the protection of Refuge habitats, wildlife and lands as well as all threatened and dwindling wetlands of the Bay. We have been a stakeholder of the South Bay Salt Pond Restoration Project since its inception. Our interests have prompted us to comment on multiple projects of the City in the last decade and to work directly with developers such as Dave Bohannon and Facebook.

We understand that the DEIR will update the Land Use and Circulation Elements of the General Plan, applicable for the entire City. It will also address land use zoning changes for planning purposes for the M-2 Area, defined in the NOP on pg. 3 and in Figure 2. The proposed M-2 Area provides for "maximum" development of the area, an outcome of a General Plan Update Advisory Committee and various public outreach actions involving City staff and the consultant, PlaceWorks. In fact, this writer participated in some of that public outreach events.

Piece-mealing?

We also understand that, running in parallel, the City has issued a NOP for a Facebook Expansion Project (FB expansion) on lands within the M-2 Area. In these comments, cross-reference will be made as relevant examples.

The DEIR will need to explain how the FB Expansion CEQA process can run in parallel when its final conclusions are dependent on to-be-determined decisions of the final GP Update and zoning DEIR. With a direct dependency, this DEIR needs to demonstrate that it does not, in fact, violate CEQA Guidelines to consider the whole of the project and illegally piece-meal the projects. It is a concern that backroom decisions between the parallel projects will cross-inform the two projects outside public review and inappropriately influence outcomes of each.

Flood Risk is a Major Concern in the M-2 Area

In the era of sea level rise, any impetus to encourage or approve development on Bay shoreline locations sets the stage for extraordinary costs in emergency services in the not so distant future plus very costly damage and hazards for residents, businesses and area employees. No development in non-shoreline areas of the City carry the same level or variety of types of flood risk.

The broad flood-risk scenarios are evident in State and Bay Conservation and Development Commission data. It is also very informative to visit a website known as "Our Coast, Our Future" (OCOF) provided by a collaborative project of multiple agencies, both government and NGO, investigating local risks. http://data.prbo.org/apps/ocof/ The website has an interactive map which allows the user to simulate multiple scenarios over time and type of inundation – sea level rise, waves, current, storms and king tides. All of those factors are threats the M-2 Area given its location on the shoreline and as the lowest point in stormwater drainage systems in the City. What happens upstream in major storms, will happen in M-2 and sea level rise (SLR) will make it worse.

While using the map, this writer noticed that even when using the minimum change in conditions, the Haven Avenue area always flooded in some way and became a gateway for flooding southerly into areas lining Bayfront Expressway. We are aware that the City is supporting the Safer Project, a planning process that is hoped to someday place a levee bounding the M-2 Area as a protection from SLR in East Palo Alto and Menlo Park. As the OCOF interactive map demonstrates, a levee that stops at the northern Menlo Park border will not protect the Haven area nor prevent Haven Area and Flood Slough from being a flood gateway for much of the rest of the M-2 Area.

We note also that the Safer Project will not protect the M-2 Area from flooding during extreme storm events. As SLR produces higher water tables near the surface, the ground will absorb less and even a moderate storm will produce more localized flooding from runoff alone.

It is crucial that the DEIR, whether or not rezoning is approved, establish a baseline condition across the entire area and require that, in subsequent development proposals, the hydrologic modeling be analyzed against the baseline with a thorough updated analysis of flood risk from all causes.

On the issue of rezoning, we wonder whether it is necessary to rezone across the entire M-2 Area through this CEQA process or to set such rezoning as an option to consider at the time a new development or redevelopment is proposed. Please discuss that issue in the DEIR.

Other Topics

1. Accurately inform agencies, interested parties and the public about the Refuge by location in the regional landscape and as a Stakeholder/landowner. Doing so more fully informs the reader of the impacts of the M-2 Area.

a. Graphic Example: See Figure 1 of the FB Expansion NOP which is a map that clearly identifies the Refuge. Incorporate the designation in the appropriate maps of this DEIR.

b. Accurate and appropriate text: Project location text descriptions used anywhere in the DEIR need to appropriately identify Refuge lands. It is known to us (personal communication, various occasions with Justin Murphy) that the City has accurate information on the boundaries of the Refuge and also that the information is readily available from the Refuge. (Contact Anne Morkill: anne_morkill@fwa.gov)

c. Identify the Refuge as City landowner and institution, not a regulator. Although managed under the parent agency, the U.S. Fish & Wildlife Service (USFWS), the Refuge is not a regulator as is commonly and erroneously assumed. This unfortunately often leads to Lead Agency decisions excluding the Refuge from CEQA analysis.

The National Wildlife Refuge System (NWRS) is a component unit of the USFWS. The NWRS operates under the Federal NWRS Administrative Act of 1966 and as amended to achieve a wildlife-first mission, related conservation actions and provide for compatible public use. It is analogous in federal operations to the National Park Service, the US Forest Service and the Bureau of Land Management, none of them regulators. In preparing this DEIR, the City should include the Refuge as an M-2 Area stakeholder for all notifications and for potential impact evaluation and discussion.

d. Land Use Designation: In Land Use Policy updates, we recommend adding a policy that establishes formal recognition and a relationship with the Refuge. It is a permanent institutional entity of the City. This Refuge happens to be the largest urban Refuge of the NWRS, was the first urban Refuge in the country and was the first to be established by an Act of Congress (by the people). It is host and partner as well to the majority of the South Bay Salt Pond Restoration Project. Menlo Park has a significant, permanent "resident" that is also a major landowner.

e. Jurisdictional Authority: Use of Refuge lands other than permitted public use and as may be needed for nearby construction or study access requires a permit from Refuge management. As needed during DEIR preparation, contact Anne Morkill (anne_morkill@fws.gov) for permits. The Refuge also has Law Enforcement staff focused primarily on enforcement of Federal laws to protect wildlife, habitats and the lands of the Refuge and who work cooperatively with local enforcement.

2. In the M-2 Area, fully specify wetland locations to inform site-specific planning and to avoid unnecessary delays during permitting.

a. Tidal Marsh Recovery Plan (TMRP) must be used as the standard reference for shoreline endangered species analysis. In 2013, the USFWS Endangered Species office published the TMRP, a formal outline of the multi-decade recovery plan for a set of the Bay's endangered species that are dependent on tidal, saline and associated upland habitats. These species include Ridgeway's rail (formerly known as the California clapper rail) and the salt marsh harvest mouse (SMHM), each with known habitat in Menlo Park. The plan provides maps of the Bay's shorelines outlining current and potential habitats for these species. The TMRP Segment N map that includes Menlo Park is attached. The key criterion of this plan *are findings of suitable habitat*, not the finding of the presence of these species. TMRP makes it inadequate to base conclusions of the Biological Resources impacts on database records of where species have previously been found. http://www.fws.gov/sacramento/es/Recovery-Planning/Tidal-Marsh/es_recovery_tidal-marsh-recovery.htm

About biological resources databases: While limiting research to State sources will make Biological Resource studies for Bay shorelines inadequate, the most current data is available through the Refuge. (Contact Supervisory Biologist Joy Albertson. joy_albertson@fws.gov).

b. The Refuge's Acquisition Boundary can be a planning tool. When a Refuge is established, Congress approves a map of lands with habitat suited to the biological mission of the particular Refuge. These boundaries do not confer any rights of ownership but rather authorize the Refuge to act if lands identified within the boundary become available for acquisition. Because this boundary exists, it is a guide to wetland habitat locations. Such lands exist in the M-2 Area and are concurred as marsh habitat in the TMRP. For instance, M-2 includes the SMHM mitigation owned by CalTrans in the triangle between University and Willow along Bayfront Expressway, a site within the Acquisition Boundary. Knowing where these areas are and aren't can help guide M-2 Area planning and help avoid impacts and the need to mitigate. It is known that City has information about the Refuge's Acquisition Boundary (personal communication, Justin Murphy) and that is also available from the Refuge. (Anne Morkill, anne_morkill@fws.gov)

c. Adequate Biological Resource preparation will improve permit time. Locally and unfortunately, the San Francisquito Creek Bay to 101 Flood Project demonstrated a worst case planning scenario. Its

CEQA process provided highly inadequate evaluation of potential impacts on marsh endangered species and habitat. As a result, the project did not meet the finding of the required "Least Environmentally Damaging Practicable Alternative" and enormous time was spent changing the project, thereby vastly extending the project's timeline. The M-2 Area plan should require that Biological Resource analysis is adequate whenever there is any possibility that impacts on TMRP habitats may occur.

3. Hydrology

a. The Safer Project: We feel certain the City will follow CEQA Guidelines but we include here a cautionary comment that reflects experience with another local Lead Agency. In that instance, the basis used for a finding of less than significant impact (multiple impacts) in the DEIR was based on a levee that did not exist albeit was in preliminary planning discussion. Under CEQA it was not permissible to use the levee to come to that finding on hydrological impacts.

14 CCR § 15125 Environmental Setting.

(a) An EIR must include a description of the physical environmental conditions in the vicinity of the project, *as they exist at the time the notice of preparation is published*, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. *This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.* The description of the environmental setting shall be no longer than is necessary to an understanding of the significant effects of the proposed project and its alternatives. (emphasis added)

However tempting, the Safer Project cannot be used to determine if an impact is significant until there is a permitted construction plan for such a levee.

b. Hydrology studies: In 2012, we commented on the first Facebook DEIR and had significant concerns about inadequacies of the hydrological studies. We hope this DEIR will provide for more thorough analysis on issues of concern:

b1. Deferred analysis and risk determination: The GP and Zoning Update discussion of the M-2 Area cannot be specific to details of future projects with the exception of the FB Expansion project. It should set standards for the kind and level of analysis required by City policy. We refer to the 2012 DEIR as an example of our concern. In that document, a mitigation measure (HY_2.1) called for the preparation of supporting data regarding flood risk, including relevant hydraulic and hydrologic analyses. That suggested that proper analysis of flood risk had not been carried out for the DEIR and that mitigation measures would be illegally developed outside the CEQA process. The DEIR for the M-2 Area must ensure that the standard for development will be completion of all needed hydraulic and hydrologic analysis within CEQA such that informed decisions occur. Also it should ensure that the parallel FB Expansion project meets such standards.

b2. Wave run-up and amplification: The following is excerpted from our comments in 2012.

> "It is also evident the West Campus flood analysis provided in the DEIR is based on 100-year base flood elevations, which are maximum *still water elevations* for San Francisco Bay. This fails to fully address the potential for wave run-up and amplification of tidal surges associated with sea level rise. Given the Project's close proximity to the Bay, potential for subsidence and liquefaction in the event of an earthquake, current analysis of the Project is wholly deficient to fully ascertain risk to human life and the surrounding environment."

This DEIR must ensure that fluvial,stormwater and tidal flood analysis on this shoreline includes varying conditions such as presented on the OCOF website.

b3. Stormwater flooding implications of the Facebook East Campus. Here is another excerpt from our 2012 comments.

> "Climate change is producing extreme swings of weather conditions. Perhaps not this year but extraordinary storms with greater water content will occur. When that happens, does the East Campus have capacity to contain storm water without overtopping levees into the Bay or, if storms occur during high tides, to contain some level of inbound overtopping? Will the waters simply pour out along Bayfront Expressway? The DEIR describes the Expressway as 7.5' above FEMA's base flood elevation, a height intended to provide one form of flood barrier for east Menlo Park developed areas. That height is based on a 2007 FEMA standard that has not been revised to more recent BCDC-used projections for SLR. Does that mean that the 7.5' BFE is misleading as to the degree of protection it provides?
>
> Even if the Expressway provides a barrier protecting east Menlo Park, what impact would water draining from a flooded East Campus *through storm drains* have on the drainage system serving the West Campus and upstream neighborhoods? What controls would be in place for flood waters that traveled through the tunnel to the other side of the Expressway?"

The unique, isolated location of the Facebook East campus singles it out for particularly thorough analysis of hydrologic impacts. We hope conclusions of this DEIR establish that as a requirement. Such a requirement should also be applied to Haven Avenue development.

4. <u>Residential development on the Facebook East campus</u>: The maximum development detail of the M-2 Area include potential for 1500 units in new residential buildings on the Facebook East Campus. The DEIR needs to pay particular attention to the following factors to determine if rezoning is allowable.

a. As outlined in the TMRP, this site is surrounded by habitat used and needed by endangered species. Any expanded development will introduce new impacts to the surrounding habitat and undermine the recovery of endangered species. Few options of mitigation are available. A USFWS consultation would be needed.
b. If not for the existing legacy development, this site would be inappropriate for any development due to the combination of natural event threats: seismic, liquefaction, SLR, King Tides and stormwater runoff. As an isolated site, it is less accessible for emergency services such as may be needed during such events. Adding 1500 units for 24/7 presence of occupants on-site puts those individuals at a significantly high level risk of natural event hazards.

5. <u>Pedestrian/Bike Bridge at Chilcot</u>: The M-2 Area Plan includes the proposal of a bridge over Bayfront Expressway at Chilcot to serve pedestrians and bicyclists and connecting to the Bay Trail. That bridge appears to be a component of the FB Expansion Project. Certain comments seem pertinent here as they relate to Circulation planning, another element of the GP Update. We raise the following questions, asking that they be considered in the DEIR.

a. The Refuge boundary lies just beyond the Bay Trail at the Chilcot intersection. Can the bridge be built such that the eastern landfall will not intrude into the Refuge?
b. Any structure of height near the Refuge is a likely perch for avian predators. Can the bridge be built in a way to make it unacceptable to avian predators?
c. The bridge will add a second, protected Bayfront Expressway crossing for mammalian predators (in addition to the tunnel at Willow), allowing raccoons, skunks, opossums, rats and feral cats easy

access to the ground-dwelling species, including threatened snowy plovers, for which the Refuge is habitat. How can the cumulative impact of two access points for these predators be mitigated to less than significant?
d. What is the expected lifetime of this bridge? The preliminary plans for the Safer Project put the Bay Trail on top of a significantly higher levee at this location. Is Facebook willing to commit to rebuilding it then or is it expected that the Safer Project will do so out of taxpayer dollars?

5. Bird Safe Design: The entire M-2 Area lies within the Pacific Migration flyway, where many thousands of birds stop along this shoreline to rest and forage until departing again on long journeys. These flocks are evident in Bedwell Bayfront Park and on the Refuge. Facebook's new park-like roof may become another attractive site during migration.

All future development in the M-2 Area should be built to meet standards of bird-safe design inclusive of windows, structural features and lighting. In addition to migration, any development near open space will reduce impacts on locally-resident or nesting species by meeting such guidelines.

We note that a recently published (General Plan Update Advisory Committee) draft Land Use Policy and Programs includes LU5.F which suggests "explore" birdsafe design. We encourage findings of this DEIR be definitive to support an "implement" birdsafe design in development planning. Design guidelines can specify site-specific triggers for various actions or no action. The DEIR can consult guidelines adopted in San Francisco, Sunnyvale and San Jose.

6. Water: As drought is a reality, the DEIR should set standards for the M-2 Area that require all developers secure sources of water for consumption in proposed development and do so in a way that does not impact the existing water supply. Additionally it should require developers to incorporate the best level of water conservation throughout each project.

7. Additional Applicable Plans: In addition to the TMRP, discussed above, the DEIR must consider the following approved plans:

> South Bay Salt Pond Restoration Project: http://www.southbayrestoration.org/documents/ or contact Executive Manager John Bourgeois, John.Bourgeois@scc.ca.gov
>
> Don Edwards San Francisco Bay National Wildlife Refuge Comprehensive Conservation Plan of 2012 http://www.fws.gov/refuge/Don_Edwards_San_Francisco_Bay/planning.html or contact Anne Morkill, anne_morkill@fws.gov.

Alternatives

It is our hope that the DEIR provides a suitable set of alternatives to provide adequate comparisons among actions available to the City such as:

1. A "moderate" development plan for the M-2 Area, reducing the amount of development to achieve benefits that reduce impacts that "maximum" development would produce.

2. A climate-conscious development that implements guidelines that are adaptable with changing conditions as climate change proceeds, actions to minimize impacts and continuously adapt for SLR, extreme storms and weather fluctuations.

Concluding these comments we ask that we be directly noticed on all subsequent communications regarding the GP and Zoning Update. Please send to wildlifestards@aol.com.

CCCR is a 501(c)(3) nonprofit corporation that is fully volunteer-run, acts to ensure that the Refuge fulfills its Congressional acquisition authority to expand its land holdings and to protect special and sensitive habitats and wildlife along the South Bay's shores. Very similarly, it acts on behalf of the continuous protection of the wildlife and habitats the Refuge must provide.

Truly yours,

Eileen McLaughlin
Board Member, CCCR

CC: Florence LaRiviere, Chair, CCCR
Carin High, Vice-Chair, CCCR
Anne Morkill, San Francisco Bay NWR Complex
Joy Albertson, San Francisco Bay NWR Complex
John Bourgeois, California Coastal Conservancy
Justin Murphy, City of Menlo Park

Attach: Map, Segment N of the Tidal Marsh Recovery Plan

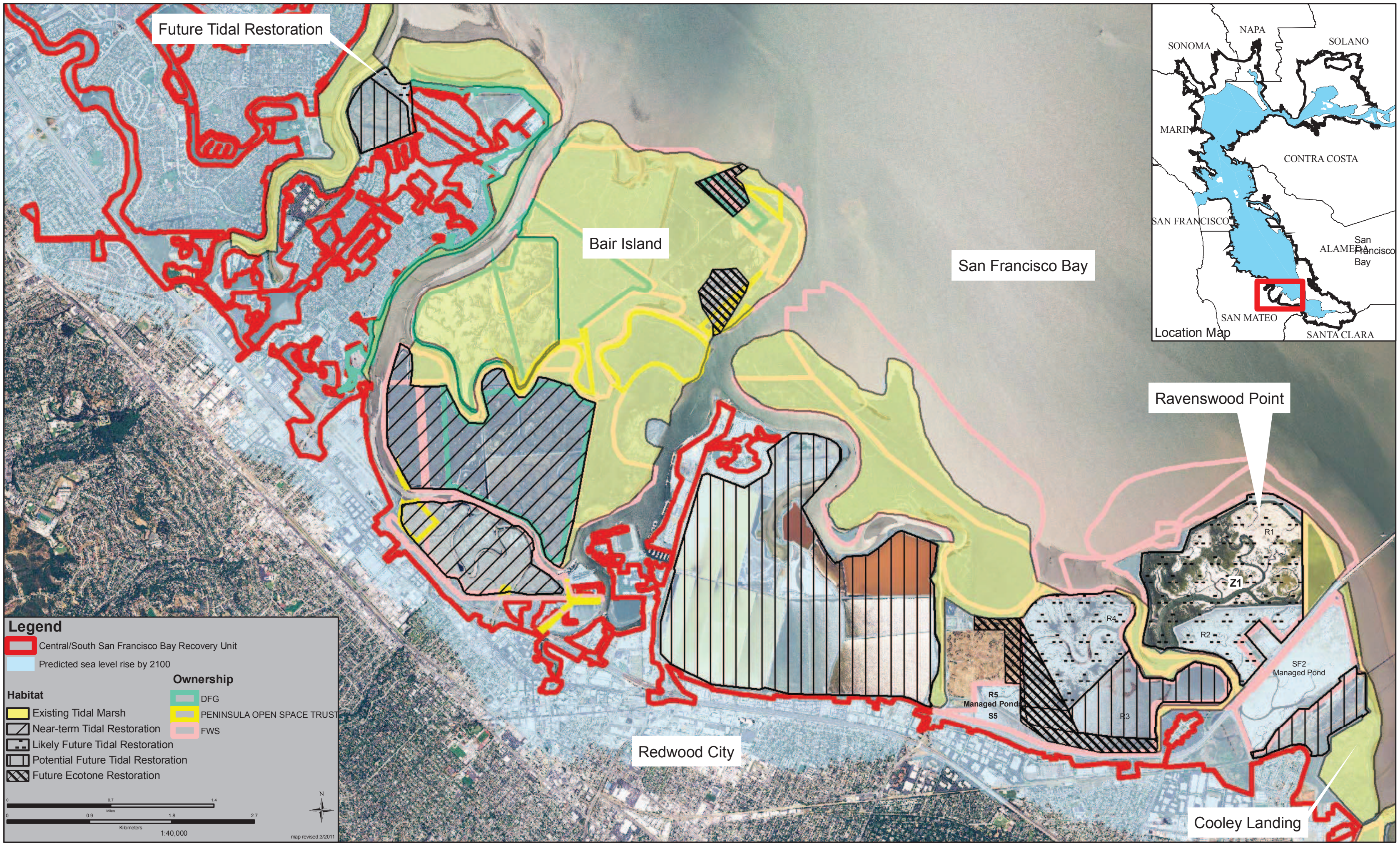

Figure III-20. Segment N

COMMUNITY
LEGAL SERVICES IN
EAST PALO ALTO

July 20, 2015

Deanna Chow
Senior Planner
City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

Via email to connectmenlo@menlopark.org

Re: Comments to the NOP of the Draft Environmental Impact Report for the Menlo Park General Plan and M-2 Area Zoning Update

Dear Ms. Chow:

Per Menlo Park's Notice of Preparation (NOP), we are submitting comments on the scope and content of the Draft Environmental Impact Report (DEIR) for the Menlo Park General Plan and M-2 Area Zoning Ordinance Update (Project). We urge the City to take this opportunity to plan to meet the local and regional affordable housing needs related to this Project proposal and the influx of new jobs to Menlo Park that will result.

Community Legal Services in East Palo Alto's (CLSEPA) interest in the proposed Project stems from both our mission and one of our core program areas - housing. CLSEPA's mission is to provide transformative legal services that enable diverse communities in East Palo Alto and neighboring communities such as Belle Haven to achieve a secure and thriving future. CLSEPA strives to safeguard decent and affordable housing for low- and moderate-income residents. We note that the Project will address, among other things, "potential affordable housing requirements, housing density bonuses, and related incentives, consistent with the City's Municipal Code and State law." *NOP, page 8.* As a local agency with a significant focus on housing related issues and a significant client population living around the M-2 area, we center our comments on elements of the NOP concerning housing and displacement.

1. We request sufficient data collection and study of the proposed Project's impact on housing access and displacement for all sectors of the economy, especially low- and moderate-wage workers.
2. We request sufficient data collection and study on current and projected citywide and regional housing pressures related to affordability, especially for the lower-income workforce. The DEIR should ensure that all residents and contributors to the local economy can access housing opportunities in Menlo Park and that the Project does not exacerbate, but rather ameliorates, current significant local and regional housing inequities.
3. We request that the analysis focus on the impacts of any proposed M-2 development on current and future affordable housing stock. The "affordable housing stock" should be understood broadly to include deed-restricted affordable housing as well as

naturally affordable housing (i.e., second units) and housing in the private market currently occupied by lower and moderate income families.

4. The DEIR should study and analyze the possibility of direct displacement of residents that would occur as a result of the proposed Project. Direct displacement should be construed to include potential eviction of renters near the M-2 area if landowners seek to redevelop or reposition their properties to capitalize on actual or potential changes in the M-2 area.
5. The DEIR should study and analyze the possibility of indirect displacement of residents that would occur as a result of the proposed Project, as follows:
   a. The DEIR should analyze and discuss the impacts of development of new market-rate housing on housing costs and upward rent pressures that, in the absence of rent stabilization and just cause for eviction laws, could lead to displacement of existing residents, especially renters in the Belle Haven neighborhood; and
   b. The DEIR should analyze and discuss the impacts of development of new office space and tech campuses on housing costs and upward rent pressures that, in the absence of rent stabilization and just cause for eviction laws, could lead to displacement of existing residents, especially renters in the Belle Haven neighborhood.
6. Potential commercial and business uses should be analyzed for their impact on the City's jobs-housing "balance" (jobs-housing <u>balance</u> relates to relative distribution of employment opportunities and workforce population across a geographic area):
   a. The DEIR should discuss the balance of new jobs to new housing in the proposed Project, in addition to the way that the proposed Project would affect the citywide jobs-housing balance.
7. The DEIR should analyze the proposed Project for jobs-housing "fit", particularly with respect to housing of lower-income workers (jobs housing <u>fit</u> relates to the ratio of available housing that is affordable to families at specific income levels and the number of jobs that pay wages corresponding to those same income levels):
   a. The DEIR should analyze and calculate the number of lower-wage and service sector jobs, including jobs on tech campuses, projected to result from the proposed Project.
   b. The DEIR should analyze and calculate the number of affordable housing units needed to house lower-wage and service sector workers whose jobs are created by the proposed Project.
   c. The DEIR should compare the number of housing units needed at various affordability levels to the actual and projected number of available housing units within the Belle Haven neighborhood and the City.
8. The DEIR should study and analyze how a jobs-housing imbalance could increase:
   a. Commute times;
   b. Number of cars on the road and total vehicle miles traveled;
   c. Traffic and congestion;
   d. Resulting greenhouse gas emissions;
   e. Air quality; and
   f. Noise.

9. The DEIR should study and analyze how if the jobs-housing fit is off, the following negative environmental effects associated with a jobs-housing imbalance will likely be exacerbated:
    a. Commute times
    b. Number of cars on the road and total vehicle miles traveled;
    c. Traffic and congestion;
    d. Resulting greenhouse gas emissions;
    e. Air quality; and
    f. Noise.
10. Given that community health is emphasized in the Project, we request study of the health impacts of the Project. In particular, we request study of (1) the health benefits that may result from the proximity of housing to jobs as a result of the Project, (2) the health consequences of increased rent burdens on families in Belle Haven due to increased land values created by the Project, and (3) the health consequences of displacement (direct and indirect) that could be fueled by the Project.

We believe that the full scope and impacts of the Project may not be known at this time. We will comment on the draft EIR when released and we will insist that unforeseen impacts be studied.

We look forward to working collaboratively with the City and other stakeholders to ensure that the General Plan and M-2 Area update leads to equitable development. Please do not hesitate to contact our office with any questions or follow up.

Sincerely,

Jason Tarricone TH

Jason Tarricone
Directing Attorney, Housing and Economic Advancement

Daniel Saver,
Attorney, Housing

Keith Ogden TH

Keith Ogden
Attorney, Housing and Economic Advancement

Charlie Knox

To: Murphy, Justin I C; Terri McCracken
Cc: Chow, Deanna M
Subject: RE: Menlo Park General Plan Update EIR

From: George Fisher [mailto:georgecfisher@gmail.com]
Sent: Monday, July 20, 2015 3:13 PM
To: _connectmenlo; Chow, Deanna M; Murphy, Justin I C; Nagaya, Nicole H
Subject: Menlo Park General Plan Update EIR

Please consider the following comments and guidance on the scope and content of the General Plan Update EIR.

1. The EIR is premature until the General Update is more specifically finalized and reported. Until that time No adequate comparison of various alternative revisions may be made with the general plan 1994 provisions and requirements to adequately minizmize impacts and maximize benefits to the city and its residents, as more specifically described below.

2. The NOP claims the maximum potential development under the general plan update would consist of 2.1 million additional square feet of non residential building space and 4500 additional multifamily dwelling units beyond what is realistically achievable under the current Menlo Park General Land Use element. It also states approximately 5,500 new jobs would result from what ins reasonably achievable under the current General Plan. However the amounst realistically achievable under the current land use element is not specified or described, not is the specific quantity of approved or built development specified. These numbers are essential to further analyze whether they should be, or might be, included in the general plan update, and more importantly to consider both a current baseline of existing conditions against which to compare new development in the EIR, or to set up alternative proposals to consider impacts and benefits. The December 2014 existing conditions for example specified 1,347 housing units, and 1.866,569 square feet of new office space planned and proposed, and only 112,693 new retail. I am not sure about new jobs.

    a. Accurate numbers of non residential development, whether office space or retail, residential units and jobs for current, proposed, revised general plan, or maximum are essential to evaluate the relationship between non residential development additional footage, generating how many new jobs, generating how much needed housing, and what the affect of needed new housing and jobs on schools, city finances, current residential neighborhoods and minimizing impacts and maximizing benefits.

b. These numbers are needed to decide what should be included as maximum under revised plan, and as alternatives to the maximum number to be analyzed in the EIR.

c. It seems to be a base line of what currently exists against the maximum to be developed should be one alternative.

d. The NOP states the its proposed no project alternative would include development potential in the rest of Menlo park that also currently exists under the general plan and zoning in place, which amount is not proposed to change under the plan. However that amount must be disclosed both for baseline comparisons and to be included in maximum development under the revised general plan, because it will be included in any revised land use or circulation revised general plan changes, and impacts must be analyzed.

e. Accurate numbers on existing, approved, and proposed under the downtown el Camino Real specific plan need to be included for complete comprehension of development.

3. More specificity is needed regarding proposed amendments to the Transportation Impact Guidelines, the Circulation System Assessment program (CSA) the current Roadway classification system prescribed in the 1994 general plan, average speeds, current cut through traffic, current traffic volumes, and current residential neighborhood quality of life, and all metrics used to protect the neighborhoods and quality of life. Although the Circulation element reviews Goal IIA of the current general plan and how it maintains traffic, pedestrian and quality of life in the neighborhoods, the only proposed changes or program are limited to measurements of safety (e.g. collision, and efficiency (eg, vehicle miles traveled (VMT). This is insufficient to minimize impacts or maximize benefits.

a. VMT is only a comparative number to be used on a per capita basis to compare against other per capita numbers, such as region, Transportation Analysis Zone (TAZ) or other and if the per capita measure favorably may be sufficient for CEQA analysis. However no measurement is made of the quantity of vehicle miles added to a particular roadway system and want impacts to existing traffic, pedestrians, etc, quality of life, cut through traffic or other impacts all relevant in an EIR. If there is an efficiency standard for VMT, that standard should be stated, and an explanation, it that standard affects quality of life or cut through traffic or residential character of our neighborhoods.

b. Even if the state prescribes that traffic delay or los is no longer an CEQA transportation issue, the affects of additional traffic to quality of life, pedestrians or maintaining the character of residential life, a specific goal and guideline of the revised general plan are relevant and need to be compared with and without proposed changes to the system.

c. Any proposed Traffic Demand Management criteria to lower the analysis of Average daily vehicle trips cut through or otherwise through our residential neighborhoods needs to be stated and examined for impacts. Additional proposals to increase FAR or height of buildings near transit must be stated and analyzed.

d. If any proposed TDM criteria are to be used to offset actual ADT either existing or projected, what monitoring and enforcement mechanisms will be used to protect Neighborhoods and quality of life.

4. Reasonable alternatives must be studied to the proposed full build out under the revised general plan and current general plan, with respect to needed housing availability, below market housing necessities, job creation, and the affect on Menlo park schools, including increased student body of 5,000 new jobs and 5,000 new multifamily housing units.

a. The current baseline of approved and existing development, housing, jobs and schools is one reasonable alternative.

b. Increasing the current base line by a factor such as 2x or 3x per single category and not others would be a reasonable alternative to measure impacts.

c. Residents need to understand what are alternatives to protect their residential neighborhoods, and quality of life, and reasonable development.

5. What provisions will be analyzed re preventing cut through traffic through our neighborhoods, including measurement, preclusion, enforcement, and definition of cut through traffic.

Respectfully submitted,

George C. Fisher

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George C. Fisher
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Menlo Park, ca

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Menlo Park Fire Protection District

170 Middlefield Road · Menlo Park, CA 94025 · Tel: 650.688.8400 · Fax: 650.323.9129
Website: www.menlofire.org · Email: mpfd@menlofire.org

July 20, 2015

Deanna Chow
City of Menlo Park
Community Development Department, Planning Division
701 Laurel Street
Menlo Park, CA 94025
e-mail - connectmenlo@menlopark.org

Re: Comments on Notice of Preparation for General Plan Update EIR (ConnectMenlo)

We appreciate the opportunity to provide comments on the Notice of Preparation (NOP) for the Environmental Impact Report (EIR) for the Menlo Park General Plan (Land Use & Circulation Elements) and M-2 Area Zoning Update (ConnectMenlo Plan). As the fire and emergency services provider in the City, we ask that the City consult and cooperate with the Fire District on the analysis of impacts and the development of mitigations for any significant impacts of the ConnectMenlo Plan on both a project and cumulative level. In general terms, the environmental issues relating to the Fire District include fire and emergency services, traffic, circulation, emergency access, water and hazardous materials. The proposed changes to the Land Use and Circulation Elements and M-2 Zoning will impact fire and emergency services. The Fire District is currently working with the City on developing goals, policies and programs in the Land Use and Circulation Elements to ensure the continued provision of a high level of fire and emergency services and address the impacts of new development and circulation changes on the Fire District. The Fire District looks forward to continuing to work closely with the City on the development of these important goals, policies and programs to be included in the Land Use and Circulation Element in furtherance of the Plan's "self-mitigating" goal.

Below are the Fire District's initial specific comments on issues to be analyzed in the ConnectMenlo EIR. The Fire District requests that the City consult and cooperate with the Fire District in the development of the portions of the EIR that address these issues.

- The description of the Fire District and existing fire and emergency services as part of the Environmental Setting in the EIR. This information includes, but is not limited to, types of services provided, staffing levels, equipment, stations, call volumes, number and types of incidents, and response times.

- The standard of significance for determining impacts on fire and emergency services and emergency access, such as performance standards.

- Impacts on Fire Stations, including staffing, equipment, truck, engine and building facilities to serve the new increased development being proposed in the ConnectMenlo Plan, especially in the M-2 area, and cumulative development within the Fire District's jurisdiction.

- Impacts due to the increase in demand for fire and emergency services from new employees and residents resulting from the ConnectMenlo Plan and cumulative development within the Fire District's jurisdiction.

- Impacts due to increased building height, increased density, change in uses (especially new residential uses), design changes, and other changes in development standards under the ConnectMenlo Plan.

- Impacts on traffic and circulation in the City and surrounding area due to the ConnectMenlo Plan and cumulative development. As the City is aware, there are significant traffic and circulation issues in the City and surrounding area that adversely affect fire and emergency vehicle access and response times. Additional deterioration of traffic conditions need to be analyzed and mitigated. The joint traffic report being prepared for the ConnectMenlo Plan and the Facebook Campus Expansion Project should carefully analyze these impacts. The Fire District requests that the impacts on emergency access routes be discussed as part of the analysis of Fire District impacts. Changes in street design and potential new alternative emergency response routes also should be addressed in the analysis.

- Analysis of cumulative impacts from development within the Fire District's jurisdiction and the ConnectMenlo Plan. As the City is aware, there is new increased development planned and proposed within the Fire District's jurisdictional boundaries. In particular, the planned and proposed new development in East Palo Alto, San Mateo County's North Fair Oaks area, and the City's Downtown Specific Plan area should be included in the cumulative impacts analysis.

- For any significant project or cumulative impacts, the Fire District requests that the City consult with the Fire District to develop appropriate mitigation to reduce the impacts to less than significant.

- Additional background information is available on the Districts web-site at www.menlofire.org related to the recently completed Standards of Cover Assessment and Draft Nexus Impact Fee Report.

The Fire District appreciates the City's consideration of these NOP comments on this important project. The Fire District, as a fellow public agency and a responsible agency under CEQA, looks forward to working with the City on the analysis of impacts on the Fire District as part of the EIR. The main contacts at the Fire District for the ConnectMenlo Plan are Fire Chief Schapelhouman and Fire Marshal Johnston.

Sincerely,

Harold Schapelhouman, Fire Chief
Menlo Park Fire Protection District

City of East Palo Alto
Office of the City Manager

July 20, 2015

Deanna Chow, Senior Planner
City of Menlo Park
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RE: Notice of Preparation of the Environmental Impact Report for the (1) Facebook Campus Expansion Project, and (2) Menlo Park General Plan and M-2 Area Zoning Update

Dear Mr. Perata and Ms. Chow:

Thank you for the opportunity to review and comment on the NOP for the Facebook Campus Expansion Project and the Menlo Park General Plan and M-2 Area Zoning Update ("General Plan Update"). The City of East Palo Alto appreciates its working relationship with the City of Menlo Park regarding this and other projects that impact both cities.

The City of East Palo Alto has reviewed the Notice of Preparation for the Facebook Campus Expansion Project and the General Plan update. The City has combined its responses because they both focus on the same area, and the impacts are related.

Comments for Both the General Plan Update and the Facebook Campus Expansion Project

Traffic

First, East Palo Alto is a city that is severely impacted by regional cut through traffic. The Ravenswood/4 Corners TOD Specific Plan Alternatives Analysis Memo identified 84% of the traffic on University Avenue as "cut through traffic" that neither originates nor ends in East Palo Alto. The type and intensity of development envisioned in both the Facebook Expansion Project and the General Plan Update (collectively, the "Projects") is likely to attract employees from both the East Bay and cities along the U.S. Highway 101 corridor. To adequately analyze the potential impact of the Facebook Campus Expansion Project and the development envisioned in the General Plan Update, please add the following intersections to the Transportation Impact Analysis (TIA):

1. University Avenue and State Highway 84/Bayfront Expressway
2. University Avenue and Adams Drive
3. University Avenue and O'Brien Drive
4. University Avenue and Kavanaugh Drive
5. University Avenue and Purdue Avenue
6. University Avenue and Bay Road
7. Newbridge Street and Willow Road
8. University Avenue and Runnymede Street
9. University Avenue and Bell Street
10. East Bayshore Road and Holland Street
11. Saratoga Avenue and Newbridge Street
12. University Avenue and Donohoe Street
13. University Avenue/Hwy 101 NB on-off ramp.
14. University Avenue/Hwy 101 SB on-off ramp.
15. University Avenue and Woodland Avenue.

Additionally, the original Facebook Campus Project in 2011 relied on an innovative Transportation Demand Management (TDM) policy to manage trips. Both the Project and the General Plan Update should include a detailed summary on the efficacy of the TDMs used for the 2011 Facebook Campus Project.

Office Space Density (Square Foot Per Employee)

Second, social media companies typically have office space densities twice those of standard office uses. Such companies are often extremely efficient in their use of office space, having office space densities of approximately 150 square feet of office space for each employee, whereas normal office activities assume twice as much density (300 square feet per employee). Given the prominence of Facebook and Facebook's purchase of the ProLogis, Inc.'s 21-building Menlo Science & Technology Park, adding to its 200-acre Bay Area portfolio, traffic studies should reflect the higher densities of 150 square feet per employee associated with social media firms.

Housing Affordability and Availability

Third, the City of East Palo Alto has significant concerns about the "growth-inducing impacts"[1] of the Projects, and in particular, how development under both projects will impact housing affordability and availability in East Palo Alto. Notably, this is a concern that Menlo Park shares for its own residents. *See* NOP for General Plan, dated June 18, 2015 ("housing that complements local job opportunities with affordability that limits displacement of current residents").

Menlo Park has an exceptionally high jobs-housing ratio and exceptionally high housing prices. Menlo Park's jobs/housing ratio is 1.96, Palo Alto's is 3.13, and the City of East Palo Alto is 0.38. See Table 1 below. This jobs-housing imbalance, which would be exacerbated by development levels proposed under both Projects, could mean (1) a significant increase in

[1] CEQA Guidelines § 15126(d) (EIR must analyze growth-inducing impacts).

housing demand (indirect impact), and (2) an accompanying increase in new housing construction (direct physical impact) to accommodate that new demand caused by an increase in the number of new employees arising from the greater density proposed under both Projects. The City of East Palo Alto is deeply concerned about these spillover impacts and how they could affect its residents given the City's proximity to the Projects' area.

Table 1: Jobs Housing Ratio

	Jobs to Housing Ratio
Menlo Park	1.96
East Palo Alto	0.38
Palo Alto	3.13

Source: Lauren Hepler, Silicon Valley Business Journal, February 28, 2014; March 3, 2014.

The high jobs-housing ratio indicates that the City of Menlo Park needs to build a substantial amount of new housing units already to provide sufficient housing for employees who work in Menlo Park. The Facebook Campus Expansion Project and the General Plan Update will further and severely exacerbate the existing housing crisis, which is caused by cities not developing sufficient housing concomitant with the approval of development projects that increase the demand for such housing.

The City of East Palo Alto provides a significant amount of the housing stock in Silicon Valley. East Palo Alto has more housing units than jobs, the lowest market rate prices in the region, and approximately 30% (or 2,405 of 7,759 units) of the total housing units are currently non-exempt-registered in the Rent Stabilization Program. East Palo Alto is an island of affordable housing surrounded by several of the most expensive housing markets in the nation. The City is concerned that the new development proposed under both Projects might exacerbate the existing housing crisis in East Palo Alto by displacing current residents and/or causing the City to have to provide additional units without sufficient resources to adequately address the need.

Please provide an analysis of how both the Facebook Campus Expansion Project and the General Plan Update will impact the jobs-housing ratio in Menlo Park, and analyze or provide information on the impact on housing prices and the potential displacement of East Palo Alto residents. The following information should be provided and analyzed.

- The net number of new market rate and affordable units permitted and constructed in the last 10 years in Menlo Park, and since the original Facebook Campus received its Certificate of Occupancy.
- The current jobs-housing ratio and the projected future jobs-housing ratio for both the Facebook Campus Expansion Project and for the General Plan Update.
- An analysis of the impact the Facebook Campus Expansion Project and the General Plan Update will have on housing prices and potentially displacement of the City of East Palo Alto residents.
- An analysis of where it is anticipated that the new employees will live, based on ZIP code level data from the existing Facebook campus.

Other

Fourth, clarify the relationship between the Facebook Campus Expansion Project and the General Plan Update. Is the proposed hotel being analyzed in both? Are the net trips from the Facebook Campus Expansion Project included in the traffic model for the General Plan Update?

Finally, please include the following individuals in all notices related to this project and the General Plan Update:

1. Sean Charpentier, Assistant City Manager, City of East Palo Alto, 1960 Tate Street, East Palo Alto, CA 94303; scharpentier@cityofepa.org.

2. Brent Butler, Planning Manager, East Palo Alto Planning Division, 1960 Tate Street, East Palo Alto, CA 94303; bbutler@cityofepa.org.

Comments Specific to the Facebook Expansion Project EIR

First, the impact analysis should analyze the significant increase of employees on the site. The project description identifies the two new buildings totaling 967,000 square feet for a net increase of approximately 127,000 square feet. There are 1,690 existing parking spaces and the project will add 3,800 parking spaces, which would be a net increase of 2,110 parking spaces.

As noted above, the new uses have a much higher employee density, and the traffic impact analysis should reflect the higher intensity of use. These traffic numbers should also be included in the General Plan Program EIR analysis to get a complete understanding of the traffic numbers.

The impacts should be analyzed on the net impact of replacing what are largely low density industrial buildings with buildings with social media employees at 150 square feet per employee.

Second, the Facebook Expansion Project will bring a substantial number of new employees and visitors, including the 200 room hotel, to an area prone to flooding; thus, substantially increasing the demand for life safety services. Please explain how Facebook is planning to improve existing levees and flood protection systems to mitigate the potential threat of flooding due to tidal flooding, including the effects of Sea Level Rise.

Comments Specific to the General Plan Update

First, based on the Draft M-2 Area Maximum Potential Development map, it appears that the proposal is to maintain the lower density industrial uses on the south side of O'Brien Drive. There is a single family residential neighborhood along Kavanaugh Drive. The City supports maintaining the existing lower density uses along the southern side of O'Brien Drive so as to provide a transition from the higher density uses to the lower density neighborhoods.

Second, the City supports the strong emphasis on separated bike paths and trails. Please explore options to connect the terminus of Ralmar Avenue to the proposed bike path along O'Brien Avenue. This would provide a trail/bike connection between Cesar Chavez Academy and Costaño School on the east side of University Avenue. With a trail connection between Ralmar

Avenue and O'Brien Drive, and the build out of the trails envisioned in the RBD/4 Corners TOD Specific Plan, students from Cesar Chavez Academy would be able to access Cooley Landing entirely via path and trail.

Third, the General Plan Update shows a series of potential transit stops. The General Plan Update EIR should analyze the option of having a multimodal rail/bus rapid transit station/center at University Avenue.

Thank you for the opportunity to comment on the Notice of Preparations for the Facebook Campus Expansion and the Menlo Park General Plan and M-2 Area Zoning Update. The City of East Palo Alto looks forward to continuing our collaborative relationship with the City of Menlo Park.

For more information or questions regarding this letter, please contact Sean Charpentier, Assistant City Manager, at (650) 853-3150.

Sincerely,

7/20/15

Carlos Martinez
City Manager

ENVISION
TRANSFORM
BUILD
EPA

HOMEGROWN DESIGN FOR COMMUNITY
SELF-DETERMINATION

ETB.EPA@GMAIL.COM

July 20, 2015

Deanna Chow, Senior Planner
City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

RE: NOP for DEIR for Menlo Park General Plan and M-2 Area Zoning Update Project

Dear Ms. Chow,

On behalf of Envision, Transform, Build – East Palo Alto (ETB-EPA) Coalition, we would like to submit comments regarding the NOP of the Draft Environmental Impact Report for the Menlo Park General Plan and M-2 Area Zoning Update. We feel strongly that information and analysis we request below is essential in order to understand the full impact of the Project on your neighboring community of East Palo Alto and, in particular, low-income residents residing therein.

ETB-EPA is a coalition of nonprofit, community and faith-based organizations, residents, architects, planners and youth, who have been working on land use, planning, and development issues in southern San Mateo County for over nine years. We were active in the development of East Palo Alto's Ravenswood/4 Corners Transit Oriented Specific Plan, as well as, an active participant and respondent in the Facebook East and West Campus EIR process in 2011-12. Presently we are engaged in leading a participatory community process to help develop East Palo Alto's update to its General Plan.

ETB-EPA has held community workshops and focus groups, conducted surveys, and educated residents about land use economics, housing policies, and displacement issues to develop a vision for the west side of EPA. In part, we have focused on this area because of the explosive growth of Facebook and other tech companies that have impacted and will continue to impact the lives of low-income residents residing in East Palo Alto and Belle Haven.

Within this body of work, affordable housing and displacement issues have been the dominant themes. We have reviewed and fully endorse the comment letter submitted by Community Legal Services in East Palo Alto (CLSEPA), which identifies numerous housing related concerns for the M-2 Area Zoning Update. We share the same concerns expressed by CLSEPA and hereby incorporate their comments into this letter. ETB-EPA will continue to work in coalition with CLSEPA to address the potential housing and displacement impacts of the proposed Project.

COORDINATING MEMBERS

Youth United for Community Action

Peninsula Interfaith Action

El Comite de Vecinos

Community Legal Services of East Palo Alto

Urban Habitat

ADVISORY MEMBERS

Community of East Palo Alto

LEAD CONTACTS

Tameeka Bennett, E.D.
Dr. Jennifer Martinez, E.D

ENVISION
TRANSFORM
BUILD
EPA

HOMEGROWN DESIGN FOR COMMUNITY
SELF-DETERMINATION

ETB.EPA@GMAIL.COM

It is undeniable that a majority of the land use and zoning changes as well as future development projects noted in the NOP will occur immediately adjacent to East Palo Alto lands. For this reason we are extremely concerned that Menlo Pak adequately study within the EIR the issues listed below. A failure to do so would leave East Palo Alto with numerous unintended consequences and with the possibility of bearing burdens caused by the benefits Menlo Park hopes to reap from this program EIR. Moreover, the very nature of a program EIR, with its adoption of up-front mitigation implementation provisions, requires a much higher level of scrutiny because challenges to future development projects in the study area will be limited by the approval and adoption of these implementation provisions. If we do not fully understand all of the environmental ramifications of the Project, East Palo Alto may find itself negatively affected in the future by the projected growth. In addition to the housing and displacement concerns expressed in CLSEPA's letter, we would like to identify the following issues of concern:

1) The EIR must not overlook the cumulative impact of the Belle Haven development projects already approved and those currently in the process of approval. A comprehensive and clear presentation of all such projects must be provided. This analysis should also look at the East Palo Alto's Ravenswood/4 Corners Transit Oriented Specific Plan when determining cumulative impacts.

2) The EIR should account for the nexus between higher-income technology jobs and the subsequent multiplier effect those jobs have on lower-income service sector job generation. This multiplier effect will add many new jobs paying less than a sufficient wage to house such lower-income workers locally.

3) The EIR analysis must also provide an accurate estimate of the number of future employees and residents that will be in the Project area if full build-out is reached.

4) Traffic concerns and congestion management should be analyzed, particularly for those intersections in East Palo Alto that may experience an increase in cut-through traffic from new commuters and future residents. Streets and intersections of particular concern are University Avenue, East Bayshore Road, Bay Road, Donohoe St, Pulgas Ave., Woodland Ave., Kavanaugh Dr. and Newbridge Ave. Traffic counts and an analysis of the diminution of service levels that may occur along these roadways are vital.

5) Since Willow Road and University Ave are the primary boundaries for a majority of the future development envisioned by the Project, these two state routes must be given a higher level of traffic and congestion scrutiny. They serve as EPA's principal entryways and could be severely impacted by growth anticipated in the Project.

6) The GHG analysis should also address consistency with the Governor's recent Executive Order B-30-15 (Apr. 29, 2015), which established "[a] new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030." In order to achieve that target, he ordered State agencies to "take climate change into account in their planning and investment decisions" (§ 6), while requiring those planning and investment actions to "protect the state's most vulnerable populations." (§ 7.) In addition to analyzing consistency with the new Executive Order, the EIR should analyze an alternative that would significantly reduce GHG emissions due to vehicle travel.

7) We are interested in learning what CO_2 emissions and traffic congestion mitigations could be implemented to lessen and improve not only traffic along the corridors, but also air quality. East Palo Alto, like many other low-income communities, has a higher prevalence of respiratory ailments than its more affluent neighbors.

8) The EIR should look at robust bus rapid transit alternatives in addition to the much more expensive fixed rail options that have been mentioned. Transbay bus service already exists and the EIR should study how it can be improved in order to reduce congestion.

9) Public transit bus service options and improvements must be considered and studied. The proliferation of private bus services by companies such as Facebook and Google do not and will not serve the needs of low-income workers who will work at these tech sites and office complexes since they are not allowed to ride these private shuttles. Public transportation is a critical piece of daily living for many of our low to medium income families alike. It is essential to the economic and social quality of life for our families.

10) To the extent that the draft EIR contemplates activation of the Dumbarton rail corridor to Menlo Park as a transportation mitigation measure, we urge that it must take into account EPA's connectivity to the potential rail station(s).

11) Sea Level Rise considerations and mitigations must be analyzed. East Palo Alto, in collaboration with the San Francisquito Creek Joint Powers Authority, is studying mitigation and adaptation approaches to this issue. Any new developments in the Project area should contribute substantially to the mitigation costs associated with addressing sea level rise.

12) The potential for contamination from toxic, biological, and biochemical materials stemming from bio-science uses adjacent to EPA should be addressed in the EIR.

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13) The EIR should study pedestrian access to jobs by local residents and interconnectivity between Menlo Park and EPA, especially the area located between Willow and University. Connecting streets between these two communities could assist in allowing all to partake in the potential benefits of this new neighborhood.

14) A comprehensive Transportation Demand Management plan and ordinance should be analyzed as a way to reduce the impact of traffic on the adjoining neighborhoods. Piecemeal approaches to manage congestion often fall short, as evidenced by the worsening traffic problems in Menlo Park and EPA despite the existence of project-specific Transportation Demand Management plans.

15) In many cities new development fails to generate high quality jobs and career pathways for residents in our low-income communities. We urge that the General Plan and M-2 Area Zoning update include an analysis of "local job access." This analysis should include consideration of policies such as local hire requirements, which are critical components for ensuring that some of the benefits of investment in economic development are shared equitably among the community.

16) Lastly, given the socio-economic makeup of Belle Haven and East Palo Alto, the EIR should include a health impact assessment that looks comprehensively at health impacts of the Project. The application of existing knowledge and evidence about health impacts to these specific social, economic and community contexts would greatly assist in developing evidence-based recommendations that protect and improve community health and wellbeing.

Thank you for your consideration of our thoughts and comments. It is our hope that when we read the full Environmental Impact Report, we will see our concerns included.

We look forward to answering any questions you may have.

Sincerely,

Tameeka Bennett, on behalf of:
El Comite de Vecinos, Community Legal Services in East Palo Alto, Urban Habitat
San Francisco Organizing Project- Peninsula Interfaith Action, Youth United for Community Action

Dear City of Menlo Park,

Menlo Park residents care deeply about the future of our city. Since the current General Plan ("GP") has not been updated comprehensively since 1994, this is an opportunity to chart a path forward that promotes predictable and positive change and that also protects the safety of our neighborhoods and streets, preserves high-quality schools without overcrowding, ensures adequate city infrastructure, helps achieve the city's aggressive climate change goals, and enhances the economic well-being of existing residents and businesses.

After reading through some of the ConnectMenlo documents, it is clear that the update of Menlo Park's General Plan's Land Use and Circulation Elements will affect the entire city over the future 20-year timeframe of the Plan. Virtually every single Goal, Policy, Program in the updated General Plan is new (still in draft form); these affect all development and circulation, city-wide. This is stated well on NOP pages 3-4 "*These two elements are central components of the General Plan because they describe which land uses should be allowed in the City, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the City and its residents."*

However, the Project defined in the NOP regards changes in only one part of Menlo Park, the M-2 Area near Belle Haven neighborhood. The Project really has two major components, only the first of which is described much at all in the GP Notice of Preparation ("NOP"):

1. Zoning changes that affect the M-2 Area in the Belle Haven area of Menlo Park
2. Changes to the Goals, Policies, Programs in the Land Use and Circulation Elements of the GP

The "Project" is defined only to include the first, and does not include the second as it should.

The NOP for the updated GP's Environmental Impact Report ("EIR") does not provide adequate information for decision-makers or the Menlo Park community to understand choices that will face them as they consider the two changes above. They need additional information and a more accurate Project definition in order to craft meaningful Alternatives to the Project during the EIR scoping step. It is essential at this NOP stage for baseline information be provided about what is built, what has been approved, and what could be built under the provisions of the current General Plan – not just in the M-2 area but also citywide. The citywide information is missing in the NOP.

The current GP's full potential buildout citywide was never analyzed when it was adopted in 1994. The EIR for the 1994 GP only assessed the potential impacts of projected growth through 2010, and identified mitigation measures to address those impacts, not for impacts of full potential buildout beyond 2010. Now is the time to assess those impacts and determine whether they can be mitigated or whether the current GP provisions should be altered.

In order to evaluate the potential impacts of changes to Goals, Policies, Programs in the two Elements, information is needed regarding what conditions exist now city-wide. There has never been a comprehensive view since 1994 about the cumulative development picture citywide of what has occurred under the current GP to this time. There has not been a citywide view of what could occur over the next 20 years with the implementation of already-approved projects. There never been a projection of what could occur over the next 20 years under provisions of the current GP. The NOP combines all three of these views into the No Project analysis.

Because the update process provides the opportunity to make decisions about the appropriateness of current zoning provisions over the next 20 years in the rest of the city outside of the M-2 Area, a baseline of information should be provided regarding what exists and what has been approved, and then a comparison made whether to continue those zoning provisions “as is”. This information would help decisionmakers and the public to identify important Alternatives to consider.

In order to fairly evaluate whether development citywide is acceptable, the community needs information about where things stand and whether there is a need to alter any GP provisions that affect the rest of the community.

Additional comments by page in the NOP:
Page 2 – There is reference to streamlining subsequent project reviews “if they comply with overarching rules prescribed in the ConnectMenlo Update and EIR”. The “ConnectMenlo Update” is undefined, and it is unclear what the “overarching rules” are; generally rules are specific and measurable.

Page 4 – The NOP states *“The Menlo Park General Plan and M-2 Area Zoning Update will be evaluated using a program EIR that determines whether potential future land use and circulation system changes may result in impacts that need to be mitigated.”* There also is a statement that Land Use changes will only occur in M-2.

Because this General Plan Update provides the first opportunity in 21 years (since 1994) to evaluate the current and future impacts of the existing General Plan’s Land Use and Circulation and zoning code provisions, it is imperative that the EIR explicitly studies a) existing conditions (what is built), b) existing conditions plus what has been approved and is in the pipeline, and c) what is possible over the next 20 years if no change is made to the existing General Plan and zoning code. With a) and b) as baselines and with evaluation of their environmental and financial impacts, decision makers and our community can fairly assess the proposed General Plan changes of ConnectMenlo, not just the changes in M-2.

Menlo Park, business practices, and transportation patterns are different than 1994. An example – the 1994 General plan (Table III-4) assumed employment densities of 1 employee per 500 square feet whereas current employment practices are closer to 1 employee per 200 square feet, sometimes more dense. The difference could have major impacts on transportation needs and congestion, on housing needs, on schools and other special districts, on water. on infrastructure, etc. The current conditions of school crowding, traffic congestion, jobs/housing imbalance are not the same as in 1994 either. For example, the connection of Sand Hill Road to El Camino Real did not exist.

The EIR process must help decision-makers and the community determine whether the “current course and speed” of existing Land Use and Circulation provisions will result in impacts that also need to be mitigated and also determine whether the impacts warrant changes to existing land use/circulation provisions that affect all or some other parts of Menlo Park beyond the M-2 area. An evaluation of only the incremental changes to M-2 zoning will not provide sufficient information to determine if continuation of existing provisions and mitigation measures would be appropriate or adequate to attain city goals, or would be environmentally sustainable. The NOP does not provide that information for either the Project or No Project Alternatives.

Page 6 – There is again reference to only growth that is expected in the M-2 Area and city-wide impacts from that M-2 growth, but not about city-wide growth and impacts of that to the entire City. There has not been community discussion about future city-wide growth or about the theoretical maximum potential development established that takes citywide development beyond what was studied for the

1994 General Plan (projected for 2010), which should be the topic of a General Plan update. Otherwise, this NOP should be about a Project that is a Specific Plan for one part of town, not for a General Plan update for the entire city.

There is reference to nonresidential building space and dwelling units and jobs "beyond what is already realistically achievable under the current…Land Use Element". As stated previously, the EIR needs to study a baseline of current conditions (what is built and also what is built plus what has been approved), and a baseline of what is currently possible not just in M-2 but also city-wide over the next 20 years. This would allow separate comparisons of the changes to zoning in M-2 Area and of the GP update provisions (Goals, Policies, and Programs). That important information also would help shape Alternatives in the EIR Scoping process.

Page 7 The No Project Alternative is described as including what exists and current development potential. Again, it is important to also study baselines of what exists, and what exists plus what has been approved so a complete picture can be evaluated about the development potential beyond that, using current General Plan provisions. This will assist in formulating and evaluating Project Alternatives in the scoping and EIR processes.

The document states the importance of community engagement, most of which has occurred within the M-2 and Belle Haven part of Menlo Park, and which was about potential M-2 changes. Thus the statement that the Land Use Element reinforces "the community's vision for the city" is inaccurate and misleading. There has not been discussion about a vision for the entire city, and there should be for a General Plan update. Without this, there cannot be appropriate "community amenities such as transportation and quality-of-life improvements" or a Capital Improvement Program that will "prioritize needed infrastructure and physical projects throughout Menlo Park". Growth beyond what is currently built, particularly that which could be built under the current General Plan, is regarded as part of No Project, not part of "the" Project. The NOP alludes to a No Project scenario for which the EIR would not evaluate that incremental growth or allow a means to mitigate potential impacts or allow GP changes that may be appropriate for other parts of Menlo Park outside of the M-2 Area. The Project definition only relates to "new or expanded development" arising from the changes in M-2 zoning.

The Circulation Element "strategies and requirements to improve mobility and address congestion citywide" must also consider the baseline information of what exists today, what exists plus what has been approved, and those two plus what is possible under the current General Plan. Again, the NOP alludes to a No Project scenario for which the EIR would not evaluate that incremental growth or allow a means to mitigate potential impacts or allow GP changes that may be appropriate for other parts of Menlo Park outside of the M-2 Area.

Page 8 – The Circulation Element Update needs to evaluate city-wide the same information as is mentioned for the M-2 Area, including parking supply, regulating the intensity of land uses, and water supply assessment. It is insufficient for this to be only about M-2.

Pages 9 and 10 – The EIR needs to analyze not only the environmental factors potentially affected by the Project, as defined, but also the baseline of what exists, what exists plus what has been approved, and those two growth scenarios plus what is possible under the current General Plan CITYWIDE, not just in M-2.

It is important that the No Project analysis utilize all the current General Plan's provisions, such as the Circulation Element Policy II-A-4 *"New development shall be restricted or required to implement migitation measures in order to maintain the levels of service and travel speeds specified in Policies II-!-a through II-A-3."* Further, using this as an example that could apply to other current GP Goals, Policies, and Programs, if the baseline analyses yield results that exceed the stated standards for levels of service and travel speeds, the expected results of mitigation must be considered and/or limited growth be assumed in the definition of No Project and its measurements.

Attachments – there is no city-wide Figure showing all parcels and their status as shown in Figure 2 that is only for the M-2 Area. There should be additional information here, too, for the NOP for the EIR analysis of a General Plan update that will affect Menlo Park city-wide through zoning changes in M-2 Area and through extensive changes to the Land Use and Circulation Elements.

General comments – The NOP asserts that there has been extensive community input on the Project. Most of the outreach and community input has been to and from the Belle Haven community and to M-2 property owners and developers. That dialogue has been very important but it is insufficient for a General Plan update that could affect the entire Menlo Park community. It is inappropriate for the NOP to assert at this point that the GP update embodies a community-wide vision for development citywide over the next 20 years.

Respectfully submitted,

Patti Fry

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 4
P.O. BOX 23660, MS-10D
OAKLAND, CA 94623-0660
PHONE (510) 286-5528
FAX (510) 286-5559
TTY 711
http://www.dot.ca.gov/dist4/

Serious Drought.
Help save water!

July 20, 2015

SMGen085
SCH# 2015062054

Ms. Deanna Chow
City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

Dear Ms. Chow:

ConnectMenlo: City of Menlo Park General Plan (Land Use and Circulation Elements) and M-2 Area Zoning Update – Notice of Preparation

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. Caltrans' new mission, vision, and goals signal a modernization of our approach to California's transportation system. The following comments are based on the Notice of Preparation. We provide these comments to promote the State's smart mobility goals that support a vibrant economy and build active communities rather than sprawl.

Project Understanding
The proposed project is an update to the Land Use and Circulation Elements to the City of Menlo Park's (City) General Plan and a zoning change to the M-2 Area. The City is located at the southern edge of San Mateo County. It is generally bounded by San Francisco Bay; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest. The City is accessed by I-280, US-101, Caltrain, and State Route (SR) 84. The M-2 Area contains major regional transportation links, including SRs 84, 114, and109, and the Dumbarton Bridge. The proposed updates frame the type and scale of potential development that may occur over the next 20-years and their potential impact to the local, regional, and state transportation system.

Traffic Impact Fees
If improvements to the Caltrans ROW are proposed, please identify any Traffic Impact Fees associated with the project. The scheduling and costs associated with planned improvements on the Caltrans ROW should be listed, in addition to identifying viable funding sources.

Traffic Impact Study
The environmental document should include an analysis of the travel demand expected from the proposed project. Early collaboration leads to better outcomes for all stakeholders. We are in the process of updating our Traffic Impact Study Guide for consistency with SB 743, but meanwhile we recommend using the Caltrans' Guide for the Preparation of Traffic Impact Studies (TIS Guide) for determining which scenarios and methodologies to use in the analysis. It is available at http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa_files/tisguide.pdf. Please ensure that a Traffic Impact Study is prepared providing the information detailed below:

1. Vicinity map, regional location map, and a site plan that clearly shows project access in relation to nearby state roadways. Clearly identify the state right-of-way (ROW). Project driveways, local roads and intersections, car and bicycle parking and transit facilities should be mapped.

2. Project-related trip generation, distribution, and assignment including per capita use of transit, rideshare or active transportation modes and vehicle miles travelled (VMT) reduction factors. The assumptions and methodologies used to develop this information should be detailed in the study, should utilize the latest place based research, and should be supported with appropriate documentation.

3. Schematic illustration of walking, biking, and auto traffic conditions at the project site and study area roadways, trip distribution percentages and volumes as well as intersection geometrics, i.e. lane configurations, for AM and PM peak periods.

4. Mitigation for any roadway sections or intersection with increasing VMT should be identified. Mitigation may include contributions to a regional or local fee program as applicable and should support the use of transit and active transportation modes.

5. Impacts on pedestrians and bicyclists resulting from projected VMT increases should be analyzed. The analysis should describe any pedestrian and bicycle mitigation measures and safety countermeasures that would be needed as a means of maintaining and improving access to transit facilities and reducing vehicle trips.

We also encourage you to develop Travel Demand Management (TDM) policies to encourage usage of nearby public transit lines and reduce vehicle trips on the state highways. These policies could include lower parking ratios, car-sharing programs, bicycle parking, and providing transit passes to residents. For information about parking ratios, see the Metropolitan Transportation Commission (MTC) report *Reforming Parking Policies to Support Smart Growth* or visit the MTC parking webpage: http://www.mtc.ca.gov/planning/smart_growth/parking/.

Active Transportation
Please consider pedestrian, bicycling, and transit performance or quality of service measures and modeling as a means of estimating the project impacts to these modes and evaluating mitigation measures and tradeoffs.

Please feel free to call or email Sandra Finegan at (510) 622-1644 or sandra.finegan@dot.ca.gov with any questions regarding this letter.

Sincerely,

Pat Ci

PATRICIA MAURICE
District Branch Chief
Local Development – Intergovernmental Review

cc: State Clearinghouse

From: Brielle Johnck [mailto:gabriellejohnck@gmail.com]
Sent: Sunday, July 19, 2015 4:42 PM
To: _connectmenlo; _CCIN
Cc: Ray Mueller; Catherine Carlton; Rich Cline
Subject: General Plan Update N.O.P. Comments

City Council:

After wading through the General Plan update documents and grappling with the tricky concepts of "full build-out", maximum allowable development, and vehicle miles traveled vs. level of service, it is clear that the City Council is about to embark on decisions that neither it nor the residents may fully understand. We are relying on our city staff's expertise but we have no information as to the kind or amount of influence it receives from developers and their attorneys.

The 1994 General Plan was created after several years of council discussion and community input. The main focus at that time was understandable: ***the preservation of a residential community, the City's ability to promote retail sales taxes and the overall livability for residents.***

This General Plan update that is to last 20 years seems to have an entirely different goal: ***jobs, innovation and the appeal to Fortune 500 companies have replaced the importance of a retail base, housing and neighborhood schools with healthy classroom sizes.*** I fear that the quality of life for residents who now call Menlo Park their home will suffer under these draconian goals.

In addition to the discussion of the updated General Plan, the Specific Plan, Zoning regulations, and potential EIR studies, the City must not ignore the impacts of development and job creation on commuter cut through traffic, the housing crunch and at the end of the day, school classroom size.

The Economic Development Plan states in one section that Belle Haven (M-2) already has 8.7 million sq ft of non-residential space already built, under construction or approved. In another section it projects 3.9 million sq. ft. more. What are the numbers for the remainder of the city regarding non-residential space already built, under construction and approved? How much more is projected? The information seems to be intentionally confusing.

Palo Alto residents and the city's current council majority are up in arms over 200,000 sq ft of potential office development while Menlo Park residents are not being fully informed as to the reality of the addition of nearly 4 million sq ft of non-residential development within our city.

All of you ran for office with campaign promises to represent the residents and their families. Our neighborhoods are now threatened by commute traffic twice a day as employees drive to and from 101 and 280 to reach their offices in Palo Alto and Stanford. When the Arrillaga, Greenheart, Tarlton, Sobrato, Bohannon, Facebook developments are completed, the impacts on traffic will be dire. Office development gets the attention of ABAG and the City will, once again, be forced to meet ABAG housing requirements. Classroom sizes in both school districts will be jeopardy. The more office you allow, the more housing we will need to satisfy ABAG. Why would Menlo Park want to run on this tread mill?

Please, get ahead of this time bomb and set policy now that will set real limits on the amount of office development in all of Menlo Park, east and west of 101. Remember that you are first and foremost residents. Your seats on the council were won on campaign promises made to voters who trust you.

Brielle Johnck
Menlo Park

From: Adina Levin [mailto:aldeivnian@gmail.com]
Sent: Monday, June 08, 2015 11:23 PM
To: Murphy, Justin I C; Chow, Deanna M; Charlie Knox
Cc: Jessica Alba; Jeffrey Tumlin
Subject: Menlo Park General Plan EIR NOP, Willow Road traffic, and Palo Alto destinations

Dear Menlo Park General Plan staff and consultants,

Following is a comment regarding the Notice of Preparation for the Menlo Park General Plan Environmental Impact Report, which was discussed at the Menlo Park Planning Commission this evening.

One of the concerns in the Menlo Park community is about the severe traffic congestion on Willow Road, which hampers residents in making basic trips into and out of the Belle Haven area.

It has been estimated that 80% of the vehicle traffic on Willow is "passthrough" - drivers are coming from the Dumbarton Bridge to a destination outside of Menlo Park, or vice versa. There are 40,000 to 50,000 average daily trips on Willow - meaning 32,000 to 40,000 are passing through Menlo Park. There are about 20,000 average daily trips on Middlefield and Hawthorn (connecting Menlo Park and Palo Alto). Logically, a notable number of the drivers that come off the Dumbarton Bridge are headed to Downtown Palo Alto and other nearby employment destinations.

Due to traffic and parking concerns Palo Alto as a similar interest in reducing vehicle trips traveling that route. Palo Alto is in the process of creating a Transportation Management Association with the goal of reducing downtown traffic and and parking demand.

There may be also other notable numbers of drivers that take Willow to 101, and from there to nearby cities that also have emerging Transportation Demand Management programs (e.g. Redwood City and Mountain View).

Therefore, in the Environmental Impact Report assessment of vehicle trips on Willow in Menlo Park, it makes sense to identify, not only whether the trip terminates in Menlo Park or not, but to assess other major destination clusters.

By partnering with Palo Alto (likely the largest destination), and potentially with other cities, the EIR may identify opportunities to mitigate traffic impact and reduce vehicle miles traveled, with measures that benefit both Menlo Park and Palo Alto (and/or other cities with destination clusters and similar policies.

Thank you for your consideration,

Adina

Adina Levin
writing as an individual, with the following affiliations:
Menlo Park Transportation Commission and General Plan Advisory Committee
Palo Alto Transportation Management Association Advisory Committee

Average Daily Trip References

Willow Road - Table 3 in this document
http://www.dot.ca.gov/dist4/envirodocs/rt101willow/willowrdinterchangeDEDsigned.pdf

Middlefield - Table 3.5.3 in this document
http://www.menlopark.org/DocumentCenter/View/2649

Dear Commissioners,
I offer these comments and suggestions regarding the scope of the EIR for the General Plan update and your study session.

A. EIR SCOPING - PROJECT DEFINITION - The General Plan update "Project" comprises

- Proposed changes to zoning in M-2,
- Continuation of current zoning in the rest of the city,including parts of M-2 (note: this is above and beyond what was anticipated in the 1994 General Plan's Maximum Buildout). and
- Proposed changes to the Goals, Policies, Programs in the Land Use and Circulation Elements.

The staff report and Notice of Preparation ("NOP") suggest that "the Project" is only the proposed changes to M-2 zoning.It is critical to note that development related to continuation of current zoning has not been studied. The Maximum Buildout for the General Plan of 1994 was achieved before the turn of the century. Additional growth potential using the same zoning has never been evaluated to determine if that zoning will take our city where it should/wants to go. This process should help explicitly to make that determination rather than blindly assume all is working fine.

Development pertinent to a study of the impacts of the General Plan update are:

1. Existing development citywide - what mix of uses exist and in what quantities, what are the ratios of this mix of uses, what are the ratios related to factors of interest to our community, such as the jobs/housing balance
2. Potential growth resulting from continuation of current zoning in the General Plan - what is the most likely resulting mix of uses, quantities, and ratios of mix of uses, jobs/housing balance, etc..
3. Potential growth resulting from the proposed changes to M-2 zoning - looking at the same information as above.

Now is the time to evaluate separately each of these aspects of the proposed General Plan.. See attached graphics for more details.

2. EIR SCOPING - ALTERNATIVES TO BE STUDIED Unfortunately, the Notice of Preparation implies that the increment of potential growth related to continuation of current Land Use zoning will not be evaluated separately. Instead, it is to be lumped into the "No Project" Alternative. That approach will produce misleading information. It does not allow our community or decisionmakers to evaluate the impacts of additional development allowed by the current zoning. It also does not allow our community to decide whether the rules established in 1994 would continue to take development in the city where our community desires it to go, and whether some or all of those rules should be modified.

The <u>No Project Alternative ("Existing and Approved Development")</u> should comprise what exists now and any projects that have been approved.This would allow our community to evaluate development overall in Menlo Park, something that has not been done comprehensively since

1994. We will then have a good view of the mix of uses, the jobs/housing balance, the amount of retail/restaurants, etc.
The mix of commercial uses should be evaluated so that it is easy to determine the extent to which retail/restaurants are available (and where), the types of office development, housing, etc. This will allow a baseline comparison with other communities of the current situation. Additionally, it would help evaluate the extent to which "allowable development" beyond the 1994 Maximum Buildout as well as the proposed M-2 zoning changes might affect factors of concern to the community, such as jobs/housing ratio, traffic, etc.

Thus, additional Alternatives should include one that focuses solely on "Allowable Development" (i.e., what exists and has been approved plus growth that would be allowed throughout Menlo Park, including all of M-2, using the current zoning). Another, separate Alternative should include the "Proposed M-2 Changes". Given the very large amount of commercial development proposed, I encourage evaluation of yet another Alternative with a lower maximum buildout.

In order to make well-informed decisions about all aspects of the General Plan, our community needs to know more about what is currently built/approved, what could be built without modifying the General Plan, and what is proposed to change in M-2.

3. STUDY SESSION - TIE TO LEVELS OF SERVICE
Currently there is high demand for development in Menlo Park. Our community cares very much about retaining high levels of community service, such as avoiding over-crowding in school classrooms, preserving and enhancing a high quality of residential life, ensuring that there is sufficient infrastructure capacity as development occurs (e.g., sewage treatment, storm water drainage, water supply, school capacity, sports playing fields and parks, net revenue that pays for desired services, safety for pedestrians and bicyclists to get around town without resorting to motor vehicles, achieving climate change goals)..

The General Plan could tie development growth to levels of service. Given the exceedingly high amount of proposed additional growth, turning Menlo Park into a jobs center, it is important to pay attention to the timing and extent of impacts on our residential community so development does not outpace the city's and special districts' (e.g., school's, fire department) capacity to deliver high quality service. Palo Alto, a much larger city, is restricting annual office growth to approximately 50,000 SF (1 million SF over 20 years) whereas much smaller Menlo Park is contemplating 4 times that amount of development (3.85 million SF) just in the M-2 area in the next 20 years.

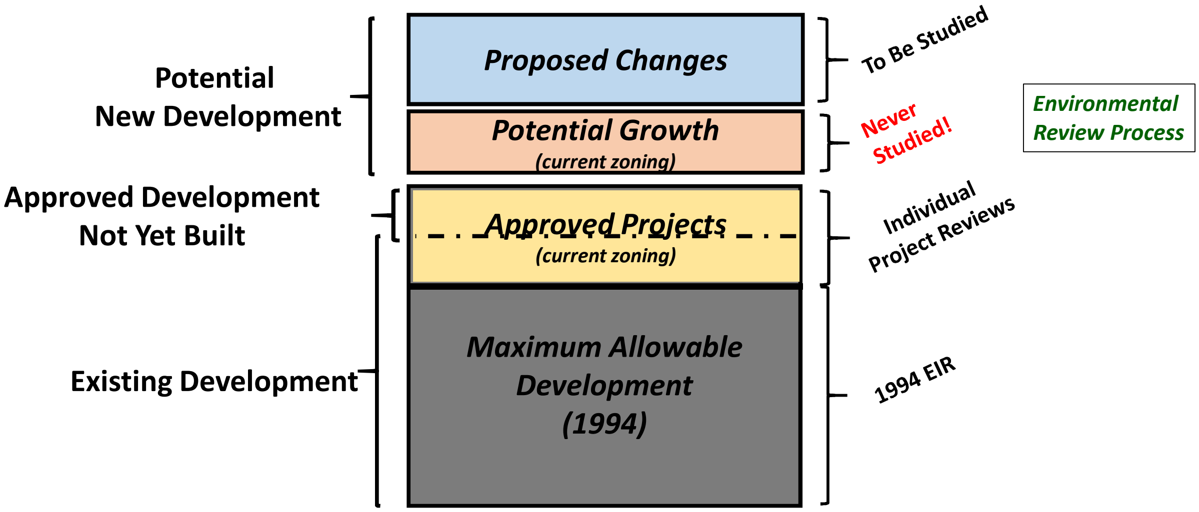
I highly recommend that the Commission discuss ways to ensure that development growth will support and enhance high service levels rather than cause harm, such as outpacing capacity of schools, infrastructure, water supply.

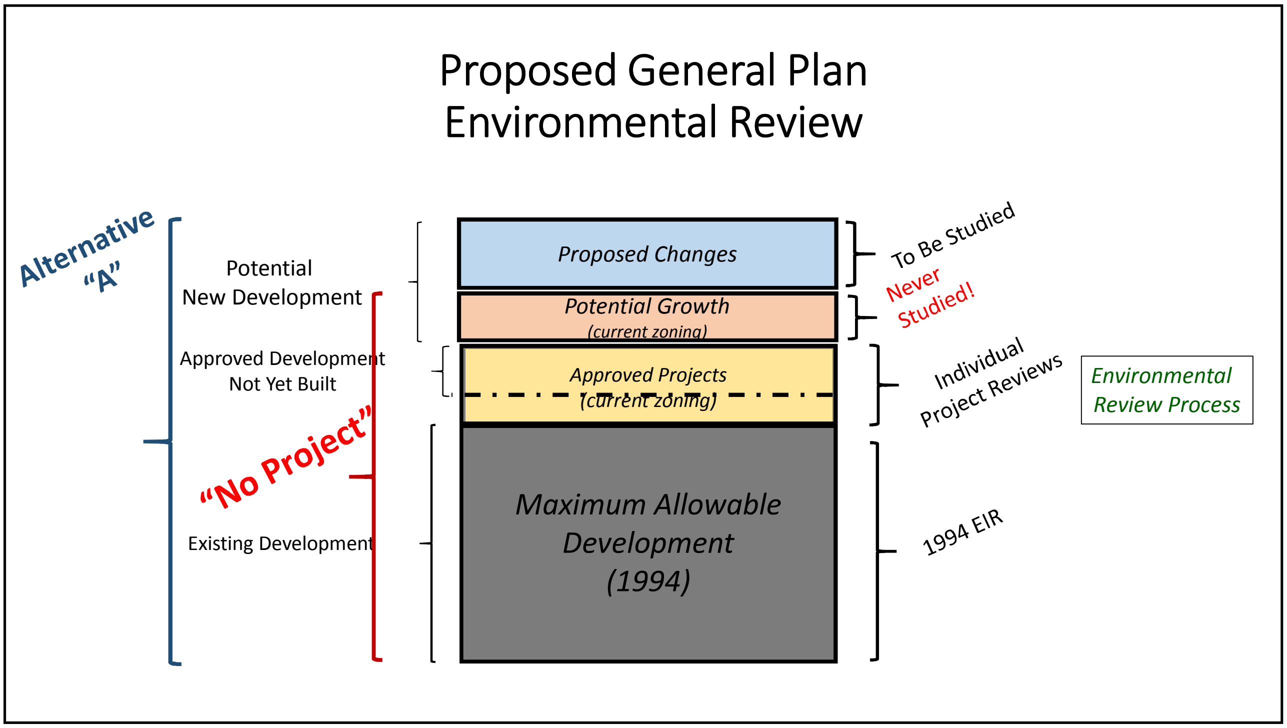
Respectfully submitted,
Patti Fry
Menlo Park resident and former Planning Commissioner

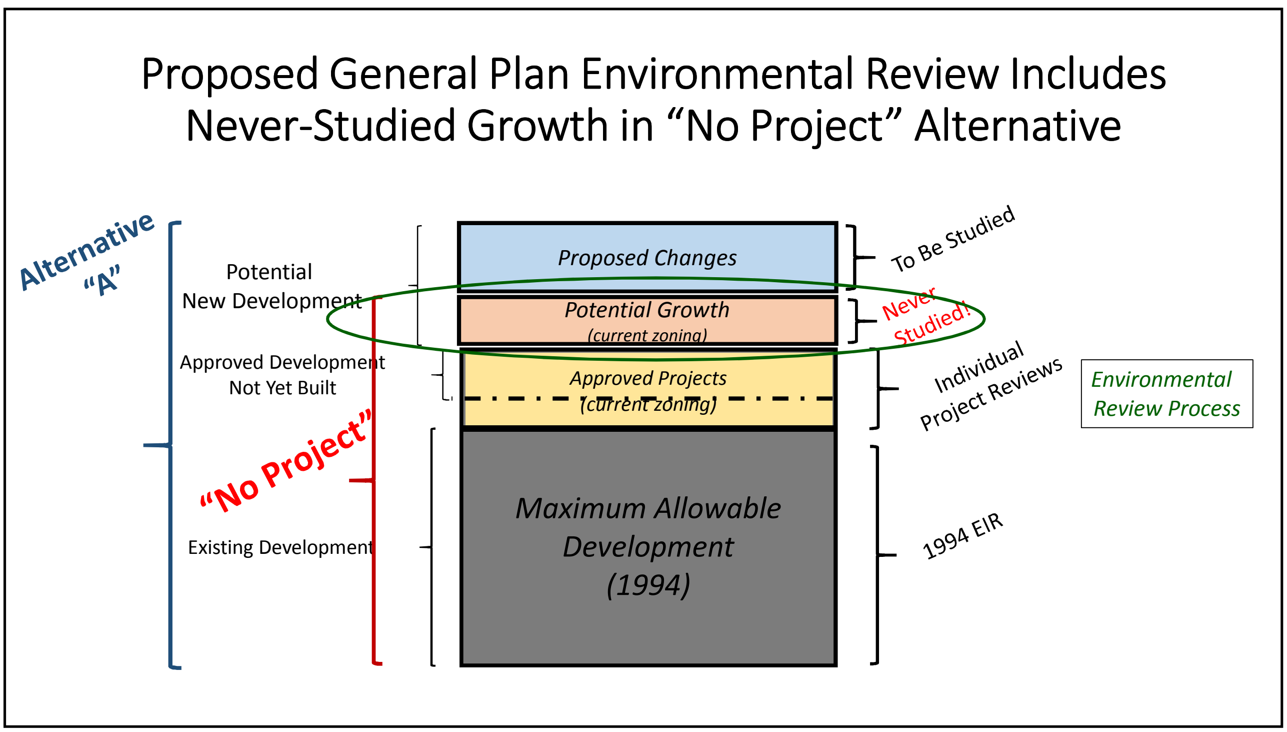
General Plan Update Scope

- Proposes changes to M-2 zoning
- Proposes changes to Land Use and Circulation Element Goals, Policies, Programs
- Perpetuates existing zoning in Land Use Element (allows growth beyond Maximum Allowable Development evaluated in 1994 EIR)
- Allows significant, "streamlined" growth that could outpace city's ability and capacity to support or to maintain a very high quality of residential life if development pace is not tied to service levels

Development Under General Plan and Environmental Review *To Date*




Proposed General Plan
Environmental Review
Alternative "A"
Potential New Development
Approved Development Not Yet Built
"No Project"
Existing Development
Proposed Changes
Potential Growth (current zoning)
Approved Projects (current zoning)
Maximum Allowable Development (1994)
To Be Studied
Never Studied!
Individual Project Reviews
Environmental Review Process
1994 EIR


Proposed General Plan Environmental Review Includes
Never-Studied Growth in "No Project" Alternative
Alternative "A"
Potential New Development
Approved Development Not Yet Built
"No Project"
Existing Development
Proposed Changes
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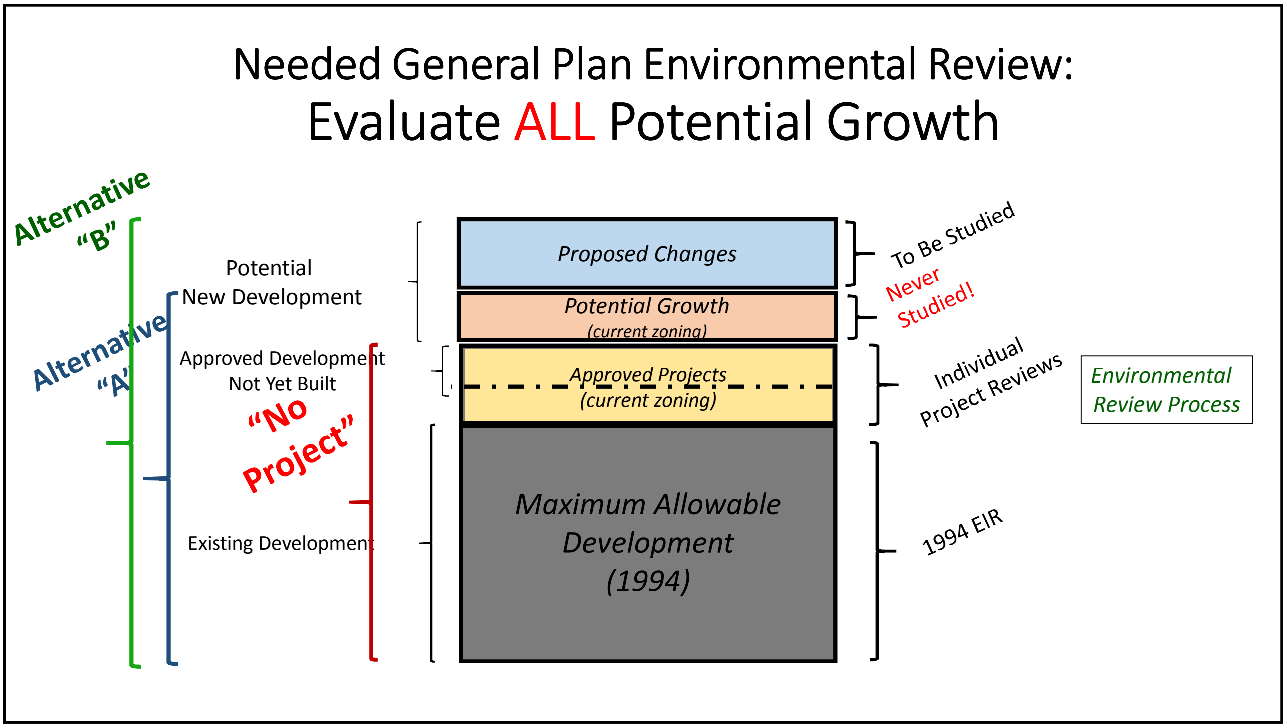

Recommendations – General Plan Scope

- **EIR Alternatives – create meaningful scenarios**
  - **Assess currently built/approved total development, and its mix of uses, relevant ratios (e.g., jobs/housing) as the "No Project" Alternative**
  - **Establish an Alternative specifically to evaluate whether current zoning allows desired development beyond the currently built/approved projects**
  - **Establish an Alternative specifically to evaluate the proposed changes to M-2 zoning**
- **Service level triggers – identify linkages of development to service levels in order to tie pace of growth to:**
  - **Capacity of schools to accommodate students without overcrowding**
  - **Ability of infrastructure to support increased demand (e.g., sewage treatment, stormwater drainage, water delivery)**
  - **Commensurate growth in parks and open space**
  - **Attainment of city goals for revenue, sustainability, climate change**
  - **Maintenance and renewal of public works (e.g., streets, sidewalks, other facilities)**

From: Adina Levin <aldeivnian@gmail.com>
Sent: Monday, June 8, 2015 11:22 PM
To: Murphy, Justin I C; Chow, Deanna M; Charlie Knox
Cc: Jessica Alba; Jeffrey Tumlin
Subject: Menlo Park General Plan EIR NOP, Willow Road traffic, and Palo Alto destinations

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By partnering with Palo Alto (likely the largest destination), and potentially with other cities, the EIR may identify opportunities to mitigate traffic impact and reduce vehicle miles traveled, with measures that benefit both Menlo Park and Palo Alto (and/or other cities with destination clusters and similar policies.

Thank you for your consideration,

Adina

Adina Levin
writing as an individual, with the following affiliations:
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http://www.menlopark.org/DocumentCenter/View/2649

From: Patti L Fry [mailto:pattilfry@gmail.com]
Sent: Friday, June 12, 2015 1:01 PM
To: _CCIN
Subject: 6/16 Agenda Item F2 - discussion about General Plan NOP

Dear Honorable Mayor and Councilmembers,
I wish to draw your attention to the issue of defining "maximum potential development" in the General Plan update Notice of Preparation conversation.
It is critical that this definition be made more clear and measurable.

As I understand EIR's, the project scenario and alternative scenarios to be studied are clearly quantified and represent what is expected to occur during the timeframe to be studied. As pointed out in my prior letter (below) to the Planning Commission, the language in the staff report (middle of what is now page 72, or page 272 of your entire packet) makes reference to an amount of potential development that is not easily measured. It is based on something that is not a concrete and easily quanitified fact but instead is a potentially debatable and not easily measured concept: "[growth] beyond what is already realistically achievable under the current Menlo Park General Plan Land Use Element." Growth is easy to measure from a fixed point, such as from the amount of square feet and residential units currently built and approved. So why obfuscate and make things unnecessarily complex? Additional discussion is in the letter below.

I want to point out the staggering magnitude of the growth proposed for a community that really cares about financial sustainability, about responsible growth that ensures a healthier balance of jobs and housing, and about potential impacts on traffic, schools, and residential quality of life. The proposed total amount of development and ratio of types of development appear to worsen, not improve. each of those factors, when improvement is what many of us residents hope a long-term plan would accomplish. Please reconsider the absolute amounts and ratio in the context of what has been already approved and not-yet-built. Now is the time to make changes, not after the NOP is issued.

The General Plan and its EIR should not be vehicles to create and study "worst case scenarios" but rather to create and study the amount and type of development that is desired (i.e., "the project") for and by our community. Those are not at all the same things. The zoning ordinance changes that implement the revised General Plan will allow what is studied ("the project") so it should be what the entire community understands and accepts as its future.

Respectfully submitted,
Patti Fry
Former Planning Commissioner

---------- Forwarded message ----------
From: **Patti L Fry** <pattilfry@gmail.com>
Date: Mon, Jun 8, 2015 at 2:50 PM
Subject: tonight's discussion about General Plan NOP
To: "planning.commission@menlopark.org" <planning.commission@menlopark.org>

Dear Planning Commissioners,
I offer the following observations for your discussion about the "maximum potential development" to be studied in the GP update:

TYPES OF USES Because the M-2 has traditionally been the economic breadbasket of Menlo Park, I think it's essential for the GP update to evaluate non-residential development in at least two categories -- nonresidential development that could directly provide sales tax or TOT revenue, and development that

would not. Since my time on the Planning Commission (2000-2004), Menlo Park has experienced a huge loss of M-2 businesses that have provided significant revenue to the city.
The GPAC documents contend that the virtues of office are the ripple effect of office jobs. That is only pertinent if the primary issue is job creation. Far bigger issues in Menlo Park are the budget impacts of lost sales/use tax revenue and TOT, traffic, and school impacts. Property tax growth is kept low by Prop 13, meaning that its growth can't keep up with city expenses.

MAXIMUM POTENTIAL DEVELOPMENT Clarity is critical regarding what the maximum means. Among things It could mean are
a) the maximum studied in the EIR (i.e., the development ASSUMED in the stated timeframe),
b) the maximum "to be allowed" (i.e., a true maximum until another maximum is set through a GP update),
c) the maximum that the zoning would support (i.e., what is truly ALLOWABLE, even if it may not occur).
Each of these is very different.

These differences matter very much. The previous General Plan of 1994 contained a stated "maximum" that was reached within about 5 years even though the timeframe studied and the intended life of the GP were considerably longer. Further the zoning changes allowed additional development without modifying the GP at all.

Similarly, the 2012 El Camino Real/Downtown Specific Plan articulated a "maximum allowable development" that was also studied in its EIR that had a timeframe of 30 years: This maximum was 474,000 SF non-residential and 680 residential units.. The lowest FAR in the Specific Plan was 0.75. If that were applied to the 130 acres in the Plan area, the total ALLOWED SF was 4,247,100 SF (existing plus new). Because many zoning districts had higher Base FAR and much higher Bonus FAR, the total ALLOWED SF was much greater. Note that less than half of that low-end calculation would be non-residential, that is an order of magnitude more development possible than was studied and described as "maximum allowable development" - and that is at the lowest FAR allowed in any zoning district of the Plan area. Some districts allow more than double that amount.. The amount of existing development has not ever been quantified.

Another example from the ECR/Downtown Specific Plan: The EIR assumed a ratio of jobs and housing that would slightly improve Menlo Park's overall currently imbalanced ratio. Projects proposed to date have a markedly worse ratio, and the overall ratio cannot be improved enough within the "maximum allowable development" even though the zoning allows more development. This very point was made by the Sierra Club, that the allowed ratio in zoning rules did not match what was forecast and desired.
See http://ccin2.menlopark.org/archive6/att-5982/Letter_to_Menlo_Park_Counci_11-18-13.pdf

I mention all of this because the wording in the staff report in the middle of page E6 states that "The maximum potential development would consist of approximately 2.1 million additional square feet of nonresidential building space and 4,500 additional multifamily dwelling units beyond what is already realistically achievable under the current Menlo Park General Plan Land Use Element." Questions directly related to this that should be asked include:

a) are these maximums for the entire city or just the M-2 area?
b) how much nonresidential SF and how many residential dwelling units currently exist (where), how much/how many have been approved but are not yet built, and how much/how many are in the pipeline?
c) how much more development (nonresidential and residential) COULD be built using current zoning (and where). If this cannot be answered, there should be no attempt to study only the amount beyond what is currently possible. In other words, if we cannot quantify what is still possible under current zoning, even though the current GP's maximum has long been passed, then we cannot possibly assess the impacts of development beyond that.

d) what does "realistically achievable" mean? Isn't that an assertion that makes assumptions about market conditions that can vary widely depending on shortages and credit? Remember, this is a long-term document and analysis that should span various types of market cycles.
e) what is the relationship between the maximums? The NOP Is for an EIR that will study several scenarios. These scenarios should evaluate the maximum POSSIBLE of each type of development.

I urge that the "maximum potential development" to be set and studied in the GP update refer specifically to that development (residential units and non-residential SF, sales/tot revenue-generating and non) which would be incremental to the currently built or approved projects, not incremental to what is possible under current zoning. Evaluation of incremental growth to what exists/approved would provide a picture of future development impacts. An evaluation of scenarios of incremental growth beyond an unidentified potential (i.e., under current zoning) is meaningless. No one could realistically assess the incremental impacts, including on traffic patterns..

A holistic view and assessment [of that increment] would help us all understand more fully the [incremental] impacts on infrastructure, water supply, traffic congestion, GHG emissions, [schools] .etc.

TOTAL DEVELOPMENT The total amount of nonresidential (mostly office), ANOTHER 2.1 million SF, on top of currently approved and pipeline amounts of nonresidential SF (nearly 2 million SF), is simply staggering. The number of new jobs and ripple effect on traffic and schools and housing shortages are simply staggering as well. Our much-larger neighbor to the south, Palo Alto just imposed a 50,000 SF/year limit on office development after experiencing office/R&D growth totaling about 400,000 SF since 2008, a fraction (1/5) of what smaller Menlo Park already faces before considering this additional amount. See editorial www.paloaltoonline.com/news/2015/03/27/editorial-development-limits-a-modest-start

IMO our community has very serious discussions that should occur right now about what it wants to be. Nearly all of the community outreach has been in Belle Haven, not throughout the community, especially about the total amount. Even if this proposed amount occurs over 30 years, it goes way beyond anything Menlo Park has [ever] experienced. [It goes without saying,] Menlo Park has yet to experience the nearly 2 million already approved/pipeline [and all of its impacts, good and bad].

Respectfully submitted,
Patti Fry
Menlo Park resident

From: Patti L Fry [mailto:pattilfry@gmail.com]
Sent: Tuesday, June 16, 2015 4:54 PM
To: _CCIN
Subject: additional comments - General Plan NOP

Please see attached comments and graphics that may help compare what was in the 1994 General Plan and what is described to be anticipated development for the next 20 years.
The General Plan determines city-wide development but the NOP scope only talks about M-2. Why is that? Isn't this supposed to be a comprehensive update of the General Plan?
The NOP needs to be modified to be a Specific Plan for the M-2 and its zoning changes, or modified to reflect cumulative and projected city-wide development.

Patti Fry
former Planning Commissioner

June 16, 2015

Subject: General Plan Update and M-2 Zoning NOP – additional comments

Dear Honorable Mayor and City Council Members,

The current General Plan was created in 1994, with no recent update of either the Land Use or Circulation Elements and the combination of its Elements not updated comprehensively at the same time. This is an opportunity to do so.

Why isn't there information about development city-wide? The GP Update reads more like a Specific Plan for the M-2 area. The only growth supposedly anticipated is described as occurring there. There is no information for the entire city.

How could the Circulation Element be completed without city-wide information? The NOP describes the Circulation Element as dealing with the entire city. Are we to believe that no additional development is expected to occur in the rest of Menlo Park over the next 20 years?

As stated in tonight's staff report (page 201) "The establishment of the maximum potential development to be studied in the EIR and FIA should not be construed as the City Council approving the maximum potential development, but **it would set the upper limit that could be approved."** [*emphasis added*] Residents, businesses, and developers need clarity on what is allowed and anticipated in the General Plan throughout Menlo Park. Supposedly the zoning rules support the General Plan, not the other way around. If no additional development is intended in other parts of Menlo Park, that should be clarified to all.

The NOP and EIR need to include an updated outlook of similar information provided in the 1994 General Plan for the entire city, while also evaluating information related to M-2 zoning changes. Otherwise, it would appear that all development in the rest of Menlo Park that exceeds the 2010 projection would require their own EIR's. Consider the differences between the 1994 and 2015 General Plans:

<u>Potential Non-Residential Development</u> – 2015 General Plan (M-2-only) and 1994 General Plan:

M-2 Area (2015)

		Million Square Feet of Non-Residential Development - M-2 Only												
Source	JOBS	1	2	3	4	5	6	7	8	9	10	11	12	13
General Plan Update 2015 M-2 Area	n/a	Existing Built/Approved (8.75 million)												
	n/a	Allowed, "Realistically Achievable" in Current General Plan (10.5 million)												
	n/a*	Proposed for M-2 By 2035 (12.6 million)												
* Additional jobs estimated at 5,500 from M-2 zoning changes														

Entire city/sphere of influence (1994 General Plan)

		Million Square Feet of Non-Residential Development																		
Source	JOBS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1994 General Plan Entire City	25,177	Existing (12.588,574)																		
	29,202	2010 projected (14,601,092)																		
	n/a	"Theoretical" Full Buildout (18,891,944)																		

To assess potential development city-wide, the city needs to embark on a similar effort as that described in the current (1994) General Plan's Land Use Element. That analyzed the potential 16-year growth from 1994 to 2010, and calculated Full Buildout Potential for non-residential development using the following technique:

Full Buildout Potential – "The Menlo Park Planning Division has estimated maximum theoretical commercial and industrial development potential by applying zoning floor area ratios to estimates of total square footage in each zoning category on a block by block basis. Adjustments to these calculations have been made based on approved master plans and zoning requirements. This methodology produces a theoretical maximum amount of development that could occur." (1994 General Plan III-3)

<u>Potential Residential Development</u> – 2015 General Plan (M-2-only) and 1994 General Plan:

M-2 Area (2015)

Source	*Thousands of Units of Residential Development* (1 2 3 4 5 6 7)
General Plan Update 2015 M-2 Area	Proposed M-2 (4,500)

Entire city/sphere of influence (1994 General Plan)

Source	POPULATION	*Thousands of Units of Residential Development* (1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25)
1994 General Plan Entire City	29,182	Existing (29,182)
	35,285	2010 Projected (15,179)
	n/a	"Theoretical" Full Buildout (20,042)

The NOP and GP update need to be clear how the 1994 General Plan and the 2015 General Plan relate, what the outlook is for the entire city for the next 20 years and what the cumulative residential development has been since 1994. We need to understand total resident and worker populations

As you know, our community is sensitive to impacts on schools, traffic congestion, achievement of greenhouse gas reduction goals, city finances, etc. It is important to gain a comprehensive picture of what future development will bring city-wide. As currently written, the scope of the GP update will not provide this. It is limited to only one part of the city-wide picture, does not provide a cumulative view of what has happened since the 1994 General Plan. It is needed.

Respectfully submitted electronically,

Patti Fry, former Menlo Park Planning Commissioner

From: Radcliffe, Michelle [mailto:mradcliffe@MenloFire.org]
Sent: Monday, June 15, 2015 4:40 PM
To: _CCIN
Cc: McIntyre, Alex D; Aguilar, Pamela I; Mariano, Nicole S; Schapelhouman, Harold; Chang Kiraly, Virginia
Subject: Correspondence from Fire Chief Schapelhouman
Importance: High

Good afternoon –
Please see the attached correspondence from Fire Chief Schapelhouman. Thank you.

Michelle

Michelle Radcliffe
Clerk of the Board
Menlo Park Fire Protection District | 170 Middlefield Road | Menlo Park, CA 94025
(650) 688-1466 | (650) 323-9129 FAX
mradcliffe@menlofire.org | www.menlofire.org

Mission Statement: To protect and preserve life and property from the impact of fire, disaster, injury and illness.

Menlo Park Fire Protection District

170 Middlefield Road · Menlo Park, CA 94025 · Tel: 650.688.8400 · Fax: 650.323.9129
Website: www.menlofire.org · Email: mpfd@menlofire.org

June 15, 2015

To: Menlo Park City Council

Re: Regarding June 16, 2015 Staff Report regarding ConnectMenlo (General Plan and M-2 Area Zoning Update) – Staff Report No. 15-107

Dear Honorable Mayor Carlton and Members of the City Council:

We are submitting again because the M-2 Zone Map has only very minor modifications to the Map considered at the March 31st Study Session. We request that the City fully evaluate and address the impacts on the Fire District in its consideration of the changes to the M-2 zone and coordinate with the District in the analysis and mitigation of impacts.

I have included a copy of the letter sent to the City on March 31^{st}. Please let me know if you have any questions.

Sincerely,

Harold Schapelhouman

Harold Schapelhouman, Fire Chief
Menlo Park Fire Protection District

Menlo Park Fire Protection District

170 Middlefield Road · Menlo Park, CA 94025 · Tel: 650.688.8400 · Fax: 650.323.9129
Website: www.menlofire.org · Email: mpfd@menlofire.org

March 31, 2015

To: Menlo Park City Council

Re: March 31st Joint Planning Commission and City Council Study Session
Preferred Land Use Map for M-2 Area under ConnectMenlo Plan

Dear Honorable Mayor Carlton and Members of the City Council:

As a fellow public agency that provides fire and emergency services to the residents of the City, the Board of Directors of the Menlo Park Fire Protection District provides its comments on the preferred land use map for the M-2 area under the ConnectMenlo Plan. The Fire District Board strongly believes that coordination and consultation between the City and the Fire District in the process for developing the ConnectMenlo and M-2 Rezoning Plan is critical. The continued provision of a high level of Fire District services to preserve and protect life and property must be a priority in developing the Plan. The Plan should contain goals, policies and programs to ensure that the impacts of the Plan on the Fire District and its provision of services are addressed and mitigated in a concrete and enforceable manner. The Board will be submitting a detailed letter to the City Council in April setting forth its specific requests regarding the planning, environmental review and fiscal impact analysis for the Plan. Since tonight's study session is only addressing the selection of the preferred land use map for the Plan, this letter focuses only on the Fire District's comments regarding the land use map and circulation issues under the map. The two main map issues are (1) the building and location of Fire Station 77 in the M-2 area; and (2) emergency response routes in the City overall and the M-2 area specifically.

<u>Fire Station 77</u>. The proposed build-out of the M-2 area under the Plan includes an increase in density and intensity of development and expansion of residential and mixed uses. These changes in land use will trigger the need for a larger station in the M-2 area. The larger station may or may not be accommodated at the existing Station 77 parcel. In order to address the Plan impacts on Station 77, the District requests the following:

1. All new development in the M-2 area should be required to contribute to the cost of additional equipment for and the construction of the new or remodeled M-2 fire station, including the cost of land acquisition.

<u>NEW FIRE STATION</u>

City to sell existing leased land at Fire Station 77 to the Fire District to support the need to increase the size and capabilities of the existing Fire Station and supporting facilities. If such a sale is not possible or the size of the existing site is insufficient then the City should commit to designating another site selected and purchased by the Fire District as a PF zone.

Emergency Response Routes and Access

The proposed build-out of M-2 will increase the density and intensity of development and expand residential and mixed uses. These changes will create additional traffic impacts on emergency access routes. The existing routes will not be able to meet the increased number of emergency vehicles trips. These include emergency routes in the north-south and east-west directions. As part of the Plan, the City will be updating its Circulation Element which addresses these issues City-wide.

1. City should work with District staff on options for modifying existing emergency access routes in M-2 and throughout City to better accommodate emergency vehicles, especially during peak travel times, and implement modifications. This includes all emergency service routes, particularly those in the north-south and east-west directions.

2. In the east-west directions: (1) provide priority access for emergency vehicles on Willow Road east of Middlefield Road and (2) provide a grade-separated train crossing at Ravenswood or Oak Grove.

3. In the north-south directions: Three unobstructed lanes in each direction on El Camino Real

4. City should include new emergency access routes as part of M-2 land use plan. For example, new accessways or paseos for pedestrians and bicycles proposed under plan should be designed to accommodate emergency vehicles.

5. All new development in the M-2 area should be required to contribute to the cost of new emergency access routes or modifications to existing routes.

6. Equip all new and existing traffic signals with preemptive devices for emergency response services. The cost of new preemptive devices should be paid by new development.

We appreciate the City's consideration of these important comments from the Fire District. We look forward to working with the City as a partner in assuring the continued provision of the highest level of fire and emergency services within the City. In order to assure this, it is critical that the City include the Fire District and solicit its input in the development of the Plan. The planning, environmental and fiscal analysis of the Plan should also make certain that the impacts of the Plan on the Fire District and its provision of services are completely addressed and mitigated through enforceable mechanisms.

Sincerely,

Virginia Chang Kiraly

Virginia Chang Kiraly, Board President
Menlo Park Fire Protection District

Menlo Park Fire Protection District

170 Middlefield Road · Menlo Park, CA 94025 · Tel: 650.688.8400 · Fax: 650.323.9129
Website: www.menlofire.org · Email: mpfd@menlofire.org

June 16, 2015

City of Menlo Park City Council
701 Laurel Street
Menlo Park, CA 94025

Honorable members of the Menlo Park City Council:

I wanted to share with you a visual representation of where our Fire, Rescue and Emergency Medical Services are being provided to the community. Clearly, the greatest demand for these services, based upon population density and other factors, is on the eastern side of Highway 101 in Menlo Park and East Palo Alto.

We also understand that the majority of the traffic that creates local congestion is a result of "pass through" commuters along the Dumbarton Bridge and Highway 101 corridors.

I believe that new development in the M2 can be beneficial for the community by increasing employment opportunities, bringing new structures up to current fire and seismic safety codes and standards and, if done correctly, could offer amenities and benefits to improve the lives of local residents, but it must include public safety elements as well.

Tonight, the Fire District Board will be presented with the final draft of what is called "The Standards of Cover" report. In summary, this study has identified that the Fire Districts facilities and effective emergency fire force and relevant response times, or service to the community, is currently adequate but with several exceptions.

Any type of build out of the M2 will trigger the need for additional emergency fire services capability on the East Side of Highway 101. The District is progressively attempting to address these challenges by:

1. Offering to purchase the land that Fire Station 77 sits on from the City to be able to expand or rebuild the current facility to meet future demand.

2. We have presented the City Manager and his staff with a Nexus Impact Fee Study seeking their feedback on fees that would require new construction to pay their "fair share" to expand needed emergency services like reconstruction of the Fire Station and for additional emergency equipment to adequately serve the M2 and East Side.

Tonight, the Fire Board will review a costing model that gives credit for existing square footage for new commercial structures and essentially exempts residential structures if they have a sprinkler system.

The Standards of Cover study also identified the daily challenge our organization faces related to traffic congestion which is starting to negatively affecting our response times and emergency services to the community.

Specifically, the eastern side of the Fire District has reached a tipping point because of the three limited crossings over Highway 101 at University Avenue, Willow and Marsh Roads and based upon the volume of traffic that is coming through the Dumbarton Bridge crossing and Highway 101 Freeway. As shown by this call intensity map, our east side stations, emergency units and crews are the busiest in the District.

When additional fire units need to cross over into the east side as part of an emergency response or for coverage purposes, they are met by a wall of traffic at various times of the day. Based upon road design, conditions and the cooperation of others using the roadway to yield or even pay attention at times, they are often forced to work their way slowly through traffic, or against it, using on-coming lanes.

In order to improve or address these public safety concerns, I have done or will be doing the following:

1. Traffic pre-emption devices have been installed along Marsh, Willow, University and Bayfront Expressway to turn red lights to green when an emergency fire vehicle approaches it. These devices are helpful when traffic is able to move but are almost useless during gridlock traffic.

2. We are establishing safety protocols and criteria with the Palo Alto Fire Department that would allow us to use the upper section of University Avenue between Middlefield and Highway 101 in Palo Alto as an alternative response route because of the difficulties of using Willow Road due to its design. This will be helpful for response into East Palo Alto but not into Eastern Menlo Park.

3. My staff will be reviewing a policy change that will allow our crews, who are detailed as a "cover unit" to the eastern side of the District because other units are tied up at emergency incidents and thus unavailable, to after 10 minutes of drive time attempting to make their way through traffic, to increase to code 3, or use red lights and siren, to accomplish a strategic geographic coverage position within the east side of the District.

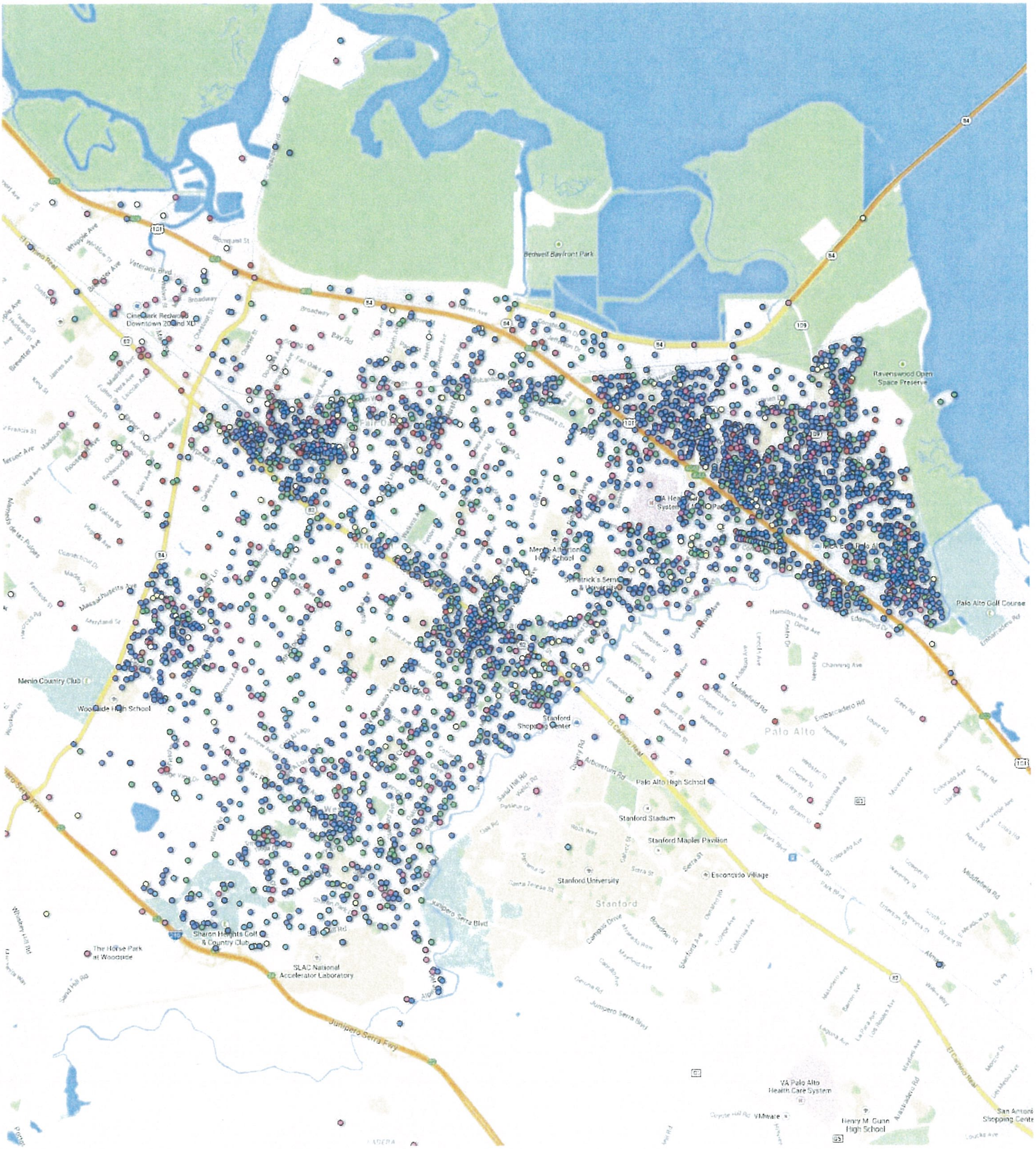
In summary, we are working to establish and understand the risk, seek solutions, establish options and prepare for the future so that we can continue to provide critical superior emergency services to the community.

Thank you,

Harold Schapelhouman

Harold Schapelhouman, Fire Chief
Menlo Park Fire Protection District

8,223 Calls in 2014
Menlo Park Fire Protection District



186 Fires

937 Service Calls

5,274 EMS Calls

149 Hazardous Conditions

752 False Alarms

817 Good Intent Calls

34 Special Incident Types

4 Severe Weather / 12 Overpressure Ruptures

58 Undefined

From: Fisher George C. [mailto:georgecfisher@gmail.com]
Sent: Tuesday, June 16, 2015 2:16 PM
To: _CCIN
Subject: General Plan Update NOP EIR

June 16, 2015

Dear Honorable Mayor and City Council Members:

The Draft NOP EIR for General Plan Land Use Element and Circulation Element are for the entire city, and are not limited to M 2 area development and should be sent back for more accurate disclosure and revision. The NOP must accurately describe anticipated development throughout the city, and correct the erroneous maximum new non-residential development number of only 2.1 millions square feet in the M 2 area.

Staff acknowledges the maximum potential non-residential development in the M2 area is 3.85 million square feet (staff report p. 204) in addition to approved or built development. Not only should the approved but un-built amount be added to the maximum 3.85 million square feet to allow comprehension of the total new development being considered, but the full 3.85 million number be used. The NOP misleadingly states only 2.1 million square feet non-residential need be included alleging that the existing General Plan includes development of the approximately 1.75 million square feet difference between the acknowledged 3.85 million square feet of new development. The current General Plan cannot provide accurate numbers because it was limited to 2010 build-out numbers, which was actually exceeded before 2000. Post 2010 development was not studied, and needs to be presently included in any General Plan revision.

In addition, no analysis has been done of the number of new jobs, new housing needed, or direct city financial benefits or burdens caused by the new non-residential development. That analysis needs to be done and accurately and completely described before any Council approval of a Draft EIR for General Plan revision. Failure to do so will lead to ambiguity, misunderstandings, and lack of clarity for developers or residents. Council has promised clear communication.

Sincerely, George C. Fisher

From: Steve Schmidt [mailto:menloparksteve@gmail.com]
Sent: Tuesday, June 16, 2015 5:30 PM
To: _CCIN
Subject: Questions re General Plan update

I am responding to the City's Newsflash that I received at 4:15 PM today. Like many residents in Menlo Park, I want to understand clearly the substance of the Notice of Preparation for the environmental study of the updated General Plan. It is imperative that Menlo Park residents understand the impacts of development on our quality of life over the next 20 years. The operative General Plan that was adopted before I was elected to the City Council is entitled the 1994 General Plan and it covered a 16 year period from 1994 to 2010. It studied three measurements:
1. The amount of existing development.
2. The most likely amount of development over the next 15 years.
3. The maximum amount of development possible. This task was determined through a block by block assessment of likely sites. The current zoning rules were the tools used to project possible development.

An update of the 1994 General Plan is, as everyone will agree, overdue. It is my recollection that the growth projected in the 1994 General Plan and expected by 2010 was reached before the year 2000.

Here are 5 question for your discussion tonight:

1. Why is this update being billed as a General Plan update when it does not include city-wide information but, instead focusses on the M-2 area? The information that is missing is the amount of development that has occurred since the 2010 projection was reached.

2. What has been built since 2000?

3. Has there been development approved since 2000 but not yet fully built and if so where?

4. Is there a block by block estimate of potential development under current zoning?

5. Are the only zoning changes currently contemplated in the M-2 area?

6. What is the 20 year projection for additional development in the rest of the city, the non-M-2 area? Sunset Magazine? Big Five store site?

7. SInce city-wide development is not being evaluated, isn't this update a Specific Plan for the M-2 area?

8. How can the community understand the impacts of development over the next 20 years if the only data relates to the M-2 area?

9.How can the community evaluate the benefits and negative impacts of future development if they have no information as to the cumulative development for the last 15 years?

Thank you for your consideration of these questions. Going forward without knowing the answers would be unwise.

Steve Schmidt

APPENDIX B: PROPOSED GENERAL PLAN GOALS, POLICIES AND PROGRAMS

GOALS, POLICIES, AND PROGRAMS

SAFE TRANSPORTATION SYSTEM

GOAL CIRC-1 Provide and maintain a safe, efficient, attractive, user-friendly circulation system that promotes a healthy, safe, and active community and quality of life throughout Menlo Park.

POLICIES

Policy CIRC-1.1 **Vision Zero.** Eliminate traffic fatalities and reduce the number of non-fatal collisions by XX% [TBD per environmental review] by 2040.

Policy CIRC-1.2 **Capital Project Prioritization.** Maintain and upgrade existing rights-of-way before incurring the cost of constructing new infrastructure, and ensure that the needs of non-motorized travelers are considered in planning, programming, design, reconstruction, retrofit, maintenance, construction, operations, and project development activities and products.

Policy CIRC-1.3 **Engineering.** Use data-driven findings to focus engineering efforts on the most critical safety projects.

Policy CIRC-1.4 **Education and Encouragement.** Introduce and promote effective safety programs for adults and youths to educate all road users as to their responsibilities.

Policy CIRC-1.5 **Enforcement Program.** Develop and implement an enforcement program to encourage safe travel behavior and to reduce aggressive and/or negligent behavior among drivers, bicyclists, and pedestrians.

Policy CIRC-1.6 **Emergency Response Routes.** Identify and prioritize emergency response routes in the citywide circulation system.

Policy CIRC-1.7 **Bicycle Safety.** Support and improve bicyclist safety through roadway maintenance and design efforts.

Policy CIRC-1.8 **Pedestrian Safety.** Maintain and create a connected network of safe sidewalks and walkways within the public right of way ensure that appropriate facilities, traffic control, and street lighting are provided for pedestrian safety and convenience, including for sensitive populations.

Policy CIRC-1.9 **Safe Routes to Schools.** Support Safe Routes to School programs to enhance the safety of school children who walk and bike to school.

PROGRAMS

Program CIRC-1.A **Pedestrian and Bicyclist Safety.** Consider pedestrian and bicyclist safety in the design of streets, intersections, and traffic control devices.

Program CIRC-1.B **Safe Routes to Schools.** Work with schools and neighboring jurisdictions to develop, implement and periodically update Safe Routes to School programs. Schools that have not completed a Safe Routes to Schools plan should be prioritized before previously completed plans are updated.

Program CIRC-1.C **Capital Improvement Program.** Annually update the Capital Improvement Program to reflect City and community priorities for physical projects related to transportation for all travel modes.

Program CIRC-1.D **Travel Pattern Data.** Bi-annually update data regarding travel patterns for all modes to measure circulation system efficiency (e.g., vehicle miles traveled per capita, traffic volumes) and safety (e.g., collision rates) standards. Coordinate with Caltrans to monitor and/or collect data on state routes within Menlo Park.

Program CIRC-1.E **Emergency Response Routes Map.** In collaboration with the Menlo Park Fire Protection District and Menlo Park Police Department, adopt a map of emergency response routes that considers alternative options, such as the Dumbarton Corridor, for emergency vehicle access. Modifications to emergency response routes should not prevent or impede emergency vehicle travel, ingress, and/or egress.

Program CIRC-1.F **Coordination with Emergency Services.** Coordinate and consult with the Menlo Park Fire Protection District in establishing circulation standards to assure the provision of high quality fire protection and emergency medical services within the City.

COMPLETE STREETS

GOAL CIRC-2 **Increase accessibility for and use of streets by pedestrians, bicyclists, and transit riders.**

POLICIES

Policy CIRC-2.1 **Accommodating All Modes.** Plan, design and construct transportation projects to safely accommodate the needs of pedestrians, bicyclists, transit riders, motorists, people with mobility challenges, and persons of all ages and abilities.

Policy CIRC-2.2 **Livable Streets.** Ensure that transportation projects preserve and improve the aesthetics of the city.

Policy CIRC-2.3 **Street Classification.** Utilize measurements of safety and efficiency for all travel modes to guide the classification and design of the circulation system, with an emphasis on providing "complete streets" sensitive to neighborhood context.

Policy CIRC-2.4 **Equity.** Identify low-income and transit-dependent districts that require pedestrian and bicycle access to, from, and within their neighborhoods.

Policy CIRC-2.5 **Neighborhood Streets.** Support a street classification system with target design speeds that promotes safe, multimodal streets, and minimizes cut-through and high-speed traffic that diminishes the quality of life in Menlo Park's residential neighborhoods.

Policy CIRC-2.6 **Local Streets as Alternate Routes.** Work with appropriate agencies to discourage use of city streets as alternatives to, or connectors of, State and federal highways; to encourage improvement of the operation of US 101; and to explore improvements to Bayfront Expressway (State Route 84) and Marsh Road (and its connection to US 101), with environmental protection for adjacent marsh and wetland areas, to reduce traffic on Willow Road (State Route 114).

Policy CIRC-2.7 **Walking and Biking.** Provide for the safe, efficient, and equitable use of streets by pedestrians and bicyclists through appropriate roadway design and maintenance, effective traffic law enforcement, and implementation of the City's Comprehensive Bicycle Development Plan and the El Camino Real/Downtown Specific Plan.

Policy CIRC-2.8 **Pedestrian Access at Intersections.** Support full pedestrian access across all legs of signalized intersections.

Policy CIRC-2.9 **Bikeway System Expansion.** Expand the citywide bikeway system through appropriate roadway design, maintenance, effective traffic law enforcement, and implementation of the City's Comprehensive Bicycle Development Plan, and the El Camino Real/Downtown Specific Plan.

Policy CIRC-2.10 **Green Infrastructure.** Maximize the potential to implement green infrastructure by: a) Reducing or removing administrative, physical, and funding barriers; b) Setting implementation priorities based on stormwater management needs, as well as the effectiveness of improvements and the ability to identify funding; and c) Taking advantage of opportunities such as grant funding, routine repaving or similar maintenance projects, funding associated with Priority Development Areas, public private partnerships, and other funding opportunities.

Policy CIRC-2.11 **Design of New Development.** Require new development to incorporate design that prioritizes safe pedestrian and bicycle travel and accommodates senior citizens, people with mobility challenges, and children.

Policy CIRC-2.12 **State-Controlled Signals.** Work with Caltrans to ensure use of appropriate modern technology traffic signal equipment on State routes with the objective of meeting Caltrans' adopted performance metrics for state-controlled facilities in conjunction with good fiscal planning.

Policy CIRC-2.13 **County Congestion Management.** Work with the County Congestion Management Agency to implement the Countywide Congestion Management Program and Deficiency Plans for City and State facilities, and avoid adding any Menlo Park streets or intersections to the Countywide Congestion Management Program.

Policy CIRC-2.14 **Impacts of New Development.** Require new development to mitigate its impacts on the safety (e.g., collision rates) and efficiency (e.g., vehicle miles traveled (VMT) per capita) of the circulation system. New development should minimize cut-through and high-speed vehicle traffic on residential streets; minimize the number of vehicle trips; provide appropriate bicycle, pedestrian, and transit connections, amenities and improvements in proportion with the scale of proposed projects; and facilitate appropriate or adequate response times and access for emergency vehicles.

Policy CIRC-2.15 **Regional Transportation Improvements.** Work with neighboring jurisdictions and appropriate agencies to coordinate transportation planning efforts and to identify and secure adequate funding for regional transportation improvements to improve transportation options and reduce congestion in Menlo Park and adjacent communities.

PROGRAMS

Program CIRC-2.A **Manage Neighborhood Traffic.** Following the adoption of a street classification system with target design speeds, establish design guidelines for each street classification. Periodically review streets for adherence to these guidelines, with priority given to preserve the quality of life in Menlo Park's residential neighborhoods and areas with community requests. Utilize a consensus-oriented process of engagement to develop an appropriate set of modifications when needed to meet the street classification guidelines.

Program CIRC-2.B **NACTO Design Guidelines.** Adopt the National Association of City Transportation Officials (NACTO) Urban Street Design Guide and Urban Bikeway Design Guide as supplements to the California Manual for Uniform Traffic Control Devices to enhance safety for users of all travel modes and improve aesthetics.

Program CIRC-2.C **Transportation Master Plan.** Prepare a citywide Transportation Master Plan that includes roadway system improvements and combines and updates the existing Bicycle Plan, includes provisions for overcoming barriers and identifying safe multi-modal routes to key destinations in the City, and replaces the existing Sidewalk Master Plan with a section that identifies areas in Menlo Park where the community and neighborhood have expressed a desire for sidewalk improvements. Update the Transportation Master Plan at least every five years, or as necessary.

Program CIRC-2.D **Pedestrian and Bicycle Facility Maintenance.** Remove debris on roadways and pedestrian/bike facilities, monitor intersection sight clearance, and repair pavement along all roadways and sidewalks; prioritize improvements along bicycle routes.

Program CIRC-2.E **Bikeway System Planning.** Review the citywide bikeway system pursuant to the Comprehensive Bicycle Development Plan and El Camino Real/Downtown Specific Plan, and other recent planning efforts every five years and update as necessary.

Program CIRC-2.F **Bicycle Improvement Funding.** Pursue funding for improvements identified in the Comprehensive Bicycle Development Plan and El Camino Real/Downtown Specific Plan.

Program CIRC-2.G **Zoning Requirements for Bicycle Storage.** Establish Zoning Ordinance requirements for new development to provide secure bicycle and convenient storage and/or bike-sharing facilities.

Program CIRC-2.H **Zoning Requirements for Shared-Use Pathways.** Establish Zoning Ordinance requirements for new development to include public easements for shared-use pathways.

Program CIRC-2.I **Bike Sharing Program.** Work with local and regional organizations to develop and implement a citywide bike sharing program.

Program CIRC-2.J **Multi-modal Stormwater Management**. Identify funding opportunities for stormwater management that can be used to support implementation of multimodal improvements to Menlo Park's streets.

Program CIRC-2.K **Municipal Code Requirements.** Establish Municipal Code requirements for all new development to incorporate safe and attractive pedestrian and bicycle facilities, including continuous shaded sidewalks, pedestrian lighting, and other amenities.

Program CIRC-2.L **Transportation Impact Analysis Guidelines.** Review and update the City's Transportation Impact Analysis (TIA) Guidelines, as needed. Consider factors such as preserving residential quality of life, appropriate accounting for mixed land uses, use of multiple transportation modes and induced travel demand.

Program CIRC-2.M **Transportation Management Program.** Establish goals and metrics for the City's Transportation Management Program, and annually assess progress toward meeting those objectives.

Program CIRC-2.N **Transportation Design Details.** Develop a signage and pavement marking inventory. Prepare and periodically update design details for transportation improvements.

Program CIRC-2.O **Traffic Signal Timing.** Periodically adjust traffic signal timing to support efficient and safe travel for all modes and emergency vehicles, including in conjunction with Caltrans on its rights-of-way.

Program CIRC-2.P **Plan Lines.** Review all "plan lines" indicating where City-owned rights-of-way exist but have not been constructed to determine whether those alignments should be maintained, modified, or abandoned, and identify locations where additional right-of-way is needed to accommodate roadway or bicycle/pedestrian improvements.

Program CIRC-2.Q **Caltrans.** Collaborate with Caltrans to achieve and maintain travel efficiency along Caltrans rights-of-way in Menlo Park consistent with the San Mateo County Congestion Management Plan.

Program CIRC-2.R **Caltrans Relinquishment.** Investigate the potential for relinquishment by Caltrans of State Route 114 (the portion of Willow Road between Bayfront Expressway and US 101 near Bay Road).

SUSTAINABLE TRANSPORTATION

GOAL CIRC-3 **Increase mobility options to reduce traffic congestion, greenhouse gas emissions, and commute travel time.**

POLICIES

Policy CIRC-3.1 **Vehicle Miles Traveled.** Support development and transportation improvements that help reduce per capita vehicle miles traveled.

Policy CIRC-3.2 **Greenhouse Gas Emissions.** Support development, transportation improvements, and emerging vehicle technology that help reduce per capita greenhouse gas emissions.

Policy CIRC-3.3 **Emerging Transportation Technology.** Support efforts to fund emerging technological transportation advancements, including connected and autonomous vehicles, emergency vehicle pre-emption, sharing technology, electric vehicle technology, electric bikes and scooters, and innovative transit options.

PROGRAMS

Program CIRC-3.A **Transportation Impact Metrics.** Supplement Vehicle Miles Traveled (VMT) and greenhouse gas emissions per capita metrics with Level of Service (LOS) in the transportation impact review process, and utilize LOS for identification of potential operational improvements, such as traffic signal upgrades and coordination, as part of the Transportation Master Plan.

Program CIRC-3.B **Emergency Response Coordination.** Equip all new traffic signals with pre-emptive traffic signal devices for emergency services. Existing traffic signals without existing pre-emptive devices will be upgraded as major signal modifications are completed.

HEALTH AND WELLNESS

GOAL CIRC-4 **Improve Menlo Park's overall health, wellness, and quality of life through transportation enhancements.**

POLICIES

Policy CIRC-4.1 **Global Greenhouse Gas Emissions.** Encourage the safer and more widespread use of nearly zero-emission modes, such as walking and biking, and lower emission modes like transit, to reduce greenhouse gas emissions.

Policy CIRC-4.2 **Local Air Pollution.** Promote non-motorized transportation to reduce exposure to local air pollution, thereby reducing risks of respiratory diseases, other chronic illnesses, and premature death.

Policy CIRC-4.3 **Active Transportation.** Promote active lifestyles and active transportation, focusing on the role of walking and bicycling, to improve public health and lower obesity.

Policy CIRC-4.4 **Safety.** Improve traffic safety by reducing speeds and making drivers more aware of other roadway users.

PROGRAMS

Program CIRC-4.A **Partnerships.** Explore partnerships with private and public organizations (e.g., the County of San Mateo Health Department) to fund incentive programs and events that encourage multimodal transportation.

TRANSIT

GOAL CIRC-5 Support local and regional transit that is efficient, frequent, convenient, and safe.

POLICIES

Policy CIRC-5.1 **Transit Service and Ridership.** Promote improved public transit service and increased transit ridership, especially to employment centers, commercial destinations, schools, and public facilities.

Policy CIRC-5.2 **Transit Proximity to Activity Centers.** Promote the clustering of as many activities as possible within easy walking distance of transit stops, and locate any new transit stops as close as possible to housing, jobs, shopping areas, open space, and parks.

Policy CIRC-5.3 **Rail Service.** Promote increasing the capacity and frequency of commuter rail service, including Caltrain; protect rail rights-of-way for future transit service; and support efforts to reactivate the Dumbarton Corridor for transit, pedestrian, bicycle, and emergency vehicle use.

Policy CIRC-5.4 **Caltrain Enhancements.** Support Caltrain safety and efficiency improvements, such as positive train control, grade separation (with priority at Ravenswood Avenue), electrification, and extension to Downtown San Francisco (Transbay Terminal), provided that Caltrain service to Menlo Park increases and use of the rail right-of-way is consistent with the City's Rail Policy.

Policy CIRC-5.5 **Dumbarton Corridor.** Work with Caltrain and appropriate agencies to reactivate the rail spur on the Dumbarton Corridor with appropriate transit service from Downtown Redwood City to Willow Road with future extension across the San Francisco Bay.

Policy CIRC-5.6 **Bicycle Amenities and Transit.** Encourage transit providers to improve bicycle amenities to enhance convenience, including access to transit including bike share programs, secure storage at transit stations and on-board storage where feasible.

Policy CIRC-5.7 **New Development.** Ensure that new nonresidential, mixed-use, and multiple-dwelling residential development provides associated needed transit service, improvements and amenities in proportion with demand attributable to the type and scale of the proposed development.

PROGRAMS

Program CIRC-5.A **Long-Term Transit Planning.** Work with appropriate agencies to agree on long-term peninsula transit service that reflects Menlo Park's desires and is not disruptive to the city.

Program CIRC-5.B **SamTrans.** Work with SamTrans to provide appropriate community-serving transit service and coordination of schedules and services with other transit agencies.

TRANSPORTATION DEMAND MANAGEMENT

GOAL CIRC-6 Provide a range of transportation choices for the Menlo Park community.

POLICIES

Policy CIRC-6.1 **Transportation Demand Management.** Coordinate Menlo Park's transportation demand management efforts with other agencies providing similar services within San Mateo and Santa Clara Counties.

Policy CIRC-6.2 **Funding Leverage.** Continue to leverage potential funding sources to supplement City and private monies to support transportation demand management activities of the City and local employers.

Policy CIRC-6.3 **Shuttle Service.** Encourage increased shuttle service between employment centers and the Downtown Menlo Park Caltrain station.

Policy CIRC-6.4 **Employers and Schools.** Encourage employers and schools to promote walking, bicycling, carpooling, shuttles, and transit use.

PROGRAMS

Program CIRC-6.A **Transportation Demand Management Guidelines.** Update the City's Transportation Demand Management Guidelines to require new nonresidential, mixed use and multiple-dwelling development to provide facilities and programs that ensure a majority of associated travel can occur by walking, bicycling, and/or transit, and that include vehicle trip reduction reporting goals, requirements, and monitoring and enforcement mechanisms.

Program CIRC-6.B **Transportation Management Association.** Participate in the formation of a Transportation Management Association (TMA) to assist local residents, employees, students, and other community members in identifying and taking advantage of travel options between employment centers and rail connections, Downtown, and nearby cities. Require new, large commercial and residential development to participate in the TMA. Establish goals for the TMA, such as those for mode share, vehicle trips, or VMT by geographic areas in the City. Collaborate or partner with adjacent cities' TMAs to ensure regional consistency. [Program CIRC-3.B]

Program CIRC-6.C **Transportation Impact Fee.** Require new and expanded development to pay a transportation impact fee, and update the fee periodically to ensure that development is paying its fair share of circulation system improvement costs for all modes of transportation. [Program CIRC-1.E]

Program CIRC-6.D **Peninsula Traffic Congestion Relief Alliance.** Consider joining the Peninsula Traffic Congestion Relief Alliance ("commute.org") to assist local employers with increasing biking and walking, transit, carpool, and vanpool and shuttle use for their employees. [Program CIRC-3.C]

Program CIRC-6.E **Employer Programs.** Work with local employers to develop programs that encourage walking, bicycling, and transit use. [Program CIRC-3.E]

PARKING

GOAL CIRC-7 Utilize innovative strategies to provide efficient and adequate vehicle parking.

POLICIES

Policy CIRC-7.1 **Parking and New Development.** Ensure new development provides appropriate parking ratios, including application of appropriate minimum and/or maximum ratios, unbundling, shared parking, electric car charging, car sharing, and Green Trip Certified strategies to accommodate employees, customers and visitors. [Policy CIRC-6.1]

Policy CIRC-7.2 **Off-Street Parking.** Ensure both new and existing off-street parking is properly designed and used efficiently through shared parking agreements and, if appropriate, parking in-lieu fees.

Policy CIRC-7.3 **Park Once.** Support the establishment of shared public parking, particularly in mixed-use and retail areas, and of Park-Once strategies that allow motorists to park once and complete multiple daily tasks on foot before returning to their vehicle, helping to reduce vehicle trips and parking demand.

Policy CIRC-7.4 **Public Parking Management.** Improve the efficiency of the on- and off-street public parking system via parking management strategies that ensure adequate parking is available for nearby uses. Prioritize allocation of short-term retail customer parking in convenient on-street and off-street facilities. Locate long-term employee parking in such a manner that it does not create a shortage of customer parking adjacent to retail. Consider utilizing parking pricing as a strategy to balance demand and supply. [Policy CIRC-6.3]

Policy CIRC-7.5 **Parking Technology.** Utilize real-time wayfinding and parking technology to guide drivers to facilities with available parking.

Policy CIRC-7.6 **Caltrain Parking and Access.** Work with the Joint Powers Board to improve bicycle and pedestrian access to Caltrain stations while providing adequate parking at the Menlo Park Caltrain station that does not negatively impact nearby uses. [Policy CIRC-6.3]

PROGRAMS

Program CIRC-7.A **Parking Requirements.** Evaluate parking requirements, including bicycle and electric vehicle spaces, and update the Parking Stall and Driveway Guidelines. Consider the effect on demand due to various contextual conditions such as parking pricing, transportation demand management strategies, transit accessibility, walkability and bikeability. [Program CIRC-6.A]

Program CIRC-7.B **Parking In-Lieu Fees.** Explore adoption of a parking in-lieu fee to fund a variety of tools that provide additional parking, improve access to parking, or reduce parking demand.

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GOALS, POLICIES, AND PROGRAMS

ORDERLY DEVELOPMENT

GOAL LU-1 Promote the orderly development of Menlo Park and its surrounding area.

POLICIES

Policy LU-1.1 **Land Use Patterns.** Cooperate with the appropriate agencies to help assure a coordinated land use pattern in Menlo Park and the surrounding area.

Policy LU-1.2 **Transportation Network Expansion.** Integrate regional land use planning efforts with development of an expanded transportation network focusing on mass transit rather than freeways, and support multi-modal transit development that coordinates with Menlo Park land uses.

Policy LU-1.3 **Land Annexation.** Work with interested neighborhood groups to establish steps and conditions under which unincorporated lands within the City's sphere of influence may be annexed.

Policy LU-1.4 **Unincorporated Land Development.** Request that San Mateo County consider Menlo Park's General Plan policies and land use regulations in reviewing and approving new developments in unincorporated areas in Menlo Park's sphere of influence.

Policy LU-1.5 **Adjacent Jurisdictions.** Work with adjacent jurisdictions to ensure that decisions regarding potential land use activities near Menlo Park include consideration of City and Menlo Park community objectives.

Policy LU-1.6 **Infill Development Environmental Review.** Streamline the environmental review process for eligible infill projects by focusing the topics subject to review where the effects of infill development have not been addressed in a planning level decision or by "uniformly applicable development policies or standards," in accordance with CEQA Guidelines Section 15183.3.

Policy LU-1.7 **School Facilities.** Encourage excellence in public education citywide, as well as use of school facilities for recreation by youth to promote healthy living.

PROGRAMS

Program LU-1.A **Zoning Ordinance Consistency.** Update the Zoning Ordinance as needed to maintain consistency with the General Plan, including implementation programs identified in the Housing Element.

Program LU-1.B **Capital Improvement Program.** Annually update the Capital Improvement Program to reflect City and community priorities for physical projects related to transportation, water supply, drainage, and other community-serving facilities and infrastructure.

Program LU-1.C **Infill Development Streamlined Review.** Establish Zoning Ordinance provisions to streamline review of infill development through "uniformly applicable development policies or standards" (per CEQA Guidelines Section 15183.3) that reduce potential adverse environmental effects, such as: regulations governing grading, construction activities, storm water runoff treatment and containment, hazardous materials, and greenhouse gas emissions; and impact fees for public improvements, including safety and law enforcement services, parks and open space, and transit, bicycle, and pedestrian infrastructure.

Program LU-1.D **School District Partnership.** Work with the school districts to aid in identifying opportunities for partnership with the City in promoting excellence in education and recreation at all schools serving Menlo Park residents.

Program LU-1.E **Assessment Districts and Impact Fees.** Pursue the creation of assessment districts and/or the adoption of development impact fees (e.g., fire impact fee) to address infrastructure and service needs in the community.

Neighborhood Preservation

GOAL LU-2 Maintain and enhance the character, variety and stability of Menlo Park's residential neighborhoods.

Policies

Policy LU-2.1 **Neighborhood Compatibility.** Require new residential development to possess high-quality design that is compatible with the scale, look, and feel of the surrounding neighborhood and that respects the city's residential character.

Policy LU-2.2 **Open Space.** Require accessible, attractive open space that is well maintained and uses sustainable practices and materials in all new multiple dwelling and mixed-use development.

Policy LU-2.3 **Mixed Use Design.** Allow mixed-use projects with residential units if project design addresses potential compatibility issues such as traffic, parking, light spillover, dust, odors, and transport and use of potentially hazardous materials.

Policy LU-2.4 **Second Units.** Encourage development of second residential units on single family lots consistent with adopted City standards.

Policy LU-2.5 **Below-Market Rate Housing.** Require residential developments of five or more units to comply with the provisions of the City's Below-Market Rate (BMR) Housing Program, including eligibility for increased density above the number of market rate dwellings otherwise permitted by the applicable zoning and other exceptions and incentives.

Policy LU-2.6 **Underground Utilities.** Require all electric and communications lines serving new development to be placed underground.

Policy LU-2.7 **Conversion of Residential Units.** Limit the loss in the number of residential units or conversion of existing residential units to nonresidential uses, unless there is a clear public benefit or equivalent housing can be provided to ensure the protection and conservation of the City's housing stock to the extent permitted by law.

Policy LU-2.8 **Property Maintenance.** Require property owners to maintain buildings, yards, and parking lots in a clean and attractive condition.

Policy LU-2.9 **Compatible Uses.** Promote residential uses in mixed-use arrangements and the clustering of compatible uses such as employment center, shopping areas, open space and parks, within easy walking and bicycling distance of each other and transit stops.

PROGRAMS

Program LU-2.A **Property Maintenance Compliance.** Work with property owners to understand City codes and to ensure that buildings, yards, landscaping, and trees are well maintained, and that property is free of litter, in prompt compliance with City codes.

Program LU-2.B **Single-Family Residential Development.** Update the Zoning Ordinance requirements for single-family residential developments to create a more predictable and expeditious process while providing a method for encouraging high-quality design in new and expanded residences.

NEIGHBORHOOD-SERVING USES

GOAL LU-3 **Retain and enhance existing and encourage new neighborhood-serving commercial uses, particularly retail services, to create vibrant commercial corridors.**

POLICIES

Policy LU-3.1 **Underutilized Properties.** Encourage underutilized properties in and near existing shopping districts to redevelop with attractively designed commercial, residential, or mixed-use development that complements existing uses and supports pedestrian and bicycle access.

Policy LU-3.2 **Neighborhood Shopping Impacts.** Limit the impacts from neighborhood shopping areas, including traffic, parking, noise, light spillover, and odors, on adjacent uses.

Policy LU-3.3 **Neighborhood Retail.** Preserve existing neighborhood-serving retail, especially small businesses, and encourage the formation of new neighborhood retail clusters in appropriate areas while enhancing and preserving the character of the neighborhood.

PROGRAMS

Program LU-3.A **Commercial Zoning Provisions.** Review, and update as necessary, Zoning Ordinance provisions related to neighborhood-serving commercial uses, in part to ensure that an appropriate and attractive mix of uses can be provided.

Business Development and Retention

GOAL LU-4 **Promote the development and retention of business uses that provide goods or services needed by the community that generate benefits to the City, and avoid or minimize potential environmental and traffic impacts.**

Policies

Policy LU-4.1 **Priority Commercial Development.** Encourage emerging technology and entrepreneurship, and prioritize commercial development that provides fiscal benefit to the City, local job opportunities, and/or goods or services needed by the community.

Policy LU-4.2 **Hotel Location.** Allow hotel uses at suitable locations in mixed-use and nonresidential zoning districts.

Policy LU-4.3 **Mixed Use and Nonresidential Development.** Limit parking, traffic, and other impacts of mixed-use and nonresidential development on adjacent uses, and promote high-quality architectural design and effective transportation options.

Policy LU-4.4 **Community Amenities.** Require mixed-use and nonresidential development of a certain minimum scale to support and contribute to programs that benefit the community and the City, including education, transit, transportation infrastructure, sustainability, neighborhood-serving amenities, child care, housing, job training, and meaningful employment for Menlo Park youth and adults.

Policy LU-4.5 **Business Uses and Environmental Impacts.** Allow modifications to business operations and structures that promote revenue generating uses for which potential environmental impacts can be mitigated.

Policy LU-4.6 **Employment Center Walkability.** Promote local-serving retail and personal service uses in employment centers and transit areas that support walkability and reduce auto trips, including along a pedestrian-friendly, retail-oriented street in Belle Haven.

Policy LU-4.7 **Fiscal Impacts.** Evaluate proposed mixed-use and nonresidential development of a certain minimum scale for its potential fiscal impacts on the City and community.

PROGRAMS

Program LU-4.A **Fiscal Impact Analysis.** Establish Zoning Ordinance requirements for mixed-use, commercial, and industrial development proposals of a certain minimum scale to include analysis of potential fiscal impact on the City, school districts, and special districts, and establish guidelines for preparation of fiscal analyses.

Program LU-4.B **Economic Development Plan.** Update the strategic policies in the City's Economic Development plan periodically as needed to reflect changing economic conditions or objectives in Menlo Park and/or to promote land use activities desired by the community, including small businesses and neighborhood-serving retail.

Program LU-4.C **Community Amenity Requirements.** Establish Zoning Ordinance requirements for new mixed-use, commercial, and industrial development to support and contribute to programs that benefit the community and City, including public or private education, transit, transportation infrastructure, public safety facilities, sustainability, neighborhood-serving amenities, child care, housing for all income levels, job training, parks and meaningful employment for Menlo Park youth and adults (e.g. first source hiring).

Program LU-4.D **Sign Requirements.** Update the Municipal Code requirements and design guidelines for off-site and on-site signage in compliance with Federal and State laws while providing a method for encouraging high-quality design in advertising for Menlo Park businesses.

Downtown/El Camino Real

GOAL LU-5 **Strengthen Downtown and the El Camino Real Corridor as a vital, competitive shopping area and center for community gathering, while encouraging preservation and enhancement of Downtown's atmosphere and character as well as creativity in development along El Camino Real.**

Policies

Policy LU-5.1 **El Camino Real/Downtown Specific Plan.** Implement the El Camino Real/Downtown Specific Plan to ensure a complementary mix of uses with appropriate siting, design, parking, and circulation access for all travel modes.

Policy LU-5.2 **El Camino Real/Downtown Housing.** Encourage development of a range of housing types in the El Camino Real/Downtown Specific Plan area, consistent with the Specific Plan's standards and guidelines, and the areas near/around the Specific Plan area.

Open Space

GOAL LU-6 **Preserve open-space lands for recreation; protect natural resources and air and water quality; and protect and enhance scenic qualities.**

POLICIES

Policy LU-6.1 **Parks and Recreation System.** Develop and maintain a parks and recreation system that provides areas, play fields, and facilities conveniently located and properly designed to serve the recreation needs of all Menlo Park residents.

Policy LU-6.2 **Open Space in New Development.** Require new nonresidential, mixed use, and multiple dwelling development of a certain minimum scale to provide ample open space in the form of plazas, greens, community gardens, and parks whose frequent use is encouraged through thoughtful placement and design.

Policy LU-6.3 **Public Open Space Design.** Promote public open space design that encourages active and passive uses, and use during daytime and appropriate nighttime hours to improve quality of life.

Policy LU-6.4 **Park and Recreational Land Dedication.** Require new residential development to dedicate land, or pay fees in lieu thereof, for park and recreation purposes.

Policy LU-6.5 **Open Space Retention.** Maximize the retention of open space on larger tracts (e.g., portions of the St. Patrick's Seminary site) through means such as rezoning consistent with existing uses, clustered development, acquisition of a permanent open space easement, and/or transfer of development rights.

Policy LU-6.6 **Public Bay Access.** Protect and support public access to the Bay for the scenic enjoyment of open water, sloughs, and marshes, including restoration efforts, and completion of the Bay Trail.

Policy LU-6.7 **Habitat Preservation.** Collaborate with neighboring jurisdictions to preserve and enhance the Bay, shoreline, San Francisquito Creek, and other wildlife habitat and ecologically fragile areas to the maximum extent possible.

Policy LU-6.8 **Landscaping in Development.** Encourage extensive and appropriate landscaping in public and private development to maintain the City's tree canopy and to promote sustainability and healthy living, particularly through increased trees and water-efficient landscaping in large parking areas and in the public right-of-way.

Policy LU-6.9 **Pedestrian and Bicycle Facilities.** Provide well-designed pedestrian and bicycle facilities for safe and convenient multi-modal activity through the use of access easements along linear parks or paseos.

Policy LU-6.10 **Stanford Open Space Maintenance.** Encourage the maintenance of open space on Stanford lands within Menlo Park's unincorporated sphere of influence.

Policy LU-6.11 **Baylands Preservation.** Allow development near the Bay only in already developed areas.

PROGRAMS

Program LU-6.A **San Francisquito Creek Setbacks.** Establish Zoning Ordinance requirements for minimum setbacks for new structures or impervious surfaces within a specified distance of the top of the San Francisquito Creek bank.

Program LU-6.B **Open Space Requirements and Standards.** Review, and update as necessary, Zoning Ordinance requirements for provision of open space in all multiple dwelling, mixed-use and nonresidential development of a certain minimum scale that encourages active and passive uses and human presence during daytime and appropriate nighttime hours.

Program LU-6.C **Space for Food Production.** Establish Zoning Ordinance requirements for new residential developments over a certain minimum scale to include space that can be used to grow food, and to establish a process through which a neighborhood can propose a site as a community garden.

Program LU-6.D **Design for Birds.** Explore whether new buildings along the Bayfront should employ façade, window, and lighting design features that make them visible to birds as physical barriers and eliminate conditions that create confusing reflections to birds.

SUSTAINABLE SERVICES

GOAL LU-7 **Promote the implementation and maintenance of sustainable development, facilities and services to meet the needs of Menlo Park's residents, businesses, workers, and visitors.**

POLICIES

Policy LU-7.1 **Sustainability.** Promote sustainable site planning, development, landscaping, and operational practices that conserve resources and minimize waste.

Policy LU-7.2 **Water Supply.** Support the efforts of the Bay Area Water Supply and Conservation Agency or other appropriate agencies to secure adequate water supplies for the Peninsula, to the extent that these efforts are in conformance with other City policies.

Policy LU-7.3 **Supplemental Water Supply.** Explore and evaluate development of supplemental water sources and storage systems, such as wells and cisterns, for use during both normal and dry years, in collaboration with water providers and users.

Policy LU-7.4 **Water Protection.** Work with regional and local jurisdictions and agencies responsible for ground water extraction to develop a comprehensive underground water protection program in accordance with the San Francisquito Creek Watershed Policy, which includes preservation of existing sources and monitoring of all wells in the basin to evaluate the long term effects of water extraction.

Policy LU-7.5 **Reclaimed Water Use.** Implement use of adequately treated "reclaimed" water (recycled/nonpotable water sources such as, graywater, blackwater, rainwater, stormwater, foundation drainage, etc.) through dual plumbing systems for outdoor and indoor uses, as feasible.

Policy LU-7.6 **Sewage Treatment Facilities.** Support expansion and improvement of sewage treatment facilities to meet Menlo Park's needs, as well as regional water quality standards, to the extent that such expansion and improvement are in conformance with other City policies.

Policy LU-7.7 **Hazards.** Avoid development in areas with seismic, flood, fire and other hazards to life or property when potential impacts cannot be mitigated.

Policy LU-7.8 **Cultural Resource Preservation.** Promote preservation of buildings, objects, and sites with historic and/or cultural significance.

Policy LU-7.9 **Green Building.** Support sustainability and green building best practices through the orientation, design, and placement of buildings and facilities to optimize their energy efficiency in preparation of State zero-net energy requirements for residential construction in 2020 and commercial construction in 2030.

PROGRAMS

Program LU-7.A **Green Building Operation and Maintenance.** Employ green building and operation and maintenance best practices, including increased energy efficiency, use of renewable energy and reclaimed water, and install drought-tolerant landscaping for all projects.

Program LU-7.B **Groundwater Wells.** Monitor pumping from existing and new wells to identify and prevent potential ground subsidence, salinity intrusion into shallow aquifers (particularly in the Bayfront Area), and contamination of deeper aquifers.

Program LU-7.C **Sustainability Criteria.** Establish sustainability criteria and metrics for resource use and conservation and monitor performance of projects of a certain minimum size.

Program LU-7.D **Performance Standards**. Establish performance standards in the Zoning Ordinance that requires new development to employ environmentally friendly technology and design to conserve energy and water, and minimize the generation of indoor and outdoor pollutants.

Program LU-7.E **Greenhouse Gas Emissions.** Develop a Greenhouse Gas (GHG) standard for development projects that would help reduce communitywide GHG emissions to meet City and Statewide reduction goals.

Program LU-7.F **Adaptation Plan.** Work with emergency service providers to develop an adaptation plan, including funding mechanisms, to help prepare the community for potential adverse impacts related to climate change, such as sea level rise, extreme weather events, wildfire, and threats to ecosystem and species health.

Program LU-7.G **SAFER Bay Process.** Coordinate with the SAFER Bay process to ensure that the Menlo Park community's objectives for sea level rise/flood protection, ecosystem enhancement, and recreational trails are adequately taken into consideration.

Program LU-7.H **Sea Level Rise.** Establish requirements based on State Sea Level Rise Policy Guidance for development projects of a certain minimum scale potentially affected by sea level rise to ensure protection of occupants and property from flooding and other potential effects.

Program LU-7.I **Green Infrastructure Plan.** Develop a Green Infrastructure Plan that focuses on implementing City-wide projects that mitigate flooding and improve storm water quality.

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APPENDIX C:
PUBLIC PROCESS AND PARTICIPATION PROCESS

ConnectMenlo's Public Outreach and Participation Process

Date	Topic	Location
May 23, 2016	Planning Commission Study Session	Council Chambers 701 Laurel St 6:00 p.m.
April 21, 2016	General Plan Advisory Committee (GPAC) Meeting	Council Chambers 701 Laurel St 6:00 p.m.
March 24, 2016	Topic Discussion: Community Amenities	Senior Center 110 Terminal Ave 6:30 p.m.
March 10, 2016	Topic Discussion: Green and Sustainable Building Regulations	Senior Center 110 Terminal Ave 6:30 p.m.
March 3, 2016	Topic Discussion: Zoning Regulations and Design Standard	Senior Center 110 Terminal Ave 6:30 p.m.
January 28, 2016	General Plan Advisory Committee (GPAC) Meeting	Arrillaga Family Recreation Center *(Oak Room)* 700 Alma St 6:00 - 8:00 p.m.
January 14, 2016	Focus Group Meeting on Proposed M-2 Area Zoning	Senior Center 110 Terminal Ave 7:00 - 9:00 p.m.
November 18, 2015	Symposium on Zoning and Design Standards	City Council Chambers 701 Laurel Street 7:00 p.m.
October 6, 2015	City Council - Draft Land Use and Circulation Elements and Zoning Update	City Council Chambers 701 Laurel Street 7:00 p.m.
September 21, 2015	Planning Commission - Review Preliminary Draft Land Use and Circulation Elements and Zoning Ordinance Update	City Council Chambers 701 Laurel Street 7:00 p.m.
September 9, 2015	Community Workshop - Draft Land Use and Circulation Elements and Zoning Update - Repeat	Senior Center 100 Terminal Avenue 7:00 p.m.
September 2, 2015	Community Workshop - Draft Land Use and Circulation Elements and Zoning Update	Downtown Paseo (Chestnut Ave. at Santa Cruz Ave.) 7:00 p.m.
August 24, 2015	GPAC #8.5 - Review Draft Land Use and Circulation Elements and Zoning Ordinance Update (Agenda, Presentation)	Arrillaga Recreation Family Center (*Oak Room)* 700 Alma Street 5:30 - 8:30 pm
July 23, 2015	GPAC #8 - Review Draft Land Use and Circulation Elements and Zoning Ordinance Update (Agenda, Presentation)	Menlo Park Public Library *(Lower Level Meeting Room*) 800 Alma Street 6:00 - 8:00 p.m.
July 20, 2015	End of Notice of Preparation (NOP) Comment Period	Online or at City Hall 701 Laurel St.

ConnectMenlo's Public Outreach and Participation Process

Date	Topic	Location
July 17, 2015	End of Goals, Policies and Programs Comment Period (Circulation Element - Clean Version / Track Change Version; Land Use Element - Clean Version / Track Change Version)	Online or at City Hall 701 Laurel St.
June 30, 2015	GPAC #7 - Review Draft General Plan Policies and Consistency Analysis (Agenda, Correspondence, Presentation)	Menlo Park Public Library Lower Level Meeting Room 800 Alma St. 6:00 - 8:00 pm
June 18, 2015	Release of Notice of Preparation (NOP) for Environmental Impact Report (EIR) for 30-day Comment Period	Available online or at City Hall 701 Laurel St.
June 16, 2015	City Council - Authorization Release of Notice of Preparation (NOP) with a Maximum Development Potential (Staff Report)	City Council Chambers 701 Laurel St. 7:00 pm
June 8, 2015	Planning Commission - Draft NOP with Description of Maximum Development Potential (Staff Report, Presentation)	City Council Chambers 701 Laurel St. 7:00 pm
June 3, 2015	GPAC #6.5 - Preliminary Draft Notice of Preparation (NOP) with Description of Maximum Development Potential and Review Results of Community Program Survey (Agenda)	Arrillaga Recreation Family Center *(Oak Room)* 700 Alma Street 6:00 - 8:00 pm
June 1, 2015	Joint Bicycle and Transportation Commissions - Circulation Element/Transportation Issues (Agenda, Meeting Summary, Presentation, Video)	Senior Center 100 Terminal Ave. 7:00 pm
May 28, 2015	Housing Commission - Housing Issues (Agenda, Demographic Data, FAQs, Meeting Summary, Presentation, Video)	Senior Center 100 Terminal Ave. 7:00 pm
May 26, 2015	City Manager's Budget Workshop (Presentation, Video)	Senior Center 100 Terminal Ave. 6:00 pm
May 21, 2015 Rescheduled to June 3, 2015	GPAC #6.5 - Preliminary Draft Notice of Preparation (NOP) with Description of Maximum Development Potential and Review Results of Community Program Survey (Agenda)	Arrillaga Recreation Family Center *(Oak Room)* 700 Alma St. 6:00 - 8:00 pm
May 7, 2015	Community Meeting with Information Stations and Group Question & Answer Session (Agenda, see May 2 for materials)	Senior Center 100 Terminal Ave. 7:00 - 9:00 pm

CONNECTMENLO'S PUBLIC OUTREACH AND PARTICIPATION PROCESS

Date	Topic	Location
May 2, 2015	Community Meeting with Information Stations and Group Question & Answer Session (Agenda, Guiding Principles, Citywide Map, Project Schedule, List of Meetings To Date, Existing Conditions map of Bayfront Area with land ownership and approved development, Proposed Maximum Development Land Use Map, Progression board with latest maps added, Live/Work/Play development prototypes with density, Amenities Survey Results, Transportation improvements (Bayfront/Hillside), Best practices in transportation, Dumbarton Rail and Other Solutions)	Senior Center 100 Terminal Ave. 9:00 - 11:00 am
April 20, 2015 (Deadline)	Community Programs Survey	Website
April 14, 2015	City Council - Revised Schedule (Agenda, Staff report)	City Council Chambers 701 Laurel St. 7:00 pm
March 31, 2015	Joint City Council/Planning Commission - Preferred Land Use Alternative (Staff report, Presentation, Public Correspondence)	City Council Chambers 701 Laurel St. 7:00 pm
March 25, 2015	GPAC Meeting #6 - Review Findings from Workshop #3 (Meeting Agenda, Presentation, Comments Distributed at Meeting, Meeting Summary)	Arrillaga Recreation Family Center *(Oak Room)* 700 Alma St. 6:00 - 8:00 pm
March 19, 2015	Open House #3 - Overview of Preferred Land Use Alternative and Potential Bayfront Area and Belle Haven Infrastructure Projects and Community Programs (Meeting Agenda, Presentation, Paper Survey: English/Spanish)	Neighborhood Service Center 871 Hamilton Ave. 7:00 - 8:30 pm
March 12, 2015	Workshop #3 - Review Preferred Land Use Alternative and Input on potential Bayfront Area and Belle Haven Infrastructure Projects and Community Programs. (Meeting Agenda, Community Programs City Projects Categorized, Land Use Handout: English/Spanish, Presentation, Transportation Improvements: Bayfront & Hillside)	Council Chambers 701 Laurel St. 7:00 pm
February 24, 2015	City Council - Status Update (Staff Report)	Council Chambers 701 Laurel St. 7:00 pm
February 19, 2015	Comment Deadline for (Public Review Draft Existing Conditions Reports, Public Correspondence)	Website
February 12, 2015	GPAC Meeting #5 - Discuss Preferred Alternative (Meeting Agenda, Presentation, Public Correspondence distributed at meeting, Meeting Summary and Updated Land Use Map)	Arrillaga Family Recreation Center *(Oak Room)* 700 Alma St. 6:00 - 8:30 pm
February 9, 2015	Planning Commission - Status Update (Staff Report)	Council Chambers 701 Laurel St. 7:00 pm

ConnectMenlo's Public Outreach and Participation Process

Date	Topic	Location
January 28, 2015	GPAC Meeting #4 – Review Findings from Workshop #2 and Recommend Land Use Alternatives (Meeting Agenda, Presentation)	Menlo Park Library *(Lower Lever Meeting Room)* 800 Alma St. 4:00 - 6:00 pm
January 20, 2015 (Deadline)	Online Survey, Online Survey Instructions (Summary of Land Use Alternatives Survey)	Website
January 8, 2015	Open House (Meeting Agenda, Presentation, Bayfront Area Planned Transportation Modifications, Alternative 1, Alternative 2, Alternative 3 and Handout)	Neighborhood Service Center 871 Hamilton Ave. 6:30 - 8:30 pm
December 18, 2014	Workshop #2 - Present Future Land Use and Circulation in Bayfront Area (Accepted Guiding Principles, Agenda, Alternative Base Map, Base Map, Key Planning Considerations, Multi-Family Residential & Office Development in the Bayfont Area, Presentation, Sample Development Types, Small Group Exercise Land Use Maps, and Workshop #2 Summary)	Senior Center *(Ballroom)* 110 Terminal Ave. 7:00 - 9:00 pm
December 16, 2014	City Council - Accept the Guiding Principles (Staff Report)	City Council Chambers 701 Laurel St. 7:00 pm
December 9, 2014	Joint City Council/Planning Commission - Study Session (Presentation and Staff Report)	City Council Chambers 701 Laurel St. 7:00 pm
December 4, 2014	GPAC #3 (Meeting Agenda and Presentation)	Arrillaga Family Recreation Center *(Oak Room)* 701 Laurel St. 6:00 - 8:30 pm
November 18, 2014	City Council Presentation - Guiding Principles (Presentation)	City Council Chambers 701 Laurel St. 6:00 pm
November 10, 2014	GPAC Meeting #2 (Draft Guiding Principles, Meeting Agenda and Presentation)	Arrillaga Family Gymnastics Center *(Multi-Purpose Room)* 501 Laurel St. 4:00 - 6:00 pm
October 26, 2014	ConnectMenlo Survey (Survey Results: Online and Paper Surveys)	Menlo Park
October 16, 2014	Focus Group #2 - Receive community feedback on ideas discussed at Symposium #2 (Focus Group #2 Summary and Presentation)	Arrillaga Family Recreation Center *(Oak Room)* 700 Alma St. 7:00 - 9:00 pm
October 14, 2014	Mobile Tour #2 - Other Communities (Route map and handouts - Foster City, Mountain View, and Sunnyvale)	Meet at Bohannon Property 155 Constitution Dr. 12:30 - 3:30 pm
October 8, 2014	Symposium #2: Transportation - LOS Case Studies (Presentation and Video)	City Council Chambers 701 Laurel St. 7:00 - 9:00 pm

ConnectMenlo's Public Outreach and Participation Process

Date	Topic	Location
October 2, 2014	Stakeholders Meeting (Summary)	Arrillaga Family Recreation Center 701 Laurel St.
October 1, 2014	Mobile Tour #1 - Menlo Park (Route map)	Meet at Civic Center 701 Laurel St. 12:30 - 3:00 pm
September 29, 2014	Focus Group #1: Receive community feedback on ideas discussed at symposium #1 (Focus Group #1 Summary and Presentation)	Arrillaga Family Recreation Center *(Juniper Room)* 700 Alma St. 7:00 - 9:00 pm
September 23, 2014	Symposium #1: Growth Management & Economic Development (Presentation and Video)	City Council Chambers 701 Laurel St. 7:00 - 9:00 pm
September 17, 2014	Workshop #1 (Repeat) (I Love Menlo Park Statement, I Wish Menlo Park had Statement, Presentation, Workshop Materials and Workshop #1 Summary)	Senior Center *(Ballroom)* 100 Terminal Ave. 7:00 - 9:00 pm
September 11, 2014	Workshop #1 (I Love Menlo Park Statement, I Wish Menlo Park had Statement, Presentation, Workshop Materials and Workshop #1 Summary)	Menlo Park Presbyterian Church *(Social Hall)* 700 B Santa Cruz Ave. 7:00 - 9:00 pm
August 25, 2014	GPAC Meeting #1 (Meeting Agenda, Meeting Summary and Presentation)	Arrillaga Family Recreation Center *(Oak Room)* 700 Alma St. 6:00 - 8:00 pm

Source: PlaceWorks and City of Menlo Park, 2015.

APPENDIX D:
EXISTING CONDITIONS REPORT

EXISTING CONDITIONS REPORTS

PUBLIC REVIEW DRAFT

City of Menlo Park

GENERAL PLAN (LAND USE & CIRCULATION) AND M-2 AREA ZONING UPDATE

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menlo park land use & mobility update

Foreword

PURPOSE OF THE REPORTS

Planning for Menlo Park's future requires an understanding of current circumstances and the issues the community is facing. Accordingly, the attached Existing Conditions Reports addressing Land Use, Circulation, and Economics have been prepared to support the ConnectMenlo project, and they are complemented by a Community Character Report that documents unique features of the city's many neighborhoods. In combination with the Guiding Principles established for the General Plan and M-2 Area Zoning Update, the information in these reports is intended to help the community create sound policies and programs to achieve the goals of the updated General Plan Land Use and Circulation Elements.

The reports can be read together or as stand-alone documents. They are intended to provide informative overviews and perspectives to help the community gain insight into how the General Plan can influence key local issues, and technical explanations of the complex, interconnected subjects the Plan must consider. The reports seek to distill a large amount of data in an accessible manner to act as a starting point for future policy discussions. Each Existing Condition Report has a concluding section entitled "Summary Key Findings" that emphasizes pressing issues and opportunities.

THE GENERAL PLAN UPDATE

Often described as each city's "Constitution," general plans are required by State law to guide land use and development, usually for a period of 10 to 20 years. With the Housing, Open Space/Conservation, Noise and Safety Elements having been recently updated, the focus of ConnectMenlo is on the Land Use and Circulation Elements. These two elements are central components of a general plan because they describe which land uses should be allowed in the city, where those land uses should be located, and how they may be accessed and connected. The Land Use Element frames the type and scale of potential development that may occur, particularly in the M-2 Area, which is generally between US 101 and the Bay and where most change is expected in Menlo Park over the next two decades. The Circulation Element will also address transportation issues throughout the city, and both updated Elements will be consistent with the other General Plan Elements.

Community engagement is the foundation of the ConnectMenlo project, as updated policy language will only be meaningful if it helps achieve the community's vision for the future. The in-person public outreach and participation process has included workshops and open houses; mobile tours of Menlo Park and nearby communities; informational symposia; stakeholder interviews; focus groups; recommendations by a General Plan Advisory Committee (GPAC) composed of City commissioners, elected officials, and community members; and consideration by the City Council and Planning Commission at public meetings. Many more such opportunities will occur throughout the process to ensure that community members play a central role in guiding the General Plan and Zoning Ordinance updates. In addition, ConnectMenlo features a comprehensive project website, online surveys, and a mobile app that provides access to project information and documents, as well as self-guided tours.

The updated Land Use and Circulation Elements and zoning provisions will be evaluated by an Environmental Impact Report (EIR) that determines whether the potential changes may produce impacts that need to be mitigated. By incorporating implementation provisions that purposely reduce environmental impacts, the proposed updates can be made largely self-mitigating, which reduces the need for separate EIR mitigation measures, improves the efficiency of implementation, and increases the likelihood that development will be environmentally sustainable.

NEXT STEPS

Following release of the Existing Conditions and Community Character Reports, the City of Menlo Park will solicit additional community feedback regarding a potential future development scenario in the M-2 Area, as well as regarding policy directions to support that scenario. New goals and policies could impact city regulations, especially in regard to development in the M-2 Area, with implications for transportation improvements. Potential land use changes, in conjunction with new goals, policies, and programs, will affect the ways in which the Menlo Park built environment may evolve over time. These policies and programs will also establish the ways in which new developments contribute to the quality of life in Menlo Park.

LAND USE

EXISTING CONDITIONS REPORT

PUBLIC REVIEW DRAFT

JANUARY 2015

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OVERVIEW

This existing conditions report provides comprehensive information to help inform the Connect Menlo General Plan (Land Use and Circulation Elements) and M-2 Area Zoning Update process as it pertains to Land Use. The report includes information about relevant regulations, a description of Menlo Park's natural and urban setting, an account of the history of Menlo Park, background on planning and land use concepts, an overview of existing land use conditions in the city, and information on quality of life and the provision of public services in Menlo Park.

STATE REGULATIONS AND GUIDANCE

CALIFORNIA GENERAL PLAN LAW

As a general law city, Menlo Park has more limited powers to enact land use regulations than do charter cities. State planning and zoning law (California Government Code Section 65000-66499.58) requires every city in California to adopt a comprehensive, long-term general plan for the physical development of the city and of any land in a "Sphere of Influence" (SOI) outside its boundaries that in the jurisdiction's judgment bears relation to its planning. A general plan should consist of an integrated and internally consistent set of goals and policies that are grouped by topic into a set of elements guided by a citywide vision. State law requires that a general plan address seven elements or topics (land use, circulation, housing, conservation, open space, noise, and safety), but allows some discretion on the arrangement and content. All of the Menlo Park General Plan Elements have been updated between 2013 and 2014, except for Land Use and Circulation, which have not been comprehensively updated since 1994. Each of the specific and applicable requirements in the State planning law (as provided California Government Code Section 65300) should be examined to determine if there are environmental issues within the community that the general plan should address, including but not limited to hazards and flooding.

CALIFORNIA OFFICE OF PLANNING AND RESEARCH GENERAL PLAN GUIDELINES

As a means of assisting local governments to comply with State law regarding the development and updating process for local government general plans, the California Office of Planning and Research (OPR), per Government Code Section 65040.2, adopts and updates guidelines for the preparation and content of general plans. These guidelines currently include sections on the required content of general plans, sustainable development, environmental justice, formatting, public participation, and implementation. The most recent version of these guidelines is from 2003, but OPR is in the process of developing an extensive update to these guidelines, which is anticipated to be released in 2015. This update is expected to focus on making the guidelines more current, interactive, and user-friendly, and will not include any changes to the required contents of a general plan.

CALIFORNIA AERONAUTICS ACT

The California Aeronautics Act, established by the California Department of Transportation (Caltrans)–Division of Aeronautics, requires the preparation of airport land use compatibility plans (ALUCPs). ALUCPs allow for compatibility between airports and the uses adjacent to airports, to the extent that these adjacent uses are not already developed with incompatible uses. The primary goals of ALUCPs are to promote safety in flying and minimize risks to surrounding land uses. Additionally, these plans serve to protect airports from encroachment by new incompatible land uses. The effects on lands in Menlo Park of the Comprehensive Land Use Compatibility Plan for the Palo Alto Airport and the San Mateo County Comprehensive Airport Plan, which includes the nearby San Carlos Airport, are discussed below in the Regional and Local Plans and Regulations section of this report.

SENATE BILL 375

As a means to achieve the statewide emission reduction goals set by Assembly Bill (AB) 32 (The California Global Warming Solutions Act of 2006), SB 375 (The Sustainable Communities and Climate Protection Act of 2008) directs the California Air Resources Board (CARB) to set regional targets for reducing greenhouse gas (GHG) emissions from cars and light trucks. Using the template provided by the State's Regional Blueprint program to accomplish this goal, the bill seeks to align transportation and land use planning to reduce vehicle miles traveled (VMT) through modified land use patterns. There are five basic directives of the bill: 1) creation of regional targets for GHG emissions reduction tied to land use; 2) a requirement that regional planning agencies create a Sustainable Communities Strategy (SCS) to meet those targets (or an Alternative Planning Strategy if the strategies in the SCS would not reach the target set by CARB); 3) a requirement that regional transportation funding decisions be consistent with the SCS; 4) a requirement that the Regional Housing Needs Allocation numbers for municipal general plan housing element updates must conform to the Sustainable Communities Strategy; and 5) California Environmental Quality Act (CEQA) exemptions and streamlining for projects that conform to the Sustainable Communities Strategy.[1] The implementation mechanism for SB 375 that applies to land use in Menlo Park is Plan Bay Area (see next section).

REGIONAL AND LOCAL PLANS AND REGULATIONS

PLAN BAY AREA

The Association of Bay Area Governments (ABAG), Metropolitan Transportation Commission (MTC), Bay Area Air Quality Management District (BAAQMD), and San Francisco Bay Conservation and Development Commission (BCDC) share joint responsibility for creating, updating, and overseeing Plan Bay Area, the Sustainable Communities Strategy (SCS) for the nine-county Bay Area region pursuant to SB 375. Each of the agencies involved in the SCS has a different role in regional governance. ABAG primarily deals with regional land use, housing, environmental quality, and economic development, while MTC is tasked with regional transportation planning, coordinating, and financing. BAAQMD is responsible for regional air pollution regulation. BCDC's focus is to preserve, enhance, and ensure responsible use of San Francisco Bay.

These agencies jointly created Plan Bay Area,[2] adopted in July 2013 and now a regulating portion of the Bay Area's 25-year Regional Transportation Plan (RTP), which in part dictates funding for local transportation programs and improvements. By federal law, the RTP must be internally consistent. Therefore, the more than $200 billion dollars of transportation investment typically included in the RTP must align with and support the SCS land use pattern. State law also requires that the updated 8-year regional housing need allocation (RHNA) prepared by ABAG for municipal housing element updates is consistent with the SCS.

Plan Bay Area sets a development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce GHG emissions from cars and light trucks beyond the per capita reduction targets identified by CARB pursuant to SB 375.

As part of the implementation framework for Plan Bay Area, local governments may identify "Priority Development Areas" (PDAs) to focus growth. The PDAs are transit-oriented, infill development opportunity areas within existing communities. Over two-thirds of overall Bay Area growth through 2040 is allocated to the PDAs, which are expected to accommodate 80 percent (or over 525,570 units) of new housing and

[1] William Fulton, 2008. *SB 375 Is Now Law – But What Will It Do,* California Planning and Development Report.
[2] To read more about Plan Bay Area go to www.OneBayArea.Org.

66 percent (or 744,230) of new jobs in the region.[3] Additionally, the plan designates "Priority Conservation Areas" (PCAs), which are regionally significant open spaces for which there exists broad consensus for long-term protection, but which face nearer-term development pressures. Menlo Park currently has one PDA that surrounds El Camino Real and includes areas in and around Downtown Menlo Park. The area covered by the El Camino Real & Downtown Specific Plan falls within Menlo Park's PDA. Menlo Park does not have a PCA.

The SCS does not directly govern land uses within Menlo Park and does not affect local decision-making authority. However, there are a number of benefits available to the City from being consistent with Plan Bay Area, including potential streamlining of CEQA review for certain transit priority, residential, and/or mixed-use projects, as well as high eligibility for transportation funding, provided that policies and land use patterns proposed in the General Plan align with SCS goals.

LOCAL AGENCY FORMATION COMMISSION

The Cortese-Knox Act (1986) and the Cortese-Knox-Hertzberg Local Government Reorganization Act (2000) govern Local Agency Formation Commissions (LAFCOs) in each county in California, empowering LAFCOs to review, approve, or deny proposals for boundary changes and incorporations for cities, counties, and special districts. San Mateo LAFCO establishes a SOI for each city that describes the city's probable future physical boundaries and service areas and/or the area with the potential to be strongly affected by city policies and land use decisions. Figure 1 shows the location of Menlo Park within the Bay Area region, and Figure 2 depicts the city limits, SOI and other important planning boundaries, which are discussed specifically beginning on page 17 of this report.

SAN FRANCISCO BAY BASIN WATER QUALITY CONTROL PLAN

The San Francisco Bay Regional Water Quality Control Board (RWQCB) oversees a Water Quality Control Plan for the San Francisco Bay Basin (the Basin Plan) that designates "beneficial" uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the Basin Plan, which includes wetlands in and near Menlo Park.[4] The Basin Plan centers on watershed management, a strategy for protecting water quality by examining all inputs into drainages and downstream water bodies. Accordingly, compliance with the Basin Plan involves adherence to stormwater control requirements for land use activities in Menlo Park.

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[3] Metropolitan Transportation Commission (MTC) and Association of Bay Area Governments (ABAG), 2013. *Final Plan Bay Area, Strategy for a Sustainable Region.*

[4] California Regional Water Quality Control Board San Francisco Bay Region (Region 2), 2007. *San Francisco Bay Basin (Region 2) Water Quality Control Plan (Basin Plan).*

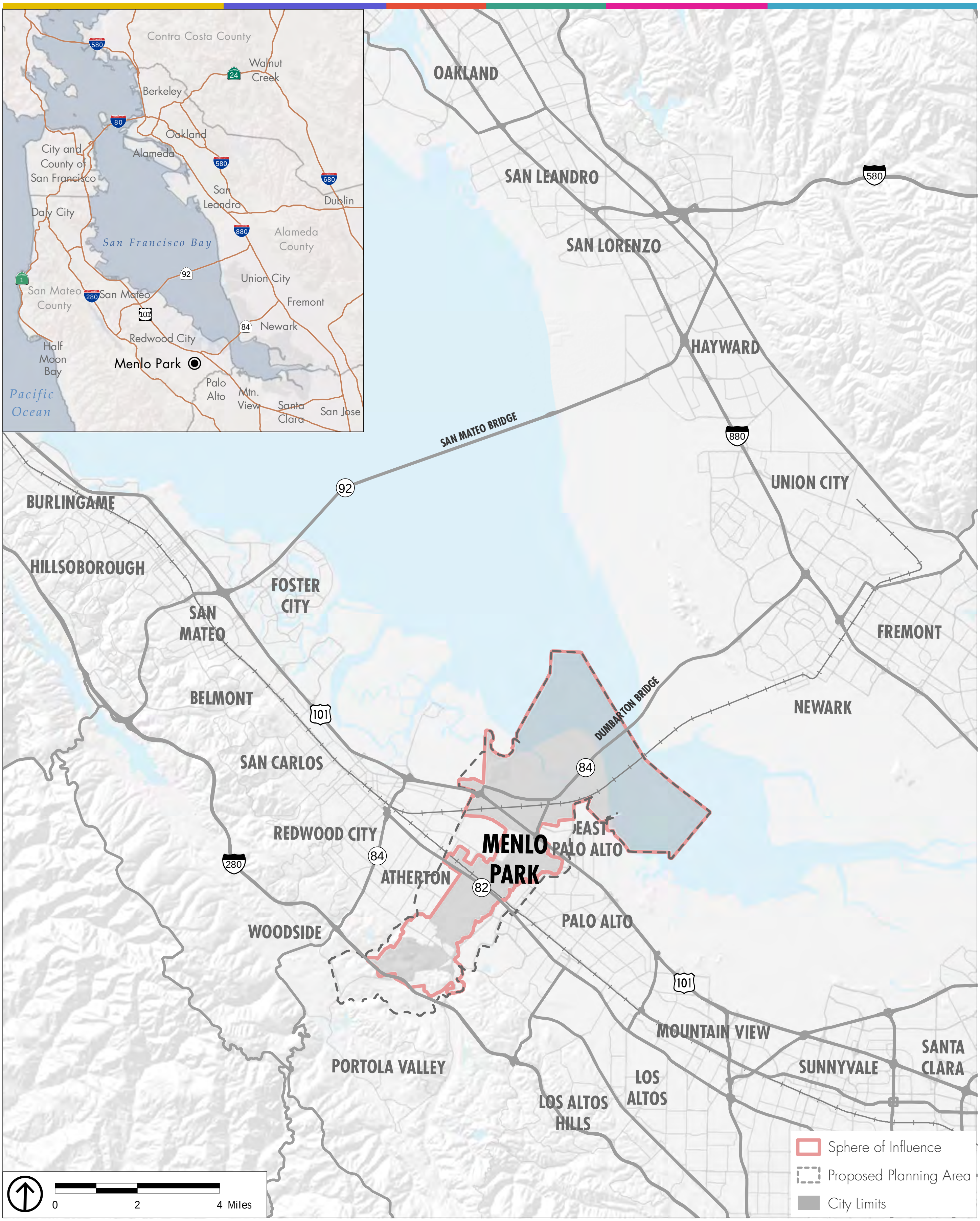

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FIGURE 1: MENLO PARK REGIONAL LOCATION

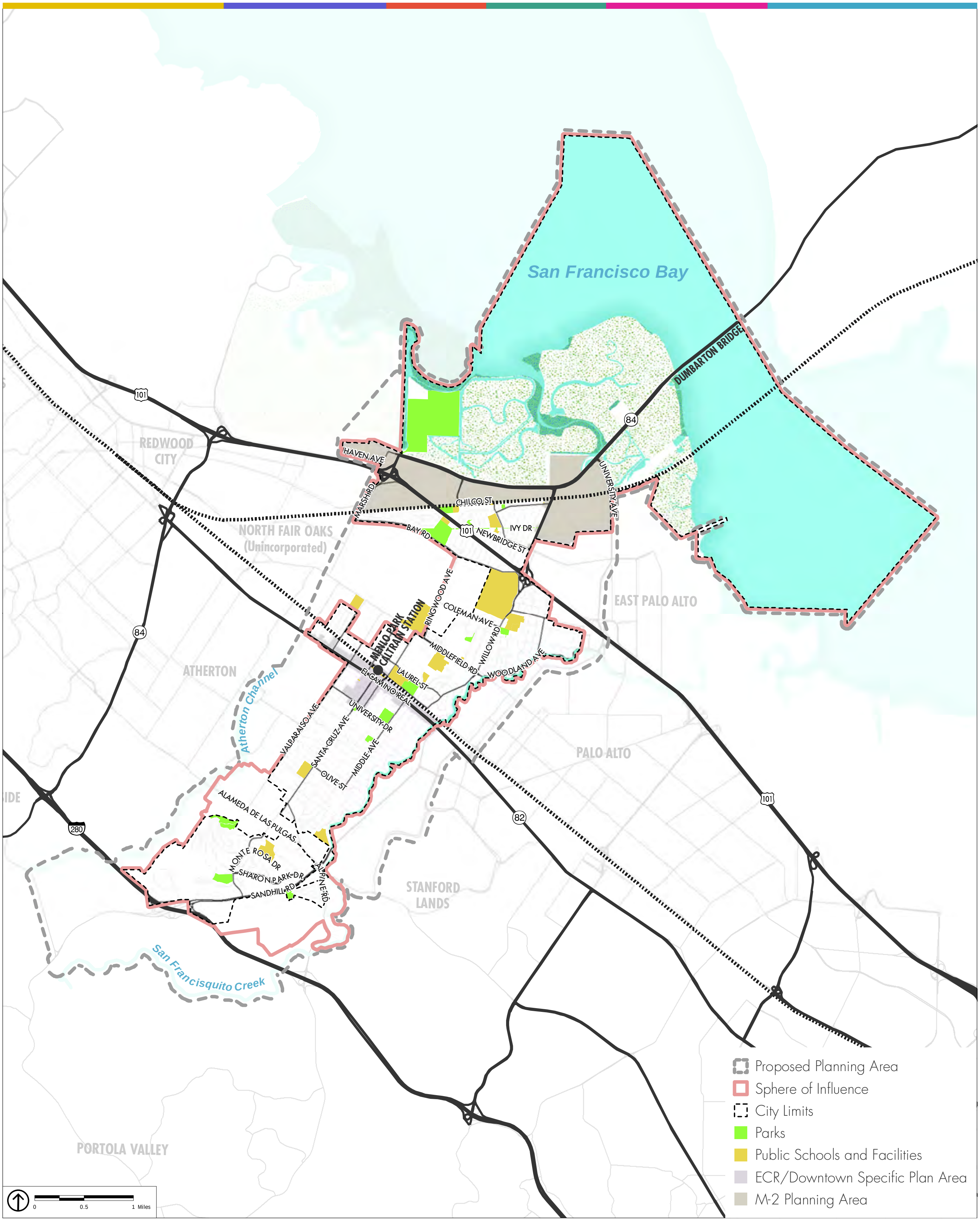

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FIGURE 2: CITYWIDE CONTEXT

SAN MATEO COUNTY GENERAL PLAN

The San Mateo County General Plan governs land use in three areas within the Menlo Park SOI that are not inside the city limits: 1) the area near Ringwood Avenue between Bay Road and Middlefield Avenue referred to as Menlo Oaks, 2) the Alameda de Las Pulgas District referred to as West Menlo Park – a census-designated place, Stanford Weekend Acres along Alpine Road, and 3) the Stanford Linear Accelerator (see Figure 2). Land use activities in these unincorporated areas, especially Alameda de Las Pulgas, influence conditions in Menlo Park. The San Mateo County General Plan includes primarily medium-to-high density residential and neighborhood commercial land uses along Alameda de Las Pulgas.

SAN MATEO COUNTY CONGESTION MANAGEMENT PROGRAM

In accordance with California Government code 65088, San Mateo County has established a Congestion Management Program (CMP), applicable to all the jurisdictions in the County, aimed at reducing traffic congestion and improving air quality. The CMP promotes infill development in core areas along major transit corridors, as well as alternative forms of transportation. The plan encourages the integration of land use and transportation planning efforts. Additional information about the CMP related to transportation is discussed in the Circulation Existing Conditions Chapter.

SAN MATEO COUNTY COMPREHENSIVE AIRPORT LAND USE PLAN

Menlo Park is not within the Airport Influence Area, Federal Aviation Regulation (FAR) Part 77 Conical Surface area,[5] or identified noise contours for any airports in San Mateo County, including the San Carlos airport.[6,7]

COMPREHENSIVE LAND USE COMPATIBILITY PLAN – PALO ALTO AIRPORT

The Comprehensive Land Use Plan (CLUP) for the Palo Alto Airport was adopted by the Santa Clara County Airport Land Use Commission in 2008. The CLUP is intended to safeguard the general welfare of the inhabitants within the vicinity of Palo Alto Airport and ensure that new surrounding uses do not affect continued safe airport operation. Specifically, the CLUP seeks to protect the public from the adverse effects

[5] The FAR Part 77 Conical Surface is an imaginary three-dimensional conical surface that extends upward and outward from airports in order to determine safe structure heights to avoid the obstruction of air traffic.

[6] City/County Association of Governments of San Mateo County, 1996. *San Mateo County Comprehensive Airport Land Use Plan,* Map SC-15, December. http://old.ccag.ca.gov/pdf/documents/2009/SMC_Airports_CLUP.pdf, accessed on Nov. 7, 2014.

[7] City/County Association of Governments of San Mateo County, 2004. *Revised Airport Influence Area Boundary for San Carlos Airport – Area B,* October 14. http://old.ccag.ca.gov/pdf/documents/archive/sc%20airport%20influence%20b.pdf, accessed on November 7, 2014.

of aircraft noise, to ensure that people and facilities are not concentrated in areas susceptible to aircraft accidents, and to ensure that no structures or activities adversely affect navigable airspace.[8] Menlo Park does not fall within the Airport Influence Area of this facility, and none of the noise or safety zones for the Palo Alto airport fall within the boundaries of Menlo Park; however, extreme eastern portions of Menlo Park in the vicinity of O'Connor Street and Byers Avenue fall within the 354-foot FAR Part 77 Surfaces for the Palo Alto Airport.[9] This means that buildings approaching or near a height of 354 feet in the area would conflict with use of the airport. Buildings in this area are generally less than 40 feet tall and are anticipated to remain at or below this height.

MENLO PARK MUNICIPAL CODE

The sections of the Menlo Park Municipal Code that are most directly relevant to land use are summarized below. Land use and development in the city are also affected by an array of other code sections that deal with specific technical issues.

CHAPTER 2.12 PLANNING COMMISSION

As currently written, this chapter assigns to the Planning Commission all the powers and duties outlined in the State Conservation and Planning Act. Although the Conservation and Planning Act has been superseded by updated legislation, the powers and duties of planning commissions remain much the same as they were under the original Act. In Menlo Park, the Planning Commission is the decision-making body on use permits, architectural control and variances. The Planning Commission also acts as the primary advisory body to the City Council on land use matters, including consideration of rezoning proposals, conditional development permits, general and specific plans, and issues recommendations regarding such plans and certain types of development proposals and land use activities.

TITLE 15 – SUBDIVISIONS

Also known as the Subdivision Ordinance, Title 15 controls the creation of parcels and establishes the regulatory process surrounding the division of land in Menlo Park. The regulations of the Subdivision Ordinance implement the Subdivision Map Act of the State of California. This ordinance includes provisions related to the requirement of tentative and final maps for all subdivisions, as well as the required contents of these tentative and final maps. Additionally, pursuant to the Quimby Act, this title contains provisions

[8] Santa Clara County Airport Land Use Commission, 2008. *Comprehensive Land Use Plan Santa Clara County,* page 1-1, November 19.

[9] Santa Clara County Airport Land Use Commission, 2008. *Comprehensive Land Use Plan Santa Clara County,* Figures 4, 5, 6, 7, and 8, November 19.

related to the required amount of parkland dedication for new subdivisions, including the formula used to calculate the required acreage of land to be dedicated or the fee, which would be due in lieu of the required land dedication. The Subdivision Ordinance also contains requirements pertaining to condominiums, lot mergers, variances, and compliance with the City's affordable housing requirements.

TITLE 16 – ZONING

Menlo Park's zoning ordinance serves to implement the land use designations in the General Plan by establishing comprehensive zoning rules for the city. The Zoning Ordinance includes the zoning map, which establishes and delineates various districts in Menlo Park, with each district having specific zoning regulations and development standards. The Zoning Code directs decision makers to consider public health, safety, general welfare, traffic conditions, and "orderly development" when making land use and zoning decisions. As stated in Chapter 16.02 of the Zoning Code:

> The purpose of this [zoning] title is to preserve and extend the charm and beauty inherent to the residential character of the city; to regulate and limit the density of population; encourage[sic] the most appropriate use of land; to conserve land and stabilize the value of property; to provide adequate open space for light, air and fire protection; to lessen traffic congestion; to facilitate the provision of community facilities; to encourage tree and shrub planting; to encourage building construction of pleasing design; to provide the economic and social advantages of a planned community.

A targeted update to the Zoning Code will be an integral component of the General Plan and M-2 Area Zoning Update Project. Zoning districts in the M-2 Area are currently viewed as out of date, since they do not adequately respond to the types of uses that are in demand and being considered for the M-2 Area.

MENLO PARK HOUSING ELEMENT

Housing Elements are one of the seven State-mandated elements for local General Plans; however, housing elements are subject to special requirements and are often updated in a process separate from the remainder of a general plan, since their updates occur on a set schedule. For jurisdictions such as Menlo Park with a compliant Housing Element, the update process is on an 8-year cycle. State law requires that municipalities adopt housing elements that enable them to adequately meet their projected housing needs, including a fair share of regional market-rate and affordable housing demand. Regional housing needs are projected as part of the Regional Housing Needs Allocation (RHNA) process, which is overseen in Menlo Park by the California Department of Housing and Community Development (HCD) and the Association of Bay Area Governments. For the 2015–2023 planning period, Menlo Park's housing allocation was 655 dwelling units, 362 of which are designated for households earning less than 80 percent of the median household income in

San Mateo County. Menlo Park is part of a collaborative effort named "21 Elements" to coordinate the update of Housing Elements in San Mateo County.

The City of Menlo Park adopted its most recent Housing Element for the 2015–2023 cycle in April 2014, and the Element was subsequently certified by HCD also in April 2014. The 2015–2023 Housing Element contains goals, policies, and programs to ensure the adequate provision of housing, affordable housing, and housing for special-needs populations. The City adopted several new ordinances alongside the Housing Element in order to comply with recent changes in State law. The ordinances adopted serve to provide opportunities for emergency shelter, residential care facilities, and supportive and transitional housing. The City also adopted amendments to the secondary dwelling unit and accessory buildings and structures ordinances. The amendments allowed for the conversion of legally permitted and constructed accessory buildings (meeting certain criteria) into second dwelling units and also provided greater clarity in the definitions of accessory building and accessory structure and established development regulations more aligned to facilitate the construction of such buildings and structures. Table 1 illustrates Menlo Park's RHNA requirements for the 2015–2023 housing cycle and lists the housing sites and other sources of residential development identified by the 2015–2023 Housing Element that will allow Menlo Park to meet these requirements.

As of December 2014, four higher density, multi-family residential projects have been initiated in Menlo Park, with a total of 795 new units. In addition to the St. Anton and Core/VA residential projects shown in Table 1, Menlo Park is now also anticipating the completion of the Greenheart – Hamilton Avenue and Greystar projects, which together will contribute 341 of the 795 new units. Of the total 795 new units, 15 units, 74 units, and 7 units will be reserved, respectively, for Low Income, Very Low Income, and Extremely Low Income Households.

MENLO PARK CLIMATE ACTION PLAN

The City's Climate Action Plan (CAP) (adopted in May 2009)10 proposes local emissions reduction strategies designed to help meet AB 32 targets. The CAP provides the emission inventory from 2005-2009, the emission forecast for year 2020, a reduction goal for 2020, and the recommendation for GHG reduction strategies. The City subsequently prepared the CAP Assessment Report in July 2011. This report clarified and updated the CAP and is now the primary strategy for the City to reduce GHG emissions. Based on the emission inventory and forecast for year 2020, and in order to meet AB 32 goals, the City adopted a GHG reduction target of 27 percent below the 2005 level by 2020 in June 2013.

[10] City of Menlo Park, 2009. *Climate Action Plan.* http://www.menlopark.org/DocumentCenter/View/1346, accessed December 30, 2014.

TABLE 1 POTENTIAL HOUSING SITES AND CONTRIBUTIONS TOWARD RHNA REQUIREMENTS

		Total Units
2015–2023 RHNA		**655**
Units in Pipeline as of December 2013 [a]		
3639 Haven Avenue (Anton Menlo)		394
605 Willow Road (Willow Housing – VA/Core)		60
Scattered Site Units Pre-2012 Zoning		11
New Second Units		7
	Subtotal	*472*
	Residual 2015–2023 RHNA (Subtracting In-Pipeline Units)	**183**
New Units Potential Under the 2015–2023 RHNA		
El Camino Real/Downtown Specific Plan Zoning		680
New Housing on Infill Sites Around Downtown		70
New Second Units		50
Conversions to Second Units		15
High Density Opportunity Sites [b]		433
Scattered Site Units Pre-2012 Zoning		189
	Subtotal	*1,427*
	Remaining Adjusted 2015–2023 RHNA	**-1,244**

a. "Units in the Pipeline" include units built or approved (permits issued or entitlements completed)
b. Includes the following sites: both of MidPen's Gateway Apartments sites, Hamilton Avenue, and Haven Avenue R-4-S sites
Source: City of Menlo Park, April 1 2014, @ Home in Menlo Park, 2015–2023 City of Menlo Park Housing Element.

The CAP Assessment Report recommends various community and municipal strategies for near-term and mid-term considerations. The emissions reduction strategies are generally focused on community actions, since more than 99 percent of the emissions are from community sources. A cost benefit analysis of the selected strategies will be presented to City Council prior to implementation.

In June 2014, the City Council approved an updated 5-year Climate Action Plan Strategy, based on the current staffing levels and budget resources available. If the current list of strategies is implemented, Menlo Park can expect to achieve 46 percent of its GHG target, which still falls far short of the goal. Additional strategies were not added as there are not sufficient staffing levels to accomplish more.

LAND USE AND ZONING

Menlo Park zoning and General Plan land use designations are more closely aligned than in many other cities. For properties in Menlo Park, a parcel's zoning designation stems directly from its General Plan land use designation, with the zoning designation acting as a means to refine the specific uses and development standards for that parcel. Land Uses in Menlo Park are also governed by Specific Plans, such as the El Camino Real and Downtown Specific Plan, which is discussed in greater detail later in this chapter.

- "Existing land use" refers to the use currently in place on a property, regardless of the General Plan land use designation or zoning designation.
- "General Plan land use designation" refers to broad categories of different types of land uses, such as Single-Family Residential or Retail/Commercial, that are included and mapped within the General Plan. Each category establishes the general types of uses that are allowed by policy on a parcel with that designation. Each designation allows a range of possible intensities.

"Zoning designations" or "zoning districts" are also categories of land use, but they are regulatory standards and more specific than the General Plan land use designation. Zoning designations must be consistent or compatible with General Plan designations and provide detail about allowed uses, minimum setbacks, parking requirements, height restrictions, and other aspects of development above and beyond what is contained in the more general General Plan designation. In Menlo Park, zoning designations correlate directly with the General Plan land use designations.

MENLO PARK'S UNIQUE IDENTITY

Menlo Park has long played a central role in the dynamism of the Bay Area and Silicon Valley culture and economy. Situated in the middle of the Peninsula, approximately halfway between San Francisco and San Jose, Menlo Park is a hub of investment and scientific innovation. Menlo Park draws upon the academic powerhouse of Stanford University as well as the economic centers of San Francisco and Silicon Valley, but Menlo Park has forged its own identity with its unique contributions to the economic and intellectual landscape both regionally and globally.

Menlo Park hosts institutions that are renowned both nationally and worldwide. Located in central Menlo Park on Middlefield Road, the US Geological Survey (USGS) Menlo Park Science center remains the Survey's "flagship research center in the western United States." SRI International, formerly the Stanford Research Institute, is a spinoff of the university that has been a world leader in science and technology for over 50 years. Sand Hill Road hosts many influential investment firms, leading it to be known as the Venture

Capital or "VC" Corridor. Finally, the location and now expansion of Facebook has drawn international attention and even tourism to the M-2 Area.

Menlo Park's identity is also defined by its mosaic of distinctive residential neighborhoods, which represent a variety of urban forms, architectural styles, and cultures. Menlo Park's individual neighborhoods are discussed in greater detail below, as well as in the Community Character Existing Conditions chapter.

REGIONAL CONTEXT

Menlo Park is one piece in a jigsaw puzzle of neighboring jurisdictions with which Menlo Park must coordinate and cooperate. The city shares borders with portions of unincorporated San Mateo County, the municipalities of Atherton, Palo Alto, East Palo Alto, Fremont, and Redwood City. Although the municipalities of Portola Valley, and Woodside and the community of Ladera are located nearby, they do not share borders with Menlo Park. The San Francisco Bay comprises as significant proportion of Menlo Park's border. The presence of the Bay uniquely defines the geography and setting of Menlo Park, creating both issues and opportunities for Menlo Park and its residents, but the Bay is not the only water feature that defines Menlo Park. San Francisquito Creek has long been an important natural feature for Menlo Park, and today serves both as the city's eastern border with Palo Alto and as much of the border between San Mateo and Santa Clara counties. Figure 1 shows Menlo Park's regional location and immediate geographic context.

THE NEXUS BETWEEN TRANSPORTATION AND LAND USE

Many issues and opportunities faced by Menlo Park relate to transportation and its connection to land use. For example, transit stations and corridors often present opportunities for higher density or mixed-use development, which gives more people easy access to transit, and in turn, increases transit ridership and fare revenue. Similarly, placing employment uses near major transit corridors or freeways can help workers reach their workplaces without a need to drive long distances on local streets. The relationship between transportation and land use is increasingly recognized as a key planning issue for the near future, a nexus highlighted by the traffic congestion in Menlo Park related to regional commuting patterns. In fact, the State of California has recognized this issue and enacted relevant legislation. SB 375 requires that regional planning agencies now account for the close relationship between transportation and land use when making key planning and transportation program decisions. Additionally, SB 743, adopted in 2013, strengthens the statewide commitment to recognize and respond to the nexus between transportation and land use. Among other things, SB 743 offers opportunities for streamlined environmental review for certain types of projects near high-quality transit facilities, and also requires transportation agencies to ensure that Congestion Management Plans (CMPs) conform to regional transportation plans.

MENLO PARK CIRCULATION SYSTEM

The transportation information discussed in this report overlaps with the more detailed presentation in the Circulation Existing Conditions report; however, a brief discussion is offered to provide context for current land use patterns in the city.

MAJOR ROADWAYS

US 101

US 101 serves as a major regional connection but is also a formidable local barrier. It provides access to San Francisco, San Jose, and beyond, but also limits crosstown connectivity. Most surface streets do not cross US 101, creating a physical separation and forcing many cars, pedestrians, and bicyclists to travel longer distances on a limited number of crossings in order to reach destinations on the opposite side of the freeway. This barrier effect raises significant issues for the M-2 Area and Belle Haven neighborhood.

Interstate 280

Noted for its scenery, Interstate 280 runs along the hillside edge of Menlo Park. I-280 serves as another important connection to San Francisco and to other Peninsula communities near Menlo Park, especially for residents living in the Hillside areas of Menlo Park. I-280 does not pass through a geographically central or densely populated area of Menlo Park, but it does contribute to traffic congestion to and from the freeway along the Sand Hill Road corridor and Alpine Road during peak commute times.

Bayfront Expressway (Highway 84)

Bayfront Expressway runs along the Bay between the developed edge of Menlo Park and the marshlands of San Francisco Bay. Highway 84 is the approach to the Dumbarton Bridge, which provides access to the East Bay.

El Camino Real

Highway 82, also known as El Camino Real, is an important roadway with a long history. Established as a conduit between many of California's early missions and pueblos, El Camino Real once served as the primary connection between San Francisco, San Jose, and all the major cities along the Peninsula. Despite the construction of newer freeways like US 101 and I-280, El Camino Real continues to serve as a primary arterial, while also functioning as an important retail and mixed-use corridor. Regional pass-through traffic along El Camino Real contributes to significant congestion during commute times.

TRANSIT OPTIONS

In addition to its automobile infrastructure, Menlo Park is also served by local and regional rail, bus, and shuttle connections.

Caltrain

Caltrain runs parallel to El Camino Real through the heart of Menlo Park, with a stop located at the foot of Santa Cruz Avenue, immediately adjacent to Downtown Menlo Park. Caltrain offers seven-day-a-week service north to San Francisco and south to San Jose and beyond. Local trains run on all days of the week, with limited-stop and several "baby bullet" services on weekdays. The planned electrification of Caltrain to this corridor may result in future land use challenges and opportunities in the area surrounding the Menlo Park Station.

Dumbarton Express

Operated through a coordinated effort of AC Transit, BART, SamTrans, Union City Transit, and the Santa Clara Valley Transportation Authority (VTA), the Dumbarton Express offers a weekday transit connection to the East Bay, via the Union City BART station. On its way to and from the Stanford University campus, the Dumbarton Express bus serves areas of Menlo Park along Willow Road from Middlefield Road to San Francisco Bay.

Local Shuttles

Menlo Park is served by four different public shuttle lines run by the City and funded by both the City and a collection of regional agencies, including the San Mateo City/County Association of Governments (C/CAG), the Bay Area Air Quality Management District's (BAAQMD) Transportation Funds for Clean Air (TFCA), and the Peninsula Joint Powers Board (JPB). These shuttles serve a variety of areas and populations and operate on differing schedules. Caltrain shuttles run during weekday mornings and afternoons, serving the Menlo Park Caltrain station and employers in the Marsh Road and Willow Road corridors. Midday Shuttles serve a variety of community amenities and commercial centers in Menlo Park during weekdays from 9:30 a.m. to 3:30 p.m. The Menlo Park Shoppers Shuttle runs on Tuesdays, Wednesdays, and Saturdays, picking up passengers from their homes in the mornings and dropping them at major shopping centers and Menlo Park destinations. Later in the day, the shuttle picks passengers up at the same locations and returns them home. In addition, large employers like Facebook operate their own shuttles to transport their employees to and from the workplace.

SamTrans

Menlo Park is served by a number of regular and school day SamTrans routes. The only routes with daily service are Route 296 between East Palo Alto and Redwood City, and the El Camino Real Express, which runs from Daly City BART to the Palo Alto Transit Center. Menlo Park is also served by a number of commute-time and school-day bus routes that provide service at limited times on weekdays only. These routes are discussed in greater detail in the Circulation Existing Conditions chapter.

FUTURE POTENTIAL DUMBARTON RAIL

The now defunct Dumbarton Rail bridge once provided a train connection to the East Bay. Although largely abandoned at present, the remaining right-of-way has been the subject of planning efforts to potentially restore rail service along this corridor. In anticipation of this future potential, other municipalities have considered station areas plans for possible stops along this route. Due to a lack of funding, this project is not currently being actively pursued at the regional level; however, the right-of-way may hold nearer-term potential for bus, rail, or light-rail service, and a bicycle/pedestrian path. The potential for a Menlo Park station along the Dumbarton rail corridor presents unique land use opportunities and major implications for nearby employers, the surrounding M-2 Area, and the adjacent Belle Haven neighborhood, even if an extended rail connection to the East Bay is not completed. A pedestrian/bicycle pathway could also be established along the Corridor.

PEDESTRIAN AND BICYCLE CONNECTIONS

Although Menlo Park does not currently have a citywide network of dedicated, fully connected bicycle/pedestrian pathways, the vast majority of arterial roadways in Menlo Park include traditional bike lanes. Menlo Park currently has in place a Sidewalk Master Plan, and most roadways in Menlo Park currently have sidewalks, with the exception of some residential areas that have traditionally not had sidewalks in order to maintain a semi-rural character. Bicycle and pedestrian connectivity across US 101 and to the San Francisco Bay have been ongoing issues in Menlo Park. In addition to the less user-friendly roadway crossings over US 101 at Marsh and Willow Roads, Menlo Park also has a pedestrian/bicycle crossing over US 101 at Ringwood Avenue. In 2012, a new structure replaced the older crossing, reestablishing pedestrian and bicycle connectivity between the Flood Triangle and Belle Haven neighborhoods. Caltrans is expected to begin work in 2016 on bicycle/pedestrian improvements at the US 101 Willow Road interchange.

PLANNING BOUNDARIES

Menlo Park is subject to a variety of political, administrative, and service area boundaries, many of which do not coincide with one another, but all of which have implications for land use planning in Menlo Park.

CITY LIMIT

The Menlo Park city limit comprises the areas under jurisdiction of the City and subject to its land use designations, zoning restrictions, municipal code, and other regulations. Certain unincorporated areas outside of the City Limit may still have a Menlo Park mailing address and may share certain services with the city. For example, most of the area along Alameda de las Pulgas, commonly referred to as West Menlo Park, is not actually contained within Menlo Park's City Limit; however, it does fall within Menlo Park's SOI, as shown in Figure 2.

SPHERE OF INFLUENCE

Menlo Park's SOI is designated by the San Mateo County Local Agency Formation Commission (LAFCo). LAFCos are county bodies empowered by the State to set boundaries for municipalities under their jurisdiction. The SOI includes areas beyond but adjacent to the city limit, where the City may not have direct land use or other legal authority, but which could be affected by development and government regulations in adjacent incorporated areas. Similarly, development in areas within the SOI but outside the city limit could likewise impact incorporated areas. For example, development within Menlo Park could have impacts on traffic or other issues in the vicinity of Alameda de Las Pulgas, even though the area surrounding the roadway is mostly unincorporated. Unincorporated areas adjacent to Menlo Park fall under the planning, land use, and regulatory jurisdiction of San Mateo County. The area within the SOI also is considered as having the potential for future annexation into Menlo Park.

PLANNING AREA BOUNDARY

The Planning Area Boundary sometimes extends beyond the SOI to capture additional areas that could experience more indirect effects of City policies and potential land uses within Menlo Park. Although General Plan policies and City zoning codes do not apply in these locations, General Plan policies must consider these areas and their relationship to the incorporated areas of Menlo Park. The Planning Area Boundary for Menlo Park extends beyond the city limit to encompass portions of Palo Alto, East Palo Alto, Atherton, and unincorporated San Mateo County. The purpose of these extended areas is to capture portions of the watersheds of San Francisquito Creek and the Atherton Channel, as well as areas of adjacent communities, that could impact or be impacted by land use, development, and other changes in Menlo Park, including impacts to hydrology, traffic, and biological resources, among others.

SERVICE AREA BOUNDARIES

In addition to the jurisdictional boundaries relevant to the General Plan, Menlo Park is subject to a number of boundaries relating to utilities and other service providers. These boundaries are largely not coterminous with Menlo Park's other administrative boundaries. Service area boundaries exist for the Menlo Park Fire Protection District, the Menlo Park Police Department, sewer service providers, and water service providers. Additional information on existing conditions relating to these service providers begins on page 45 of this report.

MENLO PARK HISTORY

Natural features both within and around Menlo Park contribute strongly to the attractiveness of the city and quality of life for the community. Native Americans and, later, European immigrants and San Francisco business owners were drawn to Menlo Park by its abundant wildlife, rich farmland, and scenic vistas. The progression from farms and large estates to tightly knit, attractive neighborhoods in large part has made Menlo Park what it is today.

Although the wetlands surrounding San Francisco Bay have been dramatically altered over the past two centuries, these natural areas remain a vital resource for both wildlife and human activity. The Baylands provide critical habitat for plants, birds, fish, and other organisms, including special-status species protected by State and federal law. Areas surrounding the Bay are also a working landscape, hosting ports, salt ponds, flood control infrastructure, and other development. The Menlo Park Baylands and Bay Trail are also valuable recreation resources, with opportunities for bicycling, hiking, bird watching, and many other outdoor activities.

Menlo Park lies at the foot of the northern reach of the Santa Cruz Mountains, and the earliest residents of the area benefited from easy access to fresh water and timber. Now heavily protected for open space uses, the Santa Cruz Mountains form a beautiful framing backdrop for the city. San Francisquito Creek flows from headwaters in the hills above the city and hosts one of the last steelhead runs in the Bay Area.

PRE-WESTERN AND EUROPEAN SETTLEMENT PERIODS

Prior to the arrival of European missionaries and immigrants, the area surrounding San Francisco Bay, including what would become Menlo Park, was populated by Native Americans, specifically the Ohlone

People. The Ohlone People lived a seasonal hunter gatherer lifestyle, relying on the abundant foodstuffs and natural resources provided by the San Francisco Bay ecosystem and trading with neighboring Native American groups. Artifacts from the lives of these early residents of what is now Menlo Park are still being discovered today. As recently as 2012, Native American remains were found at a construction site along Willow Road, not far from San Francisco Bay.[11]

Arrival of Spanish missionaries in the Bay Area disrupted the lifestyle and culture of the Ohlone People, and few Ohlone remained when California became a part of Mexico and later the United States. During California's periods of Spanish and Mexican rule, what would become the Rancho de Las Pulgas was granted to José Argüello and later his son, Luís Argüello. San Francisquito Creek, which served as the boundary of the Rancho, now forms nearly the entirety of the boundary between Menlo Park and Palo Alto. In ensuing battles over ownership, the Argüello family lost much of the original Rancho, opening the door to others who would eventually put down the roots that would establish Menlo Park.

Menlo Park was first given its name when Irish immigrants Dennis Oliver and Daniel McGlynn established farms in the area in the 1850s and named their new home after their Irish home community of Menlough. A distinctive gate, built by Oliver and McGlynn, bore and popularized the name Menlo Park. The gate stood as an important symbol of the town until an automobile crashed into the local landmark in 1922.

INCORPORATION AS A CITY

In the years after McGlynn and Oliver settled in Menlo Park, the area became a vacation destination for the upper class of San Francisco, with palatial houses on sprawling estates. The arrival of the railroad in 1863 and its connection to San Jose in 1864 dramatically cut the time it took to travel the Peninsula and cemented Menlo Park's role as an easily accessible rural getaway from San Francisco. In response to early infrastructure problems that emerged in the growing town, Menlo Park incorporated in 1874. This first incorporation, which included what would later become Atherton, was undertaken to bring about improvements such as the surfacing of Middlefield Road. Once the desired improvements were completed, however, local leaders ceased to meet and the incorporation lapsed in 1876.

The late 19th century and the early part of the 20th century witnessed a number of events that transformed Menlo Park. The opening of Stanford University in 1891 changed the course of history for Menlo Park and the San Francisco Peninsula. The growth of the University itself and the research and business it generated would become integral to the economy and character of Menlo Park. Perhaps just as transformative was the opening of Camp Fremont, a training ground for US Soldiers to be sent off to World War I, which

[11] Eslinger, Bonnie, 2012. San Jose Mercury News. *Native American Remains Found at Menlo Park Construction Site,* November 14. http://www.mercurynews.com/ci_21991249/native-american-remains-found-at-menlo-park-construction, accessed December 16, 2014.

temporarily increased Menlo Park's population, previously less than 2,000 people, by as much as 40,000 according to some estimates. After the end of WWI, Camp Fremont closed and later became the Veterans Medical Center. The closure of the camp returned the town to more incremental growth, but left behind a number of new businesses and city improvements.

THE MODERN ERA

The modern era brought considerable change and growth to Menlo Park, taking it from a small town to a major player in an increasingly urbanized region. Menlo Park's population marched steadily upward, increasing from 2,414 in 1930 to 26,826 in 1970. In 1923, the citizens of Atherton voted to effectively secede from Menlo Park, formally incorporating as Atherton in 1923. Efforts to bring Atherton into a broader reincorporation of Menlo Park were unsuccessful, and in 1927, Menlo Park voted to incorporate as a municipality independent of Atherton.[12,13]

The 1920s and 1930s saw the expansion of both Menlo Park's transportation infrastructure and its residential neighborhoods. In 1927, the same year as Menlo Park's official incorporation, the original Dumbarton Bridge opened, creating a new link between the East Bay and the Peninsula. Between 1929 and 1931 the Bayshore Highway (now US 101) was constructed and expanded to Menlo Park. Even then, the new bridges and freeways were subject to traffic and agitated drivers, especially when roads leading to the bridge proved inadequate and football games brought traffic to a standstill. Other roadways underwent similar expansions. In the late 1930s, El Camino Real was paved and widened from two lanes to four. This change meant the closure, demolition, or relocation of many Menlo Park businesses and structures. This time period also saw the beginnings of the Belle Haven neighborhood, with two-bedroom homes in the new development selling for as low as $2,950 ($50,000 in 2014 dollars).[14] Belle Haven was the only major housing development undertaken locally during the worst of the Great Depression, and it was not fully built out until the 1950s.[15] Additional information on Menlo Park neighborhoods is provided in the Community Character Report.

The mid-twentieth century witnessed Menlo Park becoming a major regional and global leader in technology and the broader economy. In 1946, the Stanford Research Institute was established, making Menlo Park a center of research and innovation. Although the Stanford Research Institute separated from Stanford University and changed its name to SRI International in 1970, this institution is still headquartered in Menlo Park and has contributed from innovations ranging from the computer mouse to the 9-1-1

[12] Svanevik, Michael and Shirley Burgett, 2000, *Menlo Park California Beyond the Gate,* San Francisco: Custom & Limited Editions.

[13] US Department of Commerce Economics and Statistics Administration Bureau of the Census, 1990. *CPH-2-1 1990 Census of Population and Housing Population and Housing Unit Counts United States.*

[14] Bureau of Labor Statistics CPI Inflation Calculator. http://www.bls.gov/data/inflation_calculator.htm, accessed October 13, 2014.

[15] Svanevik, Michael and Shirley Burgett, 2000. *Menlo Park California Beyond the Gate,* San Francisco: Custom & Limited Editions.

emergency call system. The 1950s brought increased industrial development to Menlo Park near the San Francisco Bay. Job opportunities in what is now the M-2 Area led to an increasingly diverse population in Menlo Park, especially in the areas between US 101 and the Bay. Today, the Belle Haven neighborhood is a focal point for Menlo Park's Latino, African American, and Pacific Islander communities.

The expansion of the Silicon Valley economy in the 1980s and 1990s made Menlo Park and the entire San Francisco Peninsula increasingly popular and expensive places to live. The "Dot-Com Boom" in the late 1990s drove up demand for housing in Menlo Park and similar areas with good schools, convenient access to job centers, and high quality of life. Although the recessions that began 2001 and more recently in 2008 slowed or even temporarily reversed regional job growth, Menlo Park has remained a highly desired community. The latest and ongoing economic expansion has brought new growth and real estate demand to Menlo Park. The bayside campus that once hosted Sun Microsystems is now the international headquarters of Facebook, one the world's leading tech firms, which continues to grow and build additional office facilities.

MENLO PARK PLANNING HISTORY

In 1952, Menlo Park enacted its first General Plan, which was then referred to as the City's "Master Plan." This plan was followed by the 1966 General Plan, which was prepared over the course of a 2-year process by a citizen committee with more than 100 members.

A subsequent general planning effort was launched in 1972 when the City Council and members from City commissions, boards, and advisory committees formed a task force to examine pressing issues. This large body convened about a dozen times and held a series of neighborhood information meetings to solicit community input. Following creation and adoption of an Open Space and Conservation General Plan Element, the City Council in 1974 adopted an updated General Plan titled Toward 2000. New State mandates led to updates of the Seismic Safety and Safety Element (1976) and the Noise Element (1978).

In 1984 an ad hoc committee of Planning Commission and City Council members formed to draft a project scope for an update of the 1974 Comprehensive Plan. Although extensive review by the committee found that most parts of plan remained valid, it was determined that the Land Use, Circulation, and Housing elements required further review, and public forums were held in early 1984 to solicit input from citizens. A new housing element was adopted in 1985, followed by an updated Comprehensive Plan in 1986.

In 1988 the City initiated the process for a General Plan update largely to incorporate new standards for development that could be used to conduct traffic analyses. First drafts of a General Plan update and EIR were released in 1989, with a second round in 1991, and a third in 1994. These documents included revised Land Use and Circulation Elements that had been revised to reflect what were by then 1994 conditions. The two updated elements were adopted in 1994. Each of the other required Elements, Open Space, Conservation, Noise, and Safety, were updated in 2013, and the 2015–23 Housing Element, which was the first housing element to be adopted and certified by HCD in the Bay Area for the current cycle, was adopted in 2014. The City also conducted previous Housing Element updates in 1992, and more recently in 2013 for the 2007–14 Housing Element.

Over the past 40 years, Menlo Park has developed of number of additional plans and studies that supplement the General Plan, including:

- 1978 El Camino Real/Southern Pacific Railroad Corridor Study
- 1981 Las Pulgas Community Project Area Plan
- 1987 Development Guidelines for El Camino Real
- 1996-1998 Center City Design Plan
- 1997 Willow Road Land Use Plan
- 1999 Smart Growth Initiative
- 2000 Land Use and Circulation Study

Within the past 10 years, the City has also embarked on a handful of visioning efforts, zoning updates, and specific plans that are relevant for this update.

- Comprehensive Bicycle Development Plan (2004)
- Imagine a Downtown (2005)
- Commercial Streamlining and Zoning (2004-2006)
- El Camino Real and Downtown Vision Plan (2008)
- City Sidewalk Master Plan (2008)
- El Camino Real/Downtown Specific Plan (2012)
- Belle Haven Vision Plan (2013)

Since the Land Use Element of the General Plan was last updated in 1994, significant changes in Menlo Park and the surrounding region have affected the community. The "Dot Com Boom," the housing bubble and dip, and the recent expansion of the tech economy continue to make a mark on Menlo Park. Earlier economic expansions, for instance, led to more rapid increases in Menlo Park's population and home prices than had previously been experienced. Between 1990 and 2010, Menlo Park's population increased by 13 percent from 28,403 to 32,026 people;[16] during the same time period, an influx of new businesses led the number of jobs in the city to increase by 7 percent, from 26,800 to 28,890.[17,18] This growth led to both soaring property values and increasing congestion. Given Menlo Park's close proximity to job and urban centers, and location along two major transit corridors, it is anticipated the Menlo Park will experience significant

[16] US Census Bureau, 1990 and 2010. *Census Data*. http://www.calinst.org/datapages/calcities9098.html & http://quickfacts.census.gov/qfd/states/06/0646870.html, accessed December 2, 2014.

[17] Association of Bay Area Governments (ABAG), 2002. *Projections 2002*.

[18] Association of Bay Area Governments (ABAG), 2013. *Projections 2013*.

additional growth pressure over the next 10 to 20 years. The Association of Bay Area Governments predicts that Menlo Park's population will increase to about 38,100 in 2040, with the number of jobs increasing to 34,980. These projections represent 19 percent and 21 percent growth, respectively, in population and jobs over the next 25 years.[19] More detailed information about growth in Menlo Park is contained in the Economics Existing Conditions Report.

EXISTING GENERAL PLAN

The current Menlo Park General Plan establishes ten principles to guide growth and land use policy to:

- Provide guidelines for the development of the city's remaining vacant land, for revitalization of existing development, and for development of a transportation system and other public facilities in a manner that:

  1. Maintains and enhances the residential quality of life in the city by emphasizing development, which has a human scale and is pedestrian friendly.
  2. Protects the city's open space and natural resources.
  3. Minimizes the exposure of people and property to health and safety hazards.
  4. Minimizes the adverse impacts of development on the city's public facilities and services.
  5. Minimizes traffic congestion on city streets and limits through traffic in residential neighborhoods through sound land use planning.
  6. Maintains the city's historical character by emphasizing an analysis of proposed transportation improvement projects which incorporates a balanced review of both the need for any proposed physical changes and the socio-economic impacts of the physical changes.
  7. Promotes the rehabilitation of existing housing and the upgrading of existing commercial development.
  8. Provides for expansion of the city's stock of affordable housing.
  9. Allows for the orderly development of the city's employment and commercial base.
  10. Maintains and enhances the city's economic vitality and fiscal health.

The existing General Plan Land Use Element establishes extensive goals, policies, and implementing actions with regard to land use, and also defines the existing broad land use categories for the City of Menlo Park. Table 2 shows Menlo Park's existing General Plan Land Use goals, policies, and implementing actions.

[19] Association of Bay Area Governments (ABAG), 2013. *Projections 2013.*

TABLE 2 CURRENT GENERAL PLAN LAND USE GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Residential	
Goal I-A	To maintain and improve the character and stability of Menlo Park's existing residential neighborhoods while providing for the development of a variety of housing types. The preservation of open space shall be encouraged.
Policy I-A-I	New construction in existing neighborhoods shall be designed to emphasize the preservation and improvement of the stability and character of the individual neighborhood.
Policy I-A-2	New residential developments shall be designed to be compatible with Menlo Park's residential character.
Policy I-A-3	Quality design and usable open space shall be encouraged in the design of all new residential developments.
Policy I-A-4	Residential uses may be combined with commercial uses in a mixed-use project, if the project is designed to avoid conflicts between the uses, such as traffic, parking, noise, dust, and odors.
Policy I-A-5	Development of housing, including housing for smaller households, is encouraged in commercially zoned areas in and near Downtown. (Downtown is defined as the area bounded by Alma Street, Ravenswood Avenue/Menlo Avenue, University Drive and Oak Grove Avenue.) Provisions for adequate off-street parking must be assured.
Policy I-A-6	Development of residential uses on the north side of Oak Grove Avenue and on the south side of Menlo Avenue adjacent to the Downtown commercial area is encouraged.
Policy I-A-7	Development of secondary residential units on existing developed residential lots shall be encouraged consistent with adopted City standards.
Policy I-A-8	Residential developments of ten or more units shall comply with the requirements of the City's Below-Market Rate (BMR) Housing Program.
Policy I-A-9	Residential developments subject to requirements of the BMR Housing Program may be permitted to increase the total density, number of units and floor area of residential projects up to a maximum of 15 percent above that otherwise permitted by the applicable zoning. The increases in the total density, number of units and floor area shall be in compliance with the BMR Housing Program.
Commercial	
Goal 1-B	To strengthen Downtown as a vital and competitive shopping area while encouraging the preservation and enhancement of Downtown's historic atmosphere and character.
Policy I-B-1	The Downtown should include a complementary mix of stores and services in a quality design, adding natural amenities into the development pattern.
Policy I-B-2	Parking which is sufficient to serve the retail needs of the Downtown area and which is attractively designed to encourage retail patronage shall be provided.
Policy I-B-3	New development shall not reduce the number of existing parking spaces in the Assessment District, on P-zoned parcels, or on private property where parking is provided in lieu of Assessment District participation.
Policy I-B-4	Uses and activities shall be encouraged which will strengthen and complement the relationship between the Transportation Center and the Downtown area and nearby El Camino Real corridor.
Policy I-B-5	New development with offices as the sole use that is located outside of the boundary of the Downtown area along the south side of Menlo A venue and the north side of Oak Grove A venue shall not create a traffic impact that would exceed that of a housing project on the same site.
Goal 1-C	To encourage creativity in development of the El Camino Real Corridor.
Policy I-C-1	New and upgraded retail development shall be encouraged along El Camino Real near Downtown, especially stores that will complement the retailing mix of Downtown. Adequate parking must be provided and the density, location, and site design must not aggravate traffic at congested intersections. The livability of adjacent residential areas east and west of El Camino Real and north and south of Downtown must be protected.

TABLE 2 CURRENT GENERAL PLAN LAND USE GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Policy I-C-2	Small-scale offices shall be allowed along most of El Camino Real in a balanced pattern with residential or retail development.
Goal 1-D	To encourage the rehabilitation and continued use of viable and appropriate neighborhood commercial uses or collections of stores servicing surrounding residential neighborhoods.
Policy I-D-1	Special attention should be given to strengthen the neighborhood shopping centers throughout the city. This can be done by continuing the existing policy of removing marginal uses or vacant commercially-zoned properties from the present commercial zoning and placing them in a residential land use category or rezoning to the P District.
Policy 1-D-2	Expansion of operations in neighborhood shopping centers shall be prohibited if they disrupt adjacent residential areas. Subject to obtaining a use permit or rezoning to a P district, development of additional parking may be permitted to alleviate parking problems on residential streets caused by existing businesses which lack the required number of parking spaces.
Goal 1-E	To promote the development and retention of commercial uses which provide significant revenue to the City and/or goods or services needed by the community and which have low environmental and traffic impacts.
Policy l-E-1	All proposed commercial development shall be evaluated for its fiscal impact on the City as well as its potential to provide goods or services needed by the community.
Policy l-E-2	Hotel uses may be considered at suitable locations within the commercial and industrial zoning districts of the city.
Policy I-E-3	Retention and expansion of auto dealerships in the city shall be encouraged. Development of new auto dealerships or combined dealerships in an auto center shall be encouraged at suitable locations in the city.
Policy I-E-4	Any new or expanded office use must include provisions for adequate off-street parking, mitigating traffic impacts, and developing effective alternatives to auto commuting, must adhere to acceptable architectural standards, and must protect adjacent residential uses from adverse impacts.
Policy I-E-5	The City shall consider attaching performance standards to projects requiring conditional use permits.
Policy I-E-6	Public-private cooperation in the provision of job training, child care, housing and transportation programs for Menlo Park residents shall be supported.
Industrial	
Goal I-F	To promote the retention, development, and expansion of industrial uses which provide significant revenue to the City, are well designed, and have low environmental and traffic impacts.
Policy I-F-1	Industrial development shall be allowed only in already established industrial areas and shall not encroach upon Bay wetlands.
Policy I-F-2	Establishment and expansion of industrial uses that generate sales and use tax revenues to the City shall be encouraged.
Policy I-F-3	Modifications in industrial operations required to keep firms competitive should be accommodated, so long as any negative impacts on the environment and adjacent areas are satisfactorily mitigated.
Policy I-F-4	The City shall consider attaching performance standards to projects requiring conditional use permits.
Policy I-F-5	Convenience stores and personal service uses may be permitted in industrial areas to minimize traffic impacts.
Policy I-F-6	Public-private cooperation in the provision of job training, child care, housing and transportation programs for Menlo Park residents shall be supported.
Policy I-F-7	All new industrial development shall be evaluated for its fiscal impact on the City.

TABLE 2 CURRENT GENERAL PLAN LAND USE GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Open Space	
Goal 1-G	To promote the preservation of open-space lands for recreation, protection of natural resources, the production of managed resources, protection of health and safety, and/or the enhancement of scenic qualities.
Policy I-G-1	The City shall develop and maintain a parks and recreation system that provides areas and facilities conveniently located and properly designed to serve the recreation needs of all Menlo Park residents.
Policy I-G-2	The community should contain an ample supply of specialized open space in the form of squares, greens, and parks whose frequent use is encouraged through placement and design.
Policy I-G-3	Public spaces should be designed to encourage the attention and presence of people at all hours of the day and appropriate hours of the night.
Policy I-G-4	Dedication of land, or payment of fees in lieu thereof, for park and recreation purposes shall be required of all new residential development.
Policy I-G-5	The City shall encourage the retention of at least 10 acres of open space on the St. Patrick's property through consideration of various alternatives to future development including rezoning consistent with existing uses, cluster development, acquisition of a permanent open space easement, and/or transfer of development rights.
Policy I-G-6	The City shall encourage the retention of open space on large tracts of land through consideration of various alternatives to future development including rezoning consistent with existing uses, cluster development, acquisition of a permanent open space easement, and/or transfer of development rights.
Policy I-G-7	Public access to the Bay for the scenic enjoyment of the open water, sloughs, and marshes shall be protected.
Policy I-G-8	The Bay, its shoreline, San Francisquito Creek, and other wildlife habitat and ecologically fragile areas shall be maintained and preserved to the maximum extent possible. The City shall work in cooperation with other jurisdictions to implement this policy.
Policy I-G-9	The salt ponds shall be allowed to continue in mineral production. In the event
Policy I-G-10	Extensive landscaping should be included in public and private development, including greater landscaping in large parking areas. Where appropriate, the City shall encourage placement of a portion of the required parking in landscape reserve until such time as the parking is needed. Plant material selection and landscape and irrigation design shall adhere to the City's Water Efficient Landscaping Ordinance.
Policy I-G-11	Well-designed pedestrian facilities should be included in areas of intensive pedestrian activity.
Policy I-G-12	The maintenance of open space on Stanford lands within Menlo Park's unincorporated sphere of influence shall be encouraged.
Policy I-G-13	Regional and sub-regional efforts to acquire, develop, and/or maintain appropriate open space and conservation lands shall be supported.
Public and Quasi-Public Facilities and Services	
Goal 1-H	To promote the development and maintenance of adequate public and quasi-public facilities and services to meet the needs of Menlo Park's residents, businesses, workers, and visitors.
Policy I-H-1	The community design should help conserve resources and minimize waste.
Policy I-H-2	The use of water-conserving plumbing fixtures in all new public and private development shall be required.
Policy I-H-3	Plant material selection and landscape and irrigation design for City parks and other public facilities and in private developments shall adhere to the City's Water Efficient Landscaping Ordinance.
Policy I-H-4	The efforts of the Bay Area Water Users Association to secure adequate water supplies for the Peninsula shall be supported to the extent that these efforts are in conformance with other City policies.

TABLE 2 CURRENT GENERAL PLAN LAND USE GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Policy I-H-5	New wells and reservoirs may be developed by the City to supplement existing water supplies for Menlo Park during emergency and drought periods. Other sources, such as interconnections and purchase agreements with water purveyors, shall be explored and developed.
Policy I-H-6	The City shall work with other regional and subregional jurisdictions and agencies responsible for ground water extraction to attempt to develop a comprehensive underground water protection program which includes the monitoring of all wells in the basin to evaluate the long term effects of water extraction. In addition, the City shall consider instituting appropriate controls within Menlo Park on the installation of new wells and on the pumping from both existing and new wells so as to prevent: ground subsidence, further salinity intrusion into the shallow aquifers, particularly in the bayfront area, and contamination of the deeper aquifers that may result from changes in the ground water level.
Policy I-H-7	The use of reclaimed water for landscaping and any other feasible uses shall be encouraged.
Policy I-H-8	The expansion and improvement of sewage treatment facilities to meet the needs of Menlo Park and to meet regional water quality standards shall be supported to the extent that such expansion and improvement are in conformance with other City policies.
Policy I-H-9	Urban development in areas with geological and earthquake hazards, flood hazards, and fire hazards shall be regulated in an attempt to prevent loss of life, injury, and property damage.
Policy I-H-10	The City shall continue to participate in the National Flood Insurance Program. To this end, the City shall work to keep its regulations in full compliance with standards established by the Federal Emergency Management Agency.
Policy I-H-11	Buildings, objects, and sites of historic and/or cultural significance should be preserved.
Policy I-H-12	Street orientation, placement of buildings, and use of shading should contribute to the energy efficiency of the community.
Annexation and Intergovernmental Coordination	
Goal I-I	To promote the orderly development or Menlo Park and its surrounding area.
Policy I-I-1	The City shall cooperate with the appropriate agencies to help assure a coordinated land use pattern in Menlo Park and the surrounding area.
Policy I-I-2	The regional land use planning structure should be integrated within a larger transportation network built around transit rather than freeways and the City shall influence transit development so that it coordinates with Menlo Park's land use planning structure.
Policy I-I-3	A program should be developed in cooperation with interested neighborhood groups outlining under what conditions unincorporated lands within the City's sphere of influence may be annexed.
Policy I-I-4	The City shall request San Mateo County to follow Menlo Park's General Plan policies and land use regulations in reviewing and approving new ·developments in unincorporated areas in Menlo Park's sphere of influence.
Policy I-I-5	The City shall carefully monitor any significant development proposals which are outside of Menlo Park's jurisdiction, including any development proposals along the Sand Hill Road corridor which are within the jurisdiction of the City of Palo Alto, to evaluate their potential impacts on the City of Menlo Park. It shall be the policy of the City to oppose any such development proposal(s) unless the City Council makes findings that the benefits of such proposal(s) outweigh all of the impacts to the City of Menlo Park. The City Council shall consider holding an advisory election on any such development proposal(s).
Implementation Programs	
Program I-1	The City will amend its Zoning Ordinance to maintain consistency with the General Plan. Responsibility: City Council; Planning Commission; Planning Division Time Frame: FY 94-95; on-going

TABLE 2 CURRENT GENERAL PLAN LAND USE GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Program I-2	The City shall develop, evaluate, and adopt an ordinance in cooperation with other jurisdictions and interested organizations to protect and preserve San Francisquito Creek, including consideration of land use regulations such as the requirement of use permits for structures or impervious surfaces within a specified distance of the top of the creek bank. Responsibility: City Council; Planning Commission; City Manager; Development Services Department Time Frame: FY 94-95; 95-96
Program I-3	The City will develop and periodically update a five-year Capital Improvement Program. Such program shall include, among others, improvements for transportation, water supply, and drainage. Responsibility: City Council; Planning Commission (for General Plan consistency); City Manager; City Department Heads Time Frame: On-going
Program I-4	The City shall analyze the fiscal impacts of proposed developments to determine the financial feasibility of providing needed services. Responsibility: City Council; Planning Commission; Planning Division Time Frame: On-going
Program I-5	The City shall prepare and adopt an economic vitality element to the General Plan that sets forth policies and programs to assure continued economic vitality for the city and adequate municipal revenues for City services. The development of the economic vitality policies and programs shall be a cooperative effort between the City and a task force reflecting a balance of business people and residents throughout the city. Responsibility: City Council; Planning Commission; City Manager; Finance Division; Planning Division Time Frame: FY 94-95
Program I-6	The City shall develop and conduct a public participation charrette to evaluate and propose implementation of General Plan policies for the Central Business District and the El Camino Real corridor, especially encouraging housing and mixed use developments in those areas. The charrette shall evaluate what can be developed under existing land use designations as well as what would be possible with changes in land use designations and zoning, and shall evaluate the adoption of design criteria. Responsibility: City Council; Planning Commission; City Manager; Planning Division Time Frame: FY 94-95; 95-96

LAND USES IN MENLO PARK

Menlo Park has a developed area of approximately 6.5 square miles, of which roughly 1.2 square miles are roadways or other public/utilities use lands that do not carry zoning designations. As shown in Tables 3 and 4 and Figures 3 and 4, a majority of land in Menlo Park is designated for residential use (55 percent). Other major land use categories include Industrial/Business Park (16 percent), Open Space/Recreation (5 percent), Commercial (7 percent), and Public Facilities/Institutional (6 percent). The geographic distribution of Menlo Park's generalized land uses is shown in Figure 4. Table 5 shows the acreages of these same generalized land uses for Menlo Park, Table 6 lists the amount of land by zoning districts in the M-2 Area, and Table 7 summarizes population density in Menlo Park and neighboring cities. Figure 5 shows population density by Census Block in Menlo Park. Additional details regarding residential neighborhoods

TABLE 3 EXISTING LAND USE CATEGORIES AND DESCRIPTIONS

Land Use Type	Description
Residential Designations	
Very Low Density Residential	This designation provides for single family detached homes, secondary residential units, public and quasipublic uses, and similar compatible uses. Residential intensity shall be in the range of 0 to 3.5 units per net acre.
Low Density Residential	This designation provides for single family detached homes, secondary residential units, public and quasipublic uses, and similar and compatible uses. Residential intensity shall be in the range of 3.6 to 5.0 units per net acre.
Medium Density Residential	This designation provides for single family detached and attached homes, duplexes, multi-family units, garden apartments, condominiums, public and quasi-public uses, and similar and compatible uses. Residential intensity shall be in the range of 5.1 to 18.5 units per net acre, and up to 30 units per acre in designated areas around the El Camino Real/Downtown Specific Plan boundary.
High Density Residential	This designation provides for single family detached and attached homes, duplexes, multi-family units, garden apartments, condominiums, senior rental housing operated by a non-profit agency and designed to be occupied by persons age 60 and older, public and quasi-public uses, and similar and compatible uses. Residential intensity shall be in the range of 20 to 40 units per net acre, provided, however, that the residential intensity of senior rental housing may be up to 97 units per net acre.
Commercial Designations	
Retail/Commercial	This designation provides for retail services, personal services, professional offices, banks, savings and loans, restaurants, cafes, theaters, social and fraternal clubs, residential uses, public and quasi-public uses, and similar and compatible uses. The maximum FAR for non-residential uses shall be in the range of 40 percent to 200 percent. Residential intensity shall not exceed 18.5 units per net acre.
Professional and Administrative Offices	This designation provides for professional offices, executive, general, and administrative offices, research and development facilities, banks, savings and loans, convalescent homes, research and development facilities, residential uses, public and quasi-public uses, and similar and compatible uses. The maximum FAR for non-residential uses shall be in the range of 25 percent to 40 percent. Residential intensity shall not exceed 18.5 units per net acre.
Industrial Designations	
Limited Industry	This designation provides for light manufacturing and assembly, distribution of manufactured products, research and development facilities, industrial supply, incidental warehousing, offices, limited retail sales (such as sales to serve businesses in the area), public and quasi-public uses, and similar and compatible uses. The maximum FAR shall be in the range of 45 percent to 55 percent.
Commercial Business Park	This designation provides for light manufacturing and assembly, distribution of manufactured products, research and development facilities, industrial supply, incidental warehousing, offices, limited sales, services to serve businesses and hotel/motel clientele in the area (such as restaurants, cafes, and health/fitness centers), hotel/motel to serve the local and regional market, public and quasi-public uses, and similar and compatible uses. The maximum FAR shall be 45 percent, except through a negotiated Development Agreement, which could allow a maximum FAR of 137.5 percent, with office uses limited to 100% percent.

TABLE 3 EXISTING LAND USE CATEGORIES AND DESCRIPTIONS

Land Use Type	Description
Specific Plan Designations	
El Camino Real/Downtown Specific Plan	This designation provides for a variety of retail, office, residential, personal services, and public and semipublic uses, as specified in detail in the El Camino Real/Downtown Specific Plan. The maximum FAR shall be in the range of 85 percent to 200 percent (base-level maximum) or 100 percent to 225 percent (public benefit bonus-level maximum). Office (inclusive of medical and dental offices) FAR is limited to one-half of the appropriate total FAR, and medical and dental office FAR is limited to one-third of the appropriate total FAR. Residential intensity shall be in the range of between I8 .5 to 50 units per net acre (base-level maximum) or 25 to 60 units per net acre (public benefit bonus-level maximum).
Non-Urban Designations	
Marshes	This designation provides for the preservation and protection of wildlife habitat and ecological values associated with the marshlands bordering San Francisco Bay and similar and compatible uses. The maximum amount of development allowed under this designation shall be 5,000 square feet of building floor area per parcel.
Salt Ponds	This designation provides for the commercial production of salt and other minerals on the lands bordering San Francisco Bay and similar and compatible uses. The maximum amount of development allowed under this designation shall be 5,000 square feet of building floor area per parcel.
Preserve	This designation provides for the preservation and protection of wildlife habitat and ecological values associated with the foothill areas bordering I-280 and similar and compatible uses.
Public and Quasi-Public Designations	
Parks and Recreation	This designation provides for public and private golf courses, passive and active recreation uses, educational facilities, and similar and compatible uses. The letter "P" overlaid on this designation denotes a park. The maximum FAR shall be in the range of 2.5 percent to 30 percent.
Landscaped Greenways, Buffers, and Parkways	This designation provides for public and private open space uses, linear buffers and parkways along roads, and similar and compatible uses.
Public Facilities	This designation provides for public and quasi-public uses such as government offices, fire stations, schools, churches, hospitals, public utility facilities, airports, sewage treatment facilities, reservoirs, and similar and compatible uses. Many of the specific uses within this designation are denoted by symbols on the Land Use Diagram. The maximum FAR shall not exceed 30 percent generally, although specific zoning may allow for a higher FAR. The City recognizes that it does not have the authority to regulate development by Federal, State, or other governmental agencies, but the City will work cooperatively with these agencies in an effort to ensure their development is consistent with City goals, plans, and regulations and mitigates any impacts.
Other	This designation is applied to the following two properties based on the unique qualities of the uses: 1. Stanford Linear Accelerator Center: Research facility located within City of Menlo Park's sphere of influence. 2. Allied Arts Guild (75 Arbor Road): Guild for artisans and craftsmen comprised of retail shops, workshops, restaurant, gardens and public grounds. The Guild was constructed in 1 929 and has historic significance for both its relationship to the American Arts and Crafts Movement and the architecturally important buildings and gardens. Allowed uses shall be as established in the Allied Arts Guild Preservation Permit. The maximum FAR for the property shall be 15 percent.

TABLE 4 AMOUNT OF LAND BY CURRENT GENERAL PLAN LAND USE DESIGNATION

General Plan Land Use Designation	Acres	Percent of General Plan Land Use Designations[a]
Low Density Residential	1,373.8	39.2%
Limited Industry	490.1	14.0%
Medium Density Residential	354.7	10.1%
Public Facilities	227.7	6.5%
Professional and Administrative Offices	212.5	6.1%
Very Low Density Residential	179.7	5.1%
Parks and Recreation	319.2	9.1%
El Camino Real/Downtown Specific Plan	122.2	3.5%
N/A [Infrastructure/Easements]	121.7	3.5%
Retail/Commercial	46.8	1.3%
High Density Residential	35.1	1.0%
Commercial Business Park	16.0	0.5%
Other	3.5	0.1%
Total of Land Uses *(Excluding non-urban)*	**3,503.7**	**100%**
Floodplain (Non-urban Bay lands)	*7,170.5*	*67.2%*
Total (Including non-urban Bay lands)	***10,674.2***	***100%***

a. Excluding floodplain / non-urban land use designations that apply to Bay lands
b. Including floodplain / non-urban land use designations that apply to Bay lands
Source: City of Menlo Park, December 2014, City of Menlo Park Zoning Map data and Zoning District and General Plan Land Use Designation Correspondence Table, accessed on December 11, 2014.

can be found in the Community Character Report, and information on nonresidential land use activities is contained in the Economics Existing Conditions Report.

The current Land Use Element and Zoning Ordinance define a variety of land use designations and zoning districts. These designations correspond to the basic types of land use activities that are common to most cities: residential, commercial, industrial, and institutional/public. Residential land uses are those where people live, such as single-family homes, row houses, or apartment/condominium buildings. Commercial

FIGURE 3 DISTRIBUTION OF GENERALIZED LAND USES IN MENLO PARK

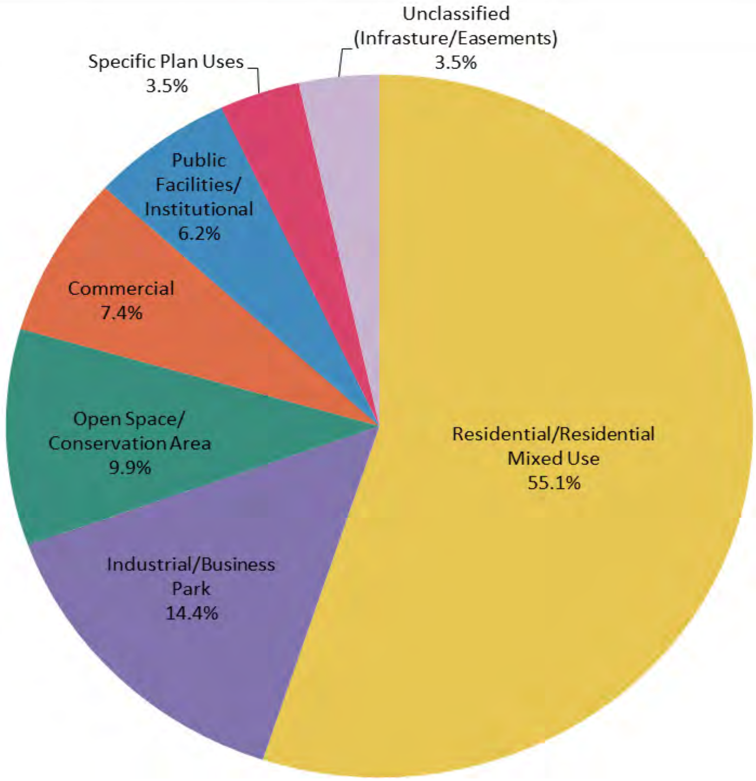

TABLE 5 EXISTING GENERALIZED LAND USE TYPES IN MENLO PARK

Generalized Land Use Type	Acres	Percent of Generalized Land Use Types[a]
Residential/Residential Mixed Use	1,929.3	55.1%
Industrial/Business Park	506.0	14.4%
Open Space/Conservation Area	348.6	9.9%
Commercial	259.3	7.4%
Public Facilities/Institutional	216.8	6.2%
Specific Plan Uses	122.2	3.5%
Infrastructure/Easements [b]	121.7	3.5%
Total of Generalized Land Use Types (Not including non-urban Bay lands)	3,503.7	100%
Floodplain/ Non-Urban Bay lands	*7,170.5*	*67.2%*
Grand Total	***10,673.4***	***100%***

a. Excluding floodplain / non-urban land use designations that apply to Bay lands
b. Does not include public roadways.
c. Including floodplain / non-urban land use designations that apply to Bay lands
Source: City of Menlo Park Zoning Map data and Zoning District and General Plan Land Use Designation Correspondence Table.

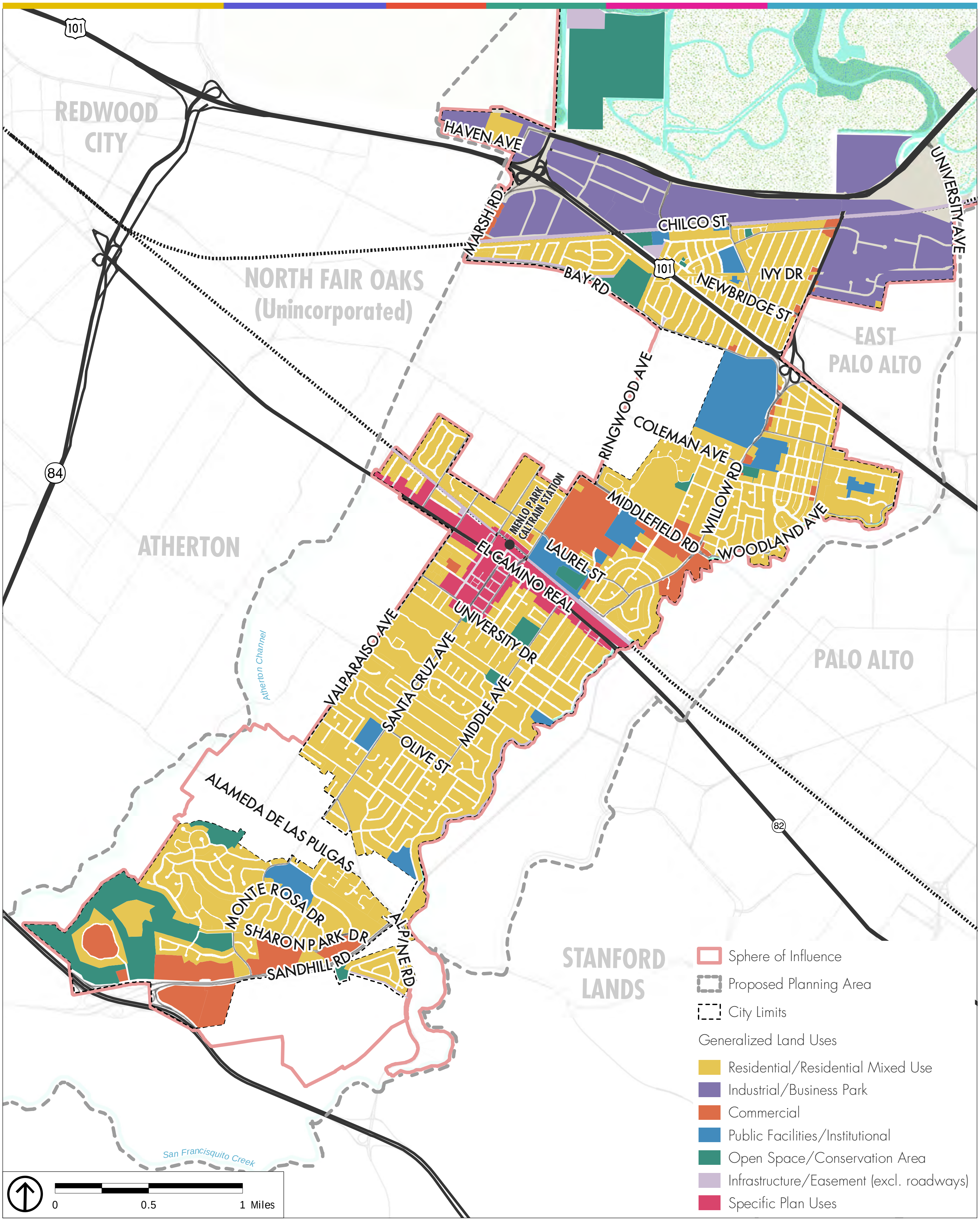

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FIGURE 4: GEOGRAPHIC DISTRIBUTION OF GENERALIZED LAND USES

TABLE 6 AMOUNT OF LAND BY ZONING DESIGNATION IN THE M-2 AREA

Zoning Designation	Generalized Land Use Type	Acres	Percent of Generalized Land Use Types[a]
C2B	Commercial	1.4	0.2%
C2S	Commercial	3.2	0.6%
C4	Commercial	2.0	0.4%
C4(X)	Commercial	3.2	0.6%
M2	Industrial/Business Park	328.4	58.4%
M2(X)	Industrial/Business Park	161.6	28.8%
M3(X)	Industrial/Business Park	16.0	2.8%
P	Parking	0.1	0.0%
R3(X)	Medium Density Residential	0.4	0.1%
R4S(AHO)	High Density Residential	15.5	2.8%
U	Unclassified (Rail right of way)	36.0	5.4%
Total of Generalized Land Use Types (Not including non-urban Bay lands)		**562.0**	**100%**
		Acres	Percent of All Zoning Designations[b]
FP	Floodplain	77.5	12.1%
	Grand Total	*639.5*	*100%*

a. Excluding floodplain / non-urban land use designations that apply to Bay lands
b. Including floodplain / non-urban land use designations that apply to Bay lands
Source: City of Menlo Park Zoning Map data and Zoning District and General Plan Land Use Designation Correspondence Table.

TABLE 7 APPROXIMATE RESIDENTIAL DENSITIES FOR MENLO PARK AND NEIGHBORING COMMUNITIES IN 2010

	Menlo Park	Palo Alto	East Palo Alto	Mountain View	Atherton	Redwood City
Land Area (square miles)[a]	6.4	12.9	2.2	11.8	5.0	10.9
Housing Units	13,085	26,493	7,819	33,881	2,530	29,167
Population	32,026	64,403	28,155	74,066	6,914	76,815
Residential Density (housing units per square mile)[b]	2,040	2,050	3,550	2,870	510	2,680
Population Density (residents per square mile)[b]	5,000	4,990	12,800	6,280	1,380	7,050

a. Approximate area excluding Bay Lands and large, protected conservation areas.
b. Approximate net density calculated by excluding Bay Lands and large, protected conservation areas and rounding to nearest ten.
Source: United States Census Bureau, 2014.

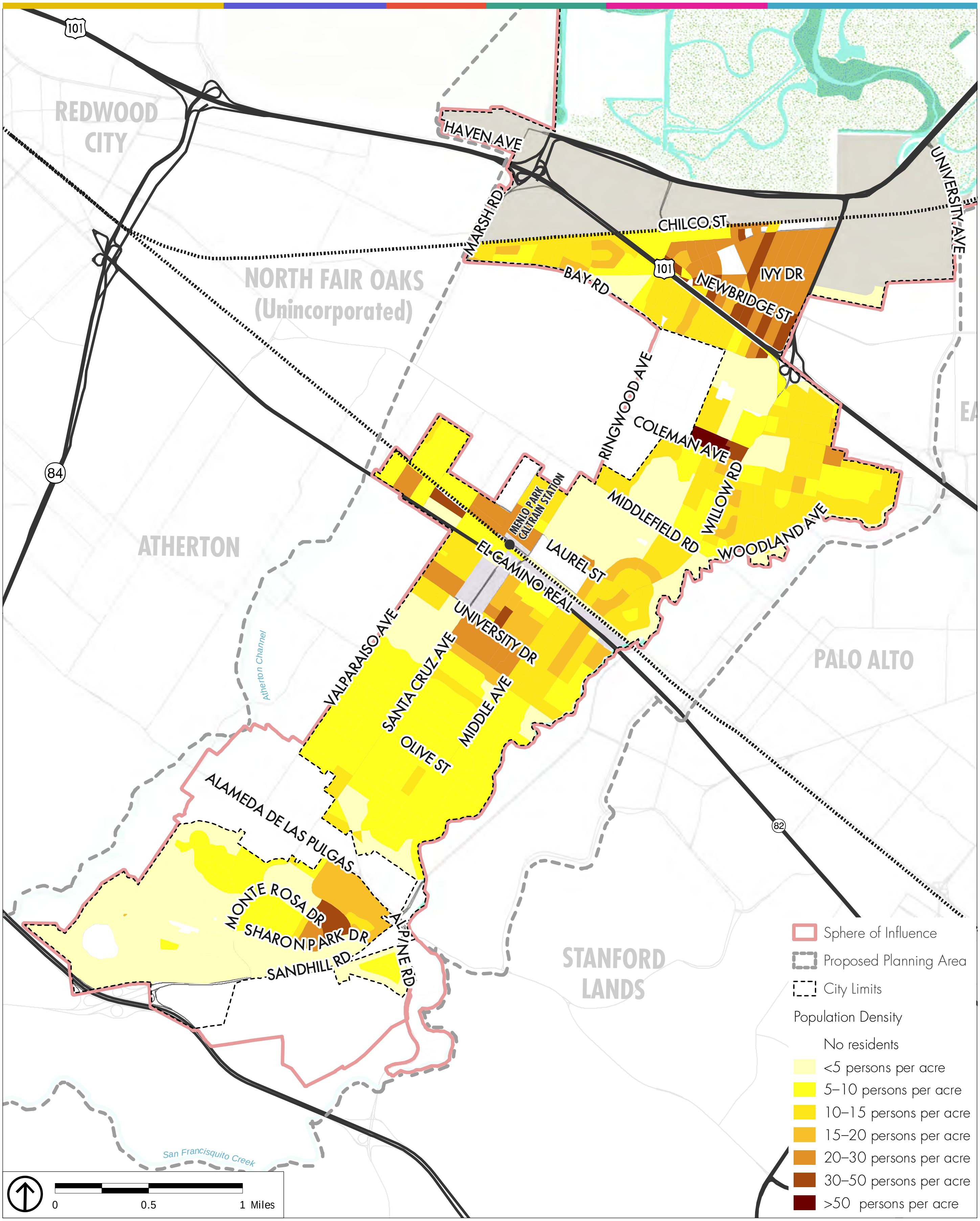

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FIGURE 5: APPROXIMATE POPULATION DENSITY BY CENSUS BLOCK

land uses typically include retail, office, and some service uses, such as gas stations, dry cleaners, and beauty salons. Industrial designations encompass a wide array of uses, including manufacturers, wholesalers, research and development, and laboratories. Public and institutional uses include facilities such as schools, parks, and places of worship.

Some buildings contain a mix of uses, including uses that do not fit into traditional categories. Until the early-1900s it was typical for various land uses to be geographically mixed together—or, in some cases, even indistinguishable. The same buildings that contained residences often also served as places of business, and even hosted small-scale home industries. Beginning in the late 19th and early 20th centuries, in response to the negative impacts of industrialization and due to safety concerns, it became more common to separate land uses physically. However, cities are increasingly returning to a mixture of land uses in appropriate locations where compatibility issues can be mitigated or avoided. Menlo Park has adopted a variety of land use and zoning designations that include both discrete uses and mixed uses.Land use designations and policies can have a profound impact upon issues of access and equity within the community. Land uses can help or hinder access to amenities, such as parks, shopping, commercial and public services, employment, and healthy food; and such access is closely tied to community health, socioeconomic mobility, and quality of life. Land use decisions can also affect other, less tangible aspects of a community such as neighborhood cohesion.

LAND USE TYPES AND METRICS

This section of the report offers general description of the type of land use activities existing in Menlo Park, as well some ways to measure and describe land uses.

RESIDENTIAL USES

Current land use designations and zoning in the City of Menlo Park currently accommodate a range of residential types, as follows:

- **Estate/Very-Low Density Residential:** This type of residential use tends to feature single-family homes on somewhat larger lots, in some cases approaching an acre in size, but usually around ¼ to ½ acre. Menlo Park features limited areas with such designations, including portions of Sharon Heights, and limited areas of West Menlo near Arbor Road and San Mateo Drive. Approximately 5.3 percent of Menlo Park's developable area is zoned Estate/Very-Low Density Residential.
- **Single-Family Residential:** As its name suggests, this type of residential includes single-family homes on a variety of lot sizes, and in some cases includes secondary dwelling units. The majority of Menlo Park's residential areas are designated single-family residential, with approximately 40.8 percent of the

city's total developable area zoned for low-density residential land uses. Single-family designations represent 71.4 percent of residentially designated areas in Menlo Park.

- **Multi-Family Residential:** Multi-family residential includes garden apartments, row homes and multi-unit buildings and complexes. Multi-family designations comprise a relatively small proportion of Menlo Park's land uses, and are generally concentrated in the area surrounding Downtown Menlo Park, as well as along corridors such as Willow Road, near US 101, and in portions of Sharon Heights. Just over 10 percent of Menlo Park's developable area is designated for medium- or high-density residential uses that may contain multi-family buildings or garden/row houses, and these uses comprise 19 percent of all residential uses in Menlo Park.
- **Mixed-Use Residential:** Mixed-use residential includes dwelling units that are co-located with other uses, such as retail or office. Usually, the uses are vertically mixed, with non-residential uses on the ground floor and residential units above. Menlo Park does not have a land use or zoning designation specific to mixed-use residential; however, mixed-use residential is permissible in a limited number of Downtown commercial designations and in certain areas under the El Camino Real/Downtown Specific Plan.

It should be noted that certain uses which are not strictly residential and which may not even contain any residential units are nonetheless grouped in the residential category based on their underlying zoning. Such uses include places of worship, such as the Church of the Nativity, as well as Corpus Christi Monastery and St. Patrick's Seminary and University, which is designated as single-family residential zoning. Religious institutions are generally conditional uses in residential areas pursuant to Menlo Park's zoning ordinance.

In addition to these primarily density-based classifications of residential areas, there are other, more qualitative ways to characterize residential neighborhoods. One such characterization is the distinction between traditional and suburban neighborhood design, both of which occur in Menlo Park. Traditional neighborhood design usually features a highly interconnected street pattern, usually based on a grid or other linear/geometric street network. This type of neighborhood design results in more frequent intersections and a higher number of potential travel routes between any two points. Suburban neighborhood design typically features curvilinear streets, cul-de-sacs, and fewer intersections and potential travel paths. Residential areas of Menlo Park feature a mixture of traditional and suburban neighborhood design. Additional information on neighborhood design and character is included in the Community Character Report.

COMMERCIAL USES

Primarily commercial land uses comprise approximately 7 percent of Menlo Park's developable land area. The existing General Plan currently establishes two different types of mainly commercial uses:

Retail/Commercial and Professional and Administrative Offices. These two commercial designations respectively occupy 1 percent and 6 percent of the city's developable land area. Additionally, certain specific plan and mixed-use designations also allow commercial land uses. The El Camino Real/Downtown Specific Plan Designation, which also permits mixed uses, is applicable to the El Camino Real/ Downtown Specific Plan Area and covers 3.5 percent of the city's developable land area.

The variety of commercial uses in Menlo Park can generally be described as follows:

- **Regional commercial:** Regional commercial uses tend to be large stores, such as department stores, home improvement stores, or "super-centers," that draw significant numbers of customers from areas beyond the city in which they are located. This type of commercial development is often characterized by "big-box" stories and nationally-recognizable chains. Menlo Park does not host this type of development, but the IKEA store located on the bay side of US 101 in East Palo Alto is an example of this sort of commercial development.
- **Community commercial:** These uses are typically characterized as those that act as a major draw throughout their host community. Popular restaurants or retail stores, such as ACE Hardware in the Downtown and Kepler's Books on El Camino Real, are good examples of this type of commercial use.
- **Service commercial:** Rather than selling food or consumer goods, this type of commercial includes activities such as automobile repair, veterinary clinics, gas stations, and personal care. This type of commercial use tends to be mixed in with other commercial uses, either in shopping centers or along retail corridors.
- **Neighborhood commercial:** These commercial uses are similar to community commercial, but typically draw customers from a smaller geographic area. Small- to medium-sized grocery stories, such as The Willows Market, and pharmacies are typical of this type of commercial use, and the Sharon Heights Shopping Center is an example of a neighborhood commercial shopping center.
- **Offices:** Offices associated with research and development uses may fall into an industrial category, such as in the M-2 Area, while offices associated with business or professional services are usually classified as commercial. For technology firms, where offices may be integrated with research and development, these classifications may be even less distinct. Office commercial is most common near Downtown and Central Menlo Park and along Sand Hill Road, which is known internationally as a Venture Capital Corridor.
- **Mixed-use:** Commercial uses may also occur as part of mixed-use designations. This sort of mixed use usually includes retail or sometimes customer-serving offices at the street level, with residential units or offices above. Downtown Menlo Park currently includes a limited amount of this type of mixed use.

- **Hotel/lodging:** Hotel and lodging commercial uses can occur as a part of mixed use, or may be stand-alone uses. Menlo Park currently has relatively few hotel rooms for its size and employment base, with the vast majority occurring along El Camino Real and Sand Hill Road. The Rosewood Sand Hill and the Stanford Park Hotel are both examples of stand-alone hotel uses in or near Menlo Park, and a large (11-story) hotel has been approved for construction at the Menlo Gateway site in the M-2 Area.

INDUSTRIAL USES

Industrial and Business Park designations together account for approximately 15.7 percent of Menlo Park's developable land area. The Limited Industry designation comprises 97 percent of industrial uses in Menlo Park, and Commercial Business Park designation comprises the remaining 3 percent, but the city and Silicon Valley Region have been experiencing a shift over the past several decades from more intensive uses to lighter industrial and research and development office-type uses. As described in Table 3, Limited Industry designations generally include "light manufacturing and assembly, distribution of manufactured products, research and development facilities, industrial supply, incidental warehousing, offices, limited retail sales [and] public and quasi-public uses." Commercial Business Park allows all of these uses, as well as "services to serve businesses and hotel/motel clientele in the area (such as restaurants, cafes, and health/fitness centers), [and] hotel/motel to serve the local and regional market."

Industrial uses in Menlo Park are concentrated in the M-2 Area. The industrial legacy of the 567-acre M-2 Area began with the 1948 arrival of Hiller Helicopters on the unincorporated outskirts of Menlo Park, and this area is now occupied by new light industrial and research and development uses. Another significant event in the industrial history of the M-2 Area was the development of a nearly 200-acre industrial park by David Dewey Bohannon in the 1950s. The legacy of these early uses continues to influence the M-2 Area today, as illustrated in Table 6. Current uses in the M-2 Area include a mix of generally low-intensity wholesaling, offices, research and development, warehousing, and light manufacturing. The M-2 Area is currently undergoing a major expansion of office uses, with Facebook currently occupying approximately 1 million square feet, completing another 435,000 square feet of new office space for their west campus, and poised to redevelop the adjacent former Raychem/TE Connectivity site with another approximately 1 million square feet of office campus. As of this writing, the largest private landholders in the M-2 Area are Bohannon, Facebook, Prologis, and Tarlton Properties Inc.

INSTITUTIONAL/PUBLIC USES

Institutional and public uses in Menlo Park include schools, government offices and agencies, the Menlo Park Civic Center, the Belle Haven library and pool, Onetta Harris Community Center, Belle Haven Child Development Center, Belle Haven Neighborhood Services Center, the USGS offices, and the Veterans Affairs

Medical Center. Together, these uses account for 6.7 percent of Menlo Park's developable land area. Although the USGS offices and the VA Medical Center are considered Institutional/Public land uses, two other major institutions in Menlo Park, SRI International and St. Patrick's Seminary and University, are not designated as public or institutional land uses, in part because they are privately owned and operated. Instead, the St. Patrick's Seminary property is zoned residential, as discussed above, and SRI international is classified as commercial.

OPEN SPACE AND CONSERVATION

Open Space and Conservation areas comprise 5 percent of Menlo Park's developable land area and include popular parks, such as Burgess Park and Nealon Park, as well as the Sharon Heights Golf and Country Club and Flood Park, although the latter two are not owned by the City. Although Bedwell Bayfront Park is a well-used recreation area, it is currently classified as Floodplain under City zoning.

EL CAMINO REAL/DOWNTOWN SPECIFIC PLAN LAND USES

Areas subject to the land use designations of the Specific Plan comprise approximately 3.5 percent of Menlo Park's developable area. The El Camino Real/Downtown Specific Plan was adopted in 2012 and applies to Downtown Menlo Park and most areas along El Camino Real. The El Camino Real/Downtown Specific Plan encourages improvements to the Downtown's streetscape and parking facilities and allows new mixed-use development along El Camino Real. The Plan contains a number of tailored land use designations, which allow a mix of commercial, including retail, office, hotel, as well as residential, depending on the location within the Specific Plan Area.

DENSITY AND INTENSITY OF USES

A common measure in planning is density, which usually refers to the number of people, dwelling units, or in some cases, jobs per acre. Gross density is expressed in people, units, or jobs in an area, including land that is not developable, such as roads, parks, or utility infrastructure areas, while net density considers only land areas that are developed (or could be developed) with the use under consideration. For example, the gross density of a neighborhood would divide the number of people or housing units in a neighborhood by the total number of acres in that area. Net density would use the same population or unit count but exclude properties where homes were not located from the acreage. Table 7 compares Menlo Park population and housing densities to that of surrounding communities.

Although density and intensity are closely correlated, intensity focuses on the physical characteristics of structures, rather than the number of housing units or of people who live or work in a given area. The concept of intensity incorporates a variety of metrics derived from the dimensions of a building and the land it occupies; these include interrelated measures of height, bulk, and lot coverage. A common measure of building intensity is Floor Area Ratio (FAR), which is determined by dividing the amount of floor space in a building by the total area of the parcel it occupies. For example, a one-story building that covers half of a parcel would have an FAR of 0.5, while a three-story building that covers 25 percent of a lot would have an FAR of 0.75.

In general, buildings that contain greater "bulk" —that is more height and more floor space— are considered to be more intense. Density and intensity do not entirely describe how a building relates to the underlying land, and depending on the degree to which building mass is visible to passersby, a building may be made to appear more or less intense. For instance, a three story building occupying one-quarter of its parcel looks very different from a one-story building occupying half of the same size lot. This is where measures and zoning controls such as height, setback, and step-back regulations play a role. Setbacks (or "build-to" lines) are the distances from building facades to the boundaries of a parcel. Step-backs establish larger setbacks for upper floors.

PARCEL SIZE AND ORIENTATION

Approximately two-thirds of Menlo Park parcels range between 1/8 and 1/3 acre. At the other end of the spectrum, the M-2 Area features parcels that are much larger than in the remainder of Menlo Park, with an average parcel size of 2.7 acres. The largest parcels in the city are institutional uses, and commercial and industrial uses located at the opposite ends of the city along the bay and near the hills. The three largest parcels in Menlo Park that are not undeveloped Bay lands are those occupied by Facebook (137 acres on three adjacent properties), the Veterans Affairs Hospital and medical complex (95 acres), and St. Patrick's Seminary and University (42 acres).

The average parcel size in Menlo Park is 1.13 acres; however, this number is skewed by a relatively small number of relatively large parcels. The median parcel size, which better captures the area of a typical Menlo Park parcel, is approximately 0.17 acres or 1/6 of an acre. Typical parcel sizes vary between neighborhoods, with Linfield Oaks and Sharon Heights tending to feature slightly larger parcels on average than Belle Haven or Allied Arts, for example. Linfield Oaks and Sharon Heights have typical parcel sizes of 1/5 and 1/3 acre, respectively; Belle Haven and Allied Arts have typical parcel sizes of approximately 1/8 and 1/6 acre, respectively. Figure 6 illustrates the geographic distribution of parcel sizes in Menlo Park, and Figure 7 depicts the mathematical distribution of parcel sizes.

In addition to zoning regulations, use restrictions, and quantitative metrics that affect and characterize land use, there are also qualitative aspects that are important to the function and feel of particular uses and areas.

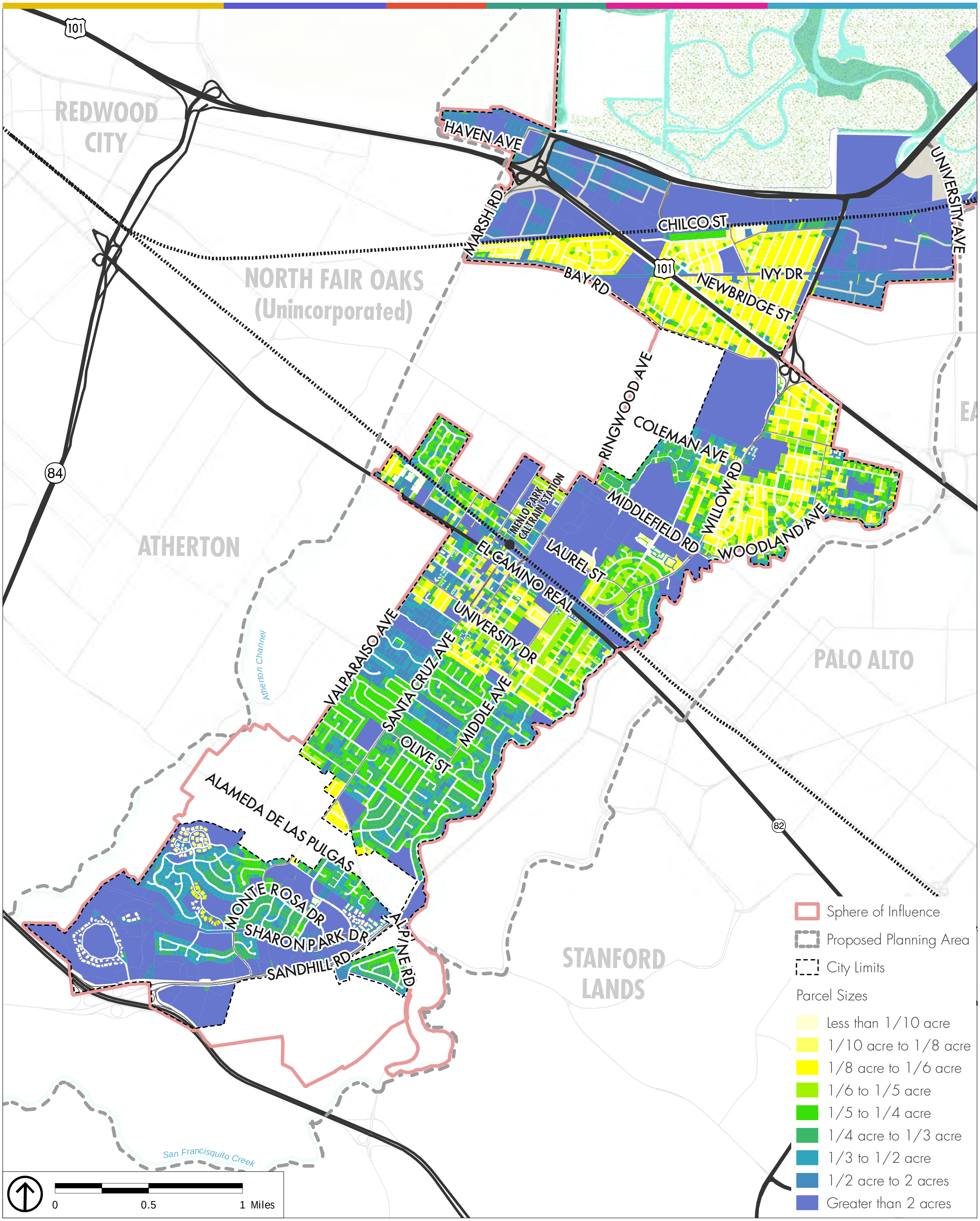

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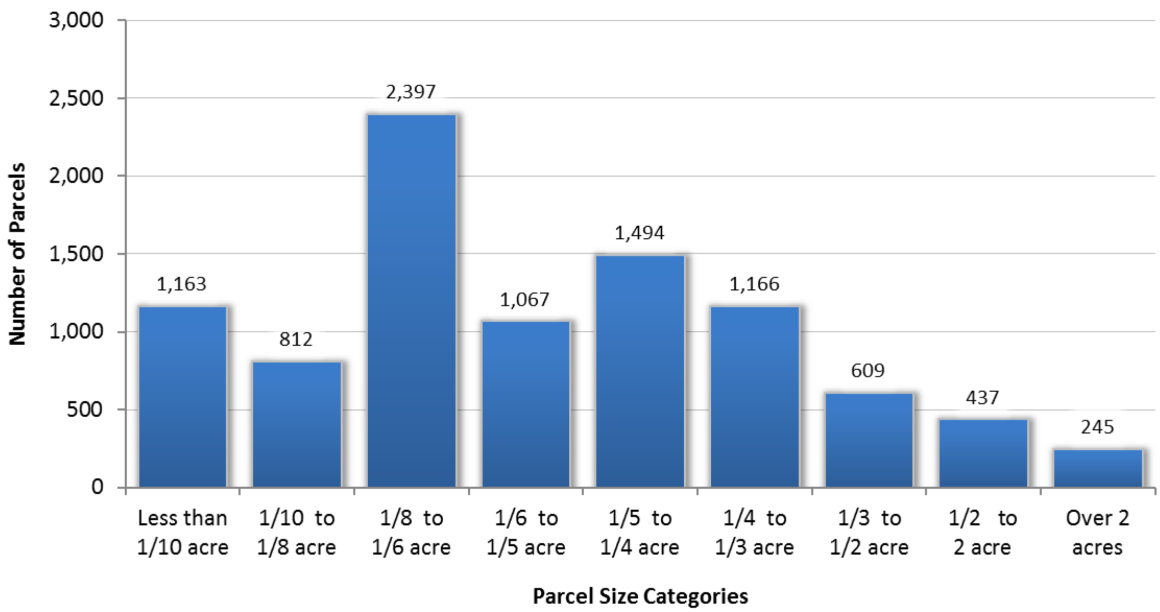
FIGURE 6: GEOGRAPHIC DISTRIBUTION OF PARCEL SIZES

FIGURE 7 MATHEMATICAL DISTRIBUTION OF PARCEL SIZES



For example, the layout and design of a land use may reflect an orientation towards pedestrians, toward automobiles, or in some cases, toward transit. Pedestrian-oriented uses typically front sidewalks and offer windows, signage and entrances accessible to those on foot. Auto-oriented uses tend to have their entrances adjacent to parking areas, which offer convenience to drivers, but may require pedestrians to walk greater distances from public streets or sidewalks, and may not offer sidewalks at all. Uses may be specifically oriented toward transit, with entrances fronting directly on to transit plazas or concourses. Many other factors contribute to a pedestrian or an automobile orientation, and some developments may present a blend of auto- and pedestrian-oriented features.

CITY STRUCTURE

COMMERCIAL CENTERS

Menlo Park contains a number of retail/commercial centers that act as a focus of community and commercial activity. Some centers are characterized primarily by retail and/or services, while others contain a mix of commercial uses and community facilities.

Downtown Menlo Park and El Camino Real

Downtown contains the primary concentration of commercial uses in Menlo Park. In addition to being an important thoroughfare in Downtown, Santa Cruz Avenue serves as Menlo Park's primary shopping and dining street. El Camino Real hosts a number of commercial uses and also serves as a major thoroughfare connecting Menlo Park to Atherton, Redwood City, Palo Alto, and other Peninsula and South Bay Cities. Together, Santa Cruz Avenue and El Camino Real feature a variety of uses, including restaurants, shops, offices, hotels, residences, places of worship, and mixed-use sites, making Downtown a bustling and diverse focal point of the City.

Sharon Heights Shopping Center

Although considerably smaller and less heavily trafficked than Downtown Menlo Park, the Sharon Heights Shopping Center is the only major shopping center in Menlo Park outside of Downtown and off of El Camino Real. Located along Sand Hill Road, the Sharon Heights Shopping Center contains primarily neighborhood-serving retail goods and services, including a grocery store, a gas station, a pharmacy, and a coffee shop.

Nearby Centers

Although the commercial and mixed uses along Alameda de Las Pulgas are not within Menlo Park (and therefore City regulations do not apply to uses there), the area is bounded on three sides by city neighborhoods. The corridor features restaurants, offices, coffee shops, a dry cleaner, a pub, and a gas station. Stanford Shopping Center is another center outside of Menlo Park that nonetheless provides important commercial retail and services for the Menlo Park community. Located along El Camino Real and Sand Hill Road, Stanford Shopping Center is a large, open-air mall with a wide variety of restaurants and retail stores that serves as a regional draw, serving not only Menlo Park and Palo Alto residents, but also the Peninsula and, to a certain extent, the greater Bay Area.

Neighborhood Retail Nodes

In addition to the larger retail centers identified above, Menlo Park also has a small number of smaller retail nodes that generally serve surrounding neighborhoods. These nodes include the Willows Market, the cluster of shops at the intersection of Menalto and Gilbert Avenues, and a number of small retail clusters along Willow Road, such as at Ivy Drive, Newbridge Street, Hamilton Avenue, and between O'Keefe Street and US 101.

EMPLOYMENT CENTERS

Menlo Park hosts a number of large employers that are generally concentrated in several clusters: the M-2 Area, the VA Medical Center, central/Downtown Menlo Park, and the Venture Capital Corridor along Sand Hill Road. Major employers include Facebook, Intuit, and Pacific Biosciences in the M-2 Area; SRI International, the City of Menlo Park, and the USGS in central Menlo Park, and a variety of noted venture capital firms such as Elevation Partners, Kleiner Perkins Caufield Byers, and Greylock Partners along Sand Hill Road. Additional discussion of employment levels and major employers in Menlo Park is available in the Existing Economics Conditions Report.

NEIGHBORHOODS

Neighborhood and community character are defined by a wide array of characteristics that both describe the built environment and reflect the diversity of a neighborhood's residents. Among many features, community character may be described in terms of architectural styles, streetscape conditions, topography, street trees, lot sizes, building forms, landscaping, public art, and open spaces. Community character is closely related to but also distinct from land use. Menlo Park's eclectic community character is discussed in much greater depth in the Community Character Report. Figure 8 shows the location of Menlo Park neighborhoods, as well as key features that distinguish the city, and Figures 9a, 9b, and 9c show examples of views and gateways in Menlo Park. It should be noted that the General Plan Update portion of the ConnectMenlo project focuses on the M-2 Area and is not anticipated to lead to new policies or land use changes directed at neighborhoods in Menlo Park, except perhaps Belle Haven.

CITY SERVICES AND PUBLIC FACILITIES

EMERGENCY SERVICES

MENLO PARK FIRE PROTECTION DISTRICT

Formed in 1916, the Menlo Park Fire Protection District (MPFPD) provides fire-prevention, inspection and investigation, along with fire-fighting, hazardous materials response, technical rescue, urban search and rescue, water rescue, and advanced life support paramedic emergency medical services for Menlo Park, the adjacent communities of Atherton, East Palo Alto, certain unincorporated portions of San Mateo County, federal facilities such as the Veterans Hospital and United States Geological Survey, Stanford Linear

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FIGURE 8: COMMUNITY FEATURES

View toward hills along Sharon Park Drive.

View toward hills along Ivy Drive.

Downtown Menlo Park gateway.

View toward hills on Santa Cruz Ave.

View toward hills along Santa Cruz Avenue.

View of bay lands from edge of Bedwell Bayfront Park.

Accelerator and the marshlands bordering San Francisco Bay in order to protect life and property.[20] As of 2012, the total population of the MPFPD service area was approximately 90,000.[21] In addition to its 33-square-mile service area, Menlo Park Fire Protection District also maintains a mutual aid agreement with Fremont Fire Department, an automatic aid agreement with Palo Alto Fire Department, and a county-wide automatic aid agreement with adjacent fire agencies such as the Woodside Fire Protection District and Redwood City Fire Department. That agreement consists of a closest unit concept, border drops, paramedic first response, move and cover station backfill, expanded incident alarm plan and common and singular dispatch agreement. Figure 10 shows the MPFPD service area and the location of MPFPD and Menlo Park Police facilities.

Because Menlo Park is composed mostly of residential and multi-residential structures, the risk of fire in these areas of Menlo Park is typical of that in primarily suburban California communities, and this risk has been reduced through the use of early fire detection and sprinkler suppression systems. Multi-unit, multi-story residential development density has been increasing in recent years, which presents unique challenges for access and increased population and vehicle trips. The elevated fire risk typical in areas with wildland/urban interface is found predominantly in the Alpine Road, Stanford Hills and Sharon Heights neighborhoods and all areas bordering San Francisquito Creek. Those areas are most susceptible to potential wildland fire hazards. Areas along the creek are also more vulnerable to flooding during significant rain storms and to large trees falling on to structures, vehicles, and pedestrians, especially during high winds and winter storm events.

Higher density buildings, specifically those in downtown Menlo Park and the M-2 Area, as well as industrial structures, are considered to be at greater risk from fire or, in the case of the latter, hazardous materials releases. Businesses in Menlo Park that use or re-sell hazardous materials, such as research and development laboratories, gas stations, dry cleaners, or industrial fabrication processes, pose a risk of special hazard fire. Hazardous materials releases or explosions may occur as a result of or independently of a fire or other disaster. Industrial buildings and other businesses that potentially use hazardous materials are mostly concentrated in M-2 Area, though other businesses throughout the city may use varying amounts of hazardous materials. Many businesses throughout the City have also installed back-up generators to insure uninterrupted operations. Most back-up generators require combustible liquid permits for their diesel fuel tanks. Businesses that handle hazardous materials must comply with applicable building, fire, and environmental regulations, and are subject to supervision and inspection by a variety of State and federal agencies, as well as the MPFPD.

[20] Menlo Park Fire Protection District. http://www.menlofire.org/Operations.html, accessed October 21, 2014.

[21] Menlo Park Fire Protection District, 2007. Ordinance 30 & District Standards, September 5. http://www.menlofire.org/fireprevention/forms/Ordinance%2035-2012.pdf, accessed September 27, 2012.

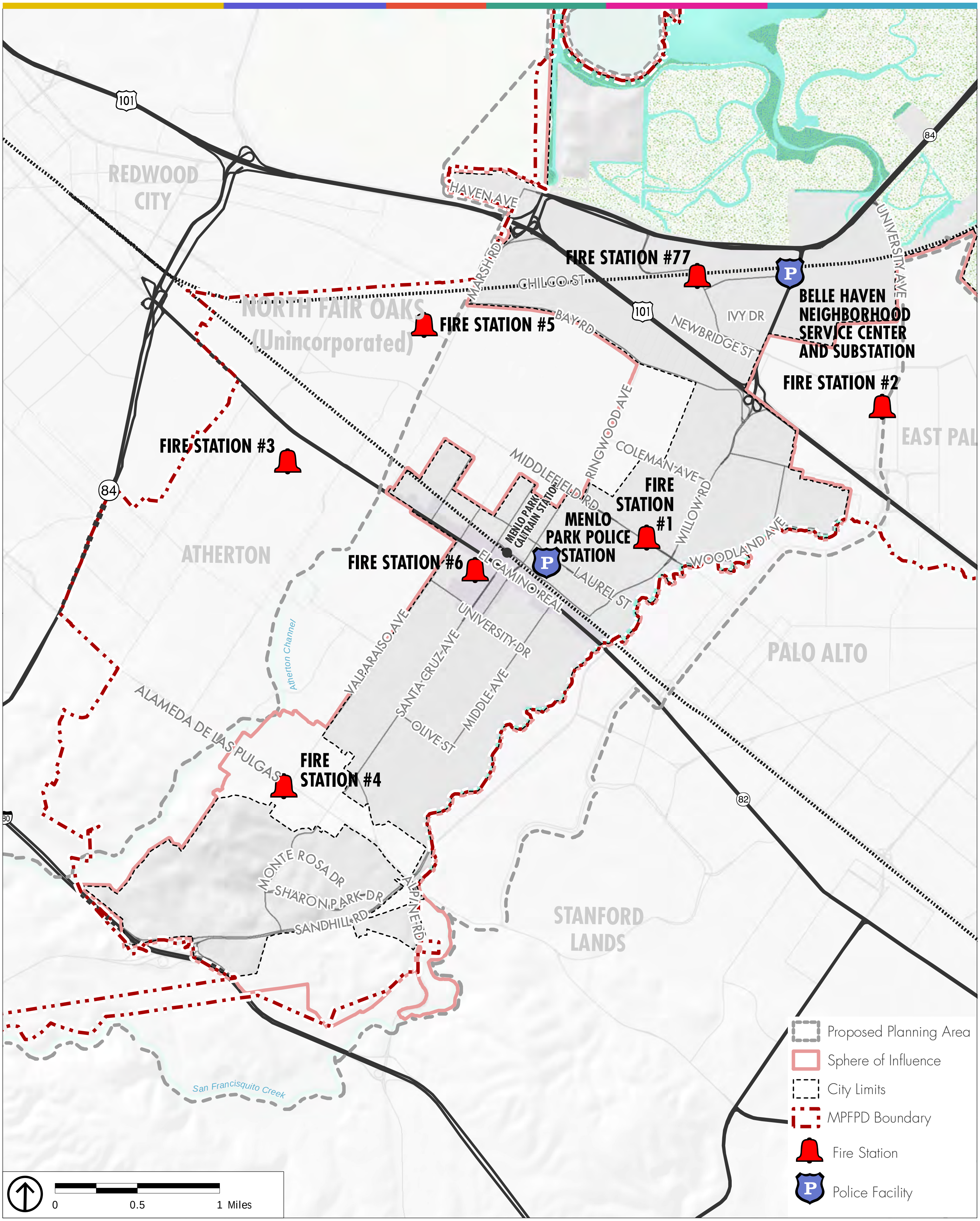

FIGURE 10: FIRE DISTRICT AND POLICE FACILITIES

Large, "campus style" complexes and technology sector, biotech, and energy businesses present unique challenges based upon their size, layout, number of employees and business purpose. These businesses and complexes are changing the traditional mix and business model of the M-2 Area with larger, denser buildings and more employees, which lead to increased service population in the M-2 Area and additional traffic impacts during peak commute hours and service demands.[22]

Menlo Park Fire Protection District Operations

Dispatching for the MPFPD is conducted through the Countywide consolidated Fire Dispatch Center. MPFPD personnel respond to more than 8,000 calls for service annually, of which 61 percent are medical emergencies.

The Menlo Park Fire Protection District operates seven stations at the following locations:

- Station 1: 300 Middlefield Rd. (1250 plus calls for service per year)
- Station 2: 2290 University Ave. (East Palo Alto – 2000 plus calls for service per year)
- Station 3: 32 Almendral (Atherton – 800 plus calls for service per year)
- Station 4: 3322 Alameda de Las Pulgas (unincorporated County – 1100 plus calls for service per year)
- Station 5: 4101 Fair Oaks Avenue (unincorporated county – 700 plus calls for service per year)
- Station 6: 700 Oak Grove Avenue – (1200 plus calls for service per year)
- Station 77: 1467 Chilco Avenue – (700 plus calls for service per year)

The Fire District maintains the following equipment and vehicle fleet:[23]

- One battalion SUV command vehicle (operating out of Station 1)
- One reserve battalion SUV command vehicle
- Seven Type 1 heavy fire engines (one at each station)
- Three Type 1 heavy reserve fire engines
- One ladder truck (105-foot ladder, operating out of Station 1)
- One reserve ladder truck (100-foot aerial ladder)
- One medium-duty technical rescue vehicle
- One utility truck with skid mount pump
- Three inflatable rescue boats and trailer
- Two jet skis and trailer
- One Office of Emergency Services (OES) water rescue truck
- One airboat and trailer
- Four fire prevention/investigation vehicles

[22] Communication with Menlo Park Fire Protection District (MPFPD) by City of Menlo Park, November 2014.

[23] Menlo Park Fire Protection District (MPFPD). http://www.menlofire.org, accessed October 23, 2014. 20 Menlo Park Fire Protection District, Fiscal Year 2014–2015 Adopted District Budget & CA-TF2 US&R Budget, http://www.menlofire.org/pdf/budget1415/Budget%2014-15.pdf, accessed October 23, 2014. Edited, updated, and confirmed by the MPFPD, December 2014.

- Two fire mechanic field utility trucks
- One dually crew cab truck (used to tow trailers)

Each of the seven fire stations is equipped with one Type 1 heavy fire engine and is continuously staffed by three fire crew members: a captain, an apparatus driver, and a paramedic. Every station operates on three rotating 48-hour shifts to ensure 24-hour constant service. Fire District staff also includes two full-time mechanics who maintain District response vehicles. Administrative offices for the Menlo Park Fire Protection District are located at 170 Middlefield Road, near the Willow Road intersection. For fiscal year 2014–2015, MPFPD's staffing level was anticipated to be 115.5 full-time equivalents.[24]

The MPFPD provides in-department training in the following areas: emergency medical technician/paramedic response; technical rescue; auto extrication; live fire training; ropes operations; incident simulation and career development; hazardous materials first response, situational awareness, command and control; and incident command special training in Urban Search and Rescue (USAR) consisting of collapsed structure, trench and confined space training. To maintain these training programs, the MPFPD training unit engages in annual requirements for all specialties including driver operator and acting officer testing, as well as probationary testing, and mandates requirements for yearly training, which consists of on-line computer and hands-on training formats. Additionally, the MPFPD runs a variety of community training and education programs, including community emergency preparedness consisting of agency to agency or inter-governmental service agreements to meet mandated training, plans and exercise requirements for unified command, Community Emergency Response Team (CERT) training, Get Ready, and the Boy Scouts high school explorer and College of San Mateo fire cadet work experience programs, which teach and train young people and students about careers in the Fire Service. MPFPD also provides custom-designed school and workplace fire safety education programs for the public by request.[25]

Fire District Budget

The 2014/2015 total budget for the Menlo Park Fire Protection District is $37.7 million, which represents a 3 percent decrease from the 2013/2014 budget, primarily due to decreased capital expenditures. The MPFPD receives the majority of its funding through property taxes and operational/developmental permitting fees, with smaller amounts coming from intergovernmental transfers, such as grants or funding provided by other agencies. The 2014/2015 budget for MPFPD includes $5.8 million for the completion of construction on Station 2 and $6.7 million for the redevelopment of Station 6.

[24] Menlo Park Fire Protection District (MPFPD). http://www.menlofire.org, accessed October 23, 2014. 20 Menlo Park Fire Protection District, Fiscal Year 2014–2015 Adopted District Budget & CA-TF2 US&R Budget, http://www.menlofire.org/pdf/budget1415/Budget%2014-15.pdf, accessed October 23, 2014. Edited, updated, and confirmed by the MPFPD, December 2014.

[25] Communication with Menlo Park Fire Protection District (MPFPD) by City of Menlo Park, November 2014.

The MPFPD maintains a schedule of fees for a variety of uses and permits in order to help support cost recovery for the District. These fees were adopted in 2012 subsequent to a fee study that was completed earlier that year. In early 2014, Facebook partnered with the Menlo Park Fire Protection District to provide $150,000 for the installation of traffic signal preemption devices that would give emergency vehicles priority at key intersections along Marsh Road, Bayfront Expressway, Willow Road, and University Avenue.[26]

Issues for Future Consideration

Although the Menlo Park Fire Protection District is currently meeting its response and service goals, it faces operational challenges as a result of ongoing and increasing traffic congestion, most notably along Marsh and Willow Roads. In order to circumvent congestion during emergency response, MPFPD vehicles are forced to drive against the flow of traffic with increasing frequency. Traffic congestion also effects non-emergency operations, decreasing the efficiency of everyday travel for routine activities such as maintenance and supply purchases.

MPFPD's future goals include improved, more reliable access across Menlo Park, especially to the M-2 Area and Belle Haven.[27] The District is updating a critical "Standards of Cover" report to analyze the effects of increased regional growth, changes to project heights, density, population, and roadway congestion as well as service delivery. An aerial ladder truck study identified that a singular ladder truck was not adequate if growth continued and traffic congestion increased, especially in the M-2 Area. The study examined the need for an aerial ladder on both sides of US 101. MPFPD has commissioned a draft impact fee study to better determine fair share costs to developers and to equally distribute service delivery changes and costs that would address the need for additional apparatus, equipment, staffing, and stations.[28]

Other future challenges that MPFPD faces include: 1) changes in MPFPD staffing, equipment, and facilities due to new development in Menlo Park; 2) impacts on MPFPD's ability to provide services due to increased development in Menlo Park and neighboring jurisdictions served by MPFPD; 3) potential replacement of Station 77 and Station 1; and 4) continued provision of a high level of MPFPD services to preserve and protect life and property.,

[26] Communication with Menlo Park Fire Protection District (MPFPD) by City of Menlo Park, November 2014.
[27] Harold Schapelhouman, Chief, Menlo Park Fire Protection District (MPFPD). Interview with PlaceWorks on October 16, 2014.
[28] Communication with the Menlo Park Fire Protection District (MPFPD) by City of Menlo Park, November 2014.

MENLO PARK POLICE DEPARTMENT

The Menlo Park Police Department (MPPD) provides law enforcement services in the City of Menlo Park. One police station, located at City Hall, primarily covers the whole service area. The MPPD operates one newly opened 1,800-square-foot substation on the bayside of US 101 in the Neighborhood Service Center, which is staffed and open to the public during normal business hours. The Belle Haven Neighborhood Service Center and Substation is also used for officers to use restrooms, make calls, or interview and process suspects, victims, or witnesses. The substation is also a location used during critical incidents in the Belle Haven neighborhood. The MPPD divides its service area by three beats:

- Beat 1 covers the area of the City on the hillside of El Camino Real
- Beat 2 covers the area between El Camino Real and US 101
- Beat 3 covers the bayside of US 101

Figure 10 shows the locations of Menlo Park police facilities.

The MPPD has a mutual aid agreement with every other police agency in the County of San Mateo. This agreement includes all neighboring jurisdictions: Atherton Police Department, East Palo Alto Police Department, Redwood City Police Department, and the San Mateo County Sherriff's Office, which is responsible for law enforcement in unincorporated areas of Menlo Park and Redwood City. The MPPD also has an informal mutual aid agreement with the Palo Alto Police Department which borders Menlo Park, but is in Santa Clara County.

Staffing

MPPD staffing includes 48 sworn officers and 22 professional staff, resulting in a total full-time equivalent (FTE) of 70 as of 2014. The sworn officers consist of one chief, two commanders, eight sergeants, and 37 police officers,[29] with a staffing ratio of 1.4 officers per 1,000 residents.[30] Recent budget shortfalls in the City have resulted in staff deficiencies in the MPPD. To maintain service levels with limited budget, the MPPD has tightened its resources by assigning some sworn officer's tasks to non-sworn staff. Recently, MPPD has been able to revive its traffic unit with the staffing of two motorcycle positions. Currently there is one full time motorcycle traffic officer on duty with a second motorcycle officer in training.

Response Times

The MPPD prioritizes calls for police services as follows: Priority 1 calls involve life-threatening situations; Priority 2 calls are not life-threatening but necessitate immediate response; all other calls are designated

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[29] Dave Bertini, Commander, Menlo Park Police Department. Interview with PlaceWorks on November 19, 2014.
[30] Dave Bertini, Commander, Menlo Park Police Department. Interview with PlaceWorks on November 19, 2014.

Priority 3. In 2014, the average response time for Priority 1 calls was 3:35 minutes, for Priority 2 calls was 7:39 minutes, and for Priority 3 calls was 11:30 minutes.[31] Vehicle traffic and congestion are the primary impediment to improving response times.

Call Volumes

From November 18, 2013 to November 18, 2014, the MPPD received 401 Priority 1 calls, 10,833 Priority 2 calls, and 10,507 Priority 3 calls for service. This does not include the 18,448 additional officer-initiated calls that the dispatch center handled.[32] These officer initiated calls could be priority 1, 2, or 3 depending on their nature. The MPPD identified the Beat 3 area as a "crime hot spot" because of entrenched gang activity in the area and rival gangs in East Palo Alto, although violent crime has dramatically decreased throughout the City in 2014.

Belle Haven Neighborhood Service Center and Substation

The City currently operates a police substation within the Neighborhood Service Center in the Belle Haven neighborhood. This location recently opened (Spring 2014) with funding provided by Facebook. The renovated facility includes a new interior and free WiFi, and is a location for community members to meet with law enforcement, and each other. The substation also houses the department's Code Enforcement Officer and newly created Community Safety Policy Officer.

Future Needs

With recent completion of the Belle Haven Neighborhood Service Center and Substation, the Menlo Park Police Department anticipates that, with the exception of evidence storage, its space needs will be adequately met for the near future. However, the Police Department has a number of programs it hopes to develop or expand in the short-term, including a Diversion Program, the David Lewis Community Re-Entry Program, Chilco area sidewalk and street lighting, and improvements to traffic management during school drop-off and pick-up.[33]

[31] Dave Bertini, Commander, Menlo Park Police Department. Interview with PlaceWorks on November 19, 2014.
[32] Dave Bertini, Commander, Menlo Park Police Department. Interview with PlaceWorks on November 19, 2014.
[33] Robert Jonsen, Police Chief, Menlo Park Police Department. Interview with PlaceWorks on October 16, 2014.

UTILITIES

WATER SERVICE

Potable water is supplied to the Menlo Park community by one of four water utility companies: the Menlo Park Municipal Water District (MPMWD), California Water Service, the O'Connor Tract Cooperative Water District, and the Palo Alto Park Mutual Water Company. Menlo Park Municipal Water District covers the Sharon Heights neighborhood and most areas on the bay side of Middlefield Road. The Menlo Park Municipal Water District also covers the SRI International campus, Menlo Park Civic Center, and a small number of nearby residences on Barron, Thurlow, and Hopkins Streets. The O'Connor Tract Cooperative Water District serves a small area of Menlo Park, roughly bounded by Euclid Avenue, Woodland Avenue, Menalto Avenue, and properties on the bay side of O'Connor Street. A small area along Euclid Avenue is served by the Menlo Park Municipal Water District. California Water Service serves the remaining, mostly central portion of Menlo Park, including Downtown Menlo Park. A very small portion of Menlo Park is served by the Palo Alto Park Mutual Water Company. This area includes several properties on Menalto Avenue near US 101. Figure 11 shows the boundaries of the water districts serving Menlo Park.

Menlo Park Municipal Water District

The MPMWD serves approximately 40 percent of the City's population within the following four zones:

- The Lower Pressure Zone includes part of the Belle Haven neighborhood, Bay Road, and Willows neighborhood. This includes the business park area located along O'Brien Drive between Willow Road and University Avenue.
- The High Pressure Zone is located in Menlo Park between US 101 and the Bayfront Expressway and includes part of the Belle Haven neighborhood and M-2 Area business parks.
- The Upper Pressure Zone is geographically and hydraulically disconnected from other zones. It primarily serves the residential Sharon Heights neighborhood, the Sharon Heights Golf and Country Club, and the SLAC National Accelerator Laboratory.

In its 2010 Urban Water Management Plan (UWMP), MPMWD's demand projections assumed very modest residential growth and strong growth in the Commercial-Industrial-Institutional sectors. The MPMWD distribution system consists of 59 miles of water mains, 4,200 metered connections, two reservoirs, and one pump station. The MPMWD also maintains fire hydrants, backflow prevention devices, flushing points,

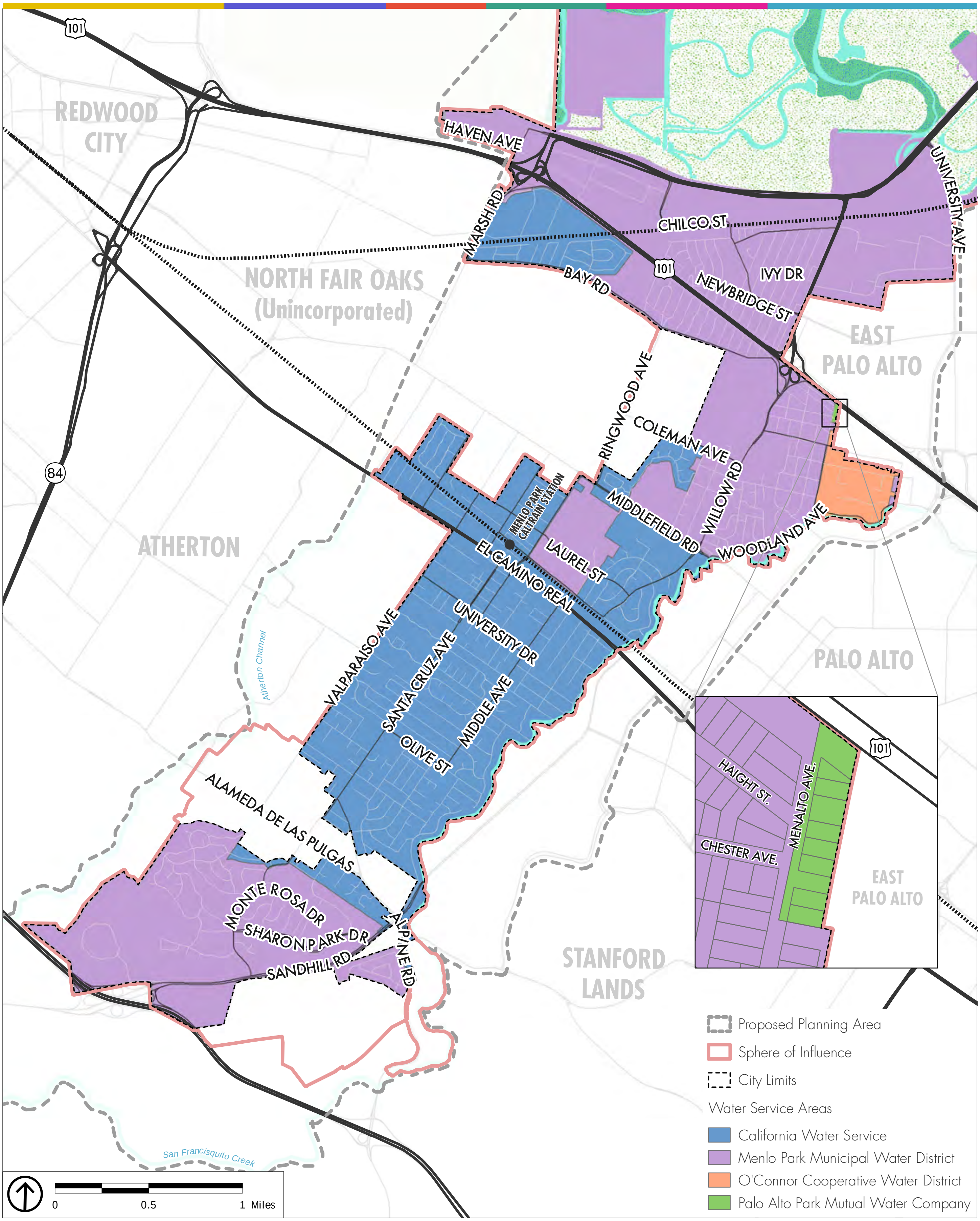

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FIGURE 11: WATER DISTRICT SERVICE AREAS

and service connections to the San Francisco Public Utilities Commission SFPUC, which controls access to water via the Hetch Hetchy pipeline right-of-way through Menlo Park.[34]

California Water Service Bear Gulch District (Cal Water BGD)

The California Water Service Company is an investor-owned public utility that provides water service to millions of customers in 24 separate water systems located across California. The particular system, or district, that serves portions of Menlo Park is known as the California Water Service Bear Gulch District, or Cal Water BGD. Cal Water BGD serves approximately 57,300 customers in several Peninsula communities, including the communities of Atherton, Portola Valley, Woodside, unincorporated portions of San Mateo County, and parts of Menlo Park (approximately 16,600 customers). In its 2010 UWMP, Cal Water BGD projected that the population in its service area would grow from 57,254 persons in 2010 to 64,573 in 2035 with an annual growth rate of 0.51 percent per year, which is slightly higher than the growth rate used in the City's UWMP.[35] The Cal Water BGD distribution system consists of 33 pressure zones, 57 booster pumps, 25 storage tanks and reservoirs, 1,865 hydrants, and 300 miles of main. Cal Water BGD tanks provide storage for more than 10 million gallons of potable water.[36]

O'Connor Tract Cooperative Water District

The O'Connor Tract Cooperative Water District (OTCWD) is a very small water district serving approximately 300 dwelling units in a small area near Menlo Park's border with East Palo Alto. To meet the demand of these households, OTCWD operates two wells in Menlo Park. The water from these wells historically has met applicable quality standards for drinking water without additional treatment. Estimated water-use levels in 2005 were 120 acre-feet per year (AFY) for OTCWD with a projected 2020 usage of 150 AFY.[37]

Palo Alto Park Mutual Water Company

Palo Alto Park Mutual Water Company (PAPMWC) serves a very small number of residential properties located on eight parcels in the vicinity of Menalto Avenue and US 101. PAPMWC is a non-profit mutual benefit corporation that is cooperatively owned by approximately 650 property owners. The water supply for PAPMWC is derived ground groundwater pumped from five wells within the service area. The rates of these pumps range from 125 to 800 gallons per minute (GPM). PAPMWC operates two storage tanks for

[34] City of Menlo Park, 2011. *Menlo Park Facebook Campus Project Draft EIR,* page 3.16-10.

[35] *Water Supply Assessment* for the City of Menlo Park Housing Element Update prepared by GHD, February 2013, pages 2-1 and 2-3.

[36] BAWSCA Annual Survey – FY 2006-07. http://bawsca.org/docs/0607_AP_CalWater_BG.pdf, accessed on January 4, 2013.

[37] Todd Engineers, 2005. *Feasibility of Supplemental Groundwater Resources Development, Menlo Park and East Palo Alto, California,* August. www.ci.east-palo-alto.ca.us/documentcenter/view/39, accessed November 2, 2014.

the pumped water, with capacities of 11,500 and 350,000 gallons. PAPMWC is not a public utility and only provides water to property owners within its service area.[38]

WATER SUPPLY

The major water supply source for both the MPMWD and the Cal Water BGD is the San Francisco Regional Water System (RWS), operated by the SFPUC, under the 2009 "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County, and Santa Clara County." The RWS is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. In June 2009 the City of Menlo Park entered into an agreement with the SFPUC that implemented a new system for allocating water during water shortages, such as drought years. This allocation system accounts for usage by both wholesale and retail customers in the SFPUC service area and specific reductions in use would be determined by water availability and projected demand at the time a water shortage is declared.

The MPMWD Individual Supply Guarantee (ISG) is 4.465 MGD (4,993 AFY), and the Cal Water ISG is 35.68 MGD (39,967 AFY). Cal Water BGD receives between 11.45 and 12.85 MGD or about one-third of the total Cal Water ISG. In addition, the Cal Water BGD obtains surface water from the Bear Gulch Creek at approximately 1,260 AFY in a normal year, 351 AFY in a single dry year, and 609 AFY in a multiple dry year. The MPMWD does not have an additional water source, but is evaluating several well sites that could produce up to 3,000 gallons per minute (GPM) in order to supplement its emergency potable and fire water supply.

A Water Supply Assessment (WSA) prepared for the 2013 Housing Element Update, General Plan Consistency Update, and Zoning Ordinance Amendments Environmental Assessment assumed that the population in the City's service area would increase by 6,800 from 2010 to 2035 based on projections from the Association of Bay Area Governments (ABAG). This would equate to an annual growth rate of 0.8 percent, which is higher than the projections in the MPMWD and Cal Water BGD's UWMPs (0.42 and 0.51 percent, respectively). The WSA assumed the multi-family demand factor of 0.1255 AFY (112 gallons per day per dwelling unit) for the Plan Components based on the City's recent El Camino Real/Downtown Specific Plan Environmental Impact Report (EIR).[39]

The MPMWD has prepared a Water Shortage Contingency Plan, as part of the MPMWD's Urban Water Management Plan, which contains measures to reduce demand by up to 50 percent in the case of drought or

[38] Palo Alto Park Mutual Water Company, http://www.paloaltoparkmutualwatercompany.com/, accessed December 12, 2014
[39] *Water Supply Assessment* for the City of Menlo Park Housing Element Update prepared by GHD in March 2013, page 4-3.

emergency. MPMWD would implement its Drought Contingency Plan to manage the shortages in multiple dry years if necessary.

SANITARY SEWER

The West Bay Sanitary District (WBSD) provides wastewater collection and conveyance services to Menlo Park, Atherton, Portola Valley, and areas of East Palo Alto, Woodside, and unincorporated San Mateo and Santa Clara counties. Small areas along Haven Avenue are served by the Fair Oaks Sewer Maintenance District (FOSMD), and small portions of the Willows neighborhood in the O'Connor area are served by East Palo Alto Sanitary District (EPASD). WBSD collected wastewater is treated by Silicon Valley Clean Water (SVCW), which is the Joint Powers Authority that owns and operates a regional Waste Water Treatment Plant (WWTP) in Redwood Shores. The SVCW also operates the pump stations that are located at the terminus of each member's collection system. The Joint Powers Authority governing members include WBSD and the cities of Redwood City, San Carlos, and Belmont.

The WBSD service area encompasses approximately 8,325 acres and includes approximately 19,000 service connections to serve a population of 52,900.[40] The WBSD conveys raw wastewater to SVCW for treatment through the Menlo Park Pump Station and force main.[41] The SVCW then discharges treated water to the San Francisco Bay.[42]

Wastewater Collection

The WBSD operates and maintains approximately 200 miles of gravity sewer mains in size from 6 to 54 inches in diameter.[43] The system serves more than 19,000 connections, including residential, commercial, and industrial users, and contains 150 miles of private lateral sewers.[44]

The WBSD owns and operates 12 pump stations ranging in capacity from 110 to 2,500 gallons per minute (GPM).[45] As a precaution, pump stations have redundant pumping equipment and standby generators, and the WBSD has additional emergency standby generators and bypass pumps as part of its mobile emergency

[40] West Bay Sanitary District, 2011. *Wastewater Collection System Master Plan,* prepared by West Yost Associates.
[41] West Bay Sanitary District, About Us. http://www.westbaysanitary.org/, accessed December 6, 2012.
[42] South Bayside Systems Authority, About Us, http://www.sbsa.org/about-us/, accessed December 31, 2012.
[43] West Bay Sanitary District, 2011. *Wastewater Collection System Master Plan,* prepared by West Yost Associates.
[44] West Bay Sanitary District, 2011. *Wastewater Collection System Master Plan,* prepared by West Yost Associates.
[45] West Bay Sanitary District, 2011. *Wastewater Collection System Master Plan,* prepared by West Yost Associates.

response equipment.[46] The average age of components in WBSD's collection system is 50 years, with a current expected life span of approximately 90 years.[47]

The WBSD's system flows from the hills to the bay and terminates at the Menlo Park Pump Station, which is owned by the WBSD, operated by SVCW, and located at the entrance to Bedwell Bayfront Park near the San Francisco Bay. The Menlo Park Pump Station conveys wastewater via main line trunk to SVCW's WWTP.[48]

Wastewater Treatment

The SVCW WWTP treats raw wastewater from Menlo Park and other communities and discharges to the deep water channel of the San Francisco Bay.[49] The WWTP is designed to remove more than 97 percent of all solids, organic material, and pathogens from the wastewater through physical and biological processes.[50]

The SVCW's WWTP has an existing dry weather capacity of 27 MGD and wet weather capacity of 71 MGD. On average in 2009, the WWTP treated 15 MGD in dry weather and 62 MGD in wet weather. Under its Stage 2 Expansion Program, the SVCW will increase WWTP capacity to 29 MGD dry weather capacity and 80 MGD wet weather capacity as needed.[51] The improvements under the SVCW's CIP are intended to accommodate regional development to year 2030.[52]

During the dry season, SVCW further treats some of the WWTP flow with coagulation and additional disinfection for use as recycled water for landscape irrigation in the SVCW service area.

Other Facilities

The WBSD owns four storage basins, named the Flow Equalization Facility (FEF), on approximately 20 acres at the bayside terminus of Marsh Road in Menlo Park. The two basins closest to the Menlo Park Pump Station are currently used to provide wet weather storage for the WBSD. The WBSD's primary wet weather storage facility, Pond 1, has an estimated capacity of less than 10 million gallons. This land and these basins were part of the WBSD's wastewater treatment facilities, prior to the forming of the SVCW in 1980.[53]

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[46] West Bay Sanitary District, About Us. http://www.westbaysanitary.org/education/what-we-do, accessed October 22, 2012.

[47] State Water Resources Control Board, *Order No. 2010-0014-DWQ*. http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_factsheet.pdf, accessed September 28, 2012.

[48] West Bay Sanitary District, 2011. *Wastewater Collection System Master Plan,* prepared by West Yost Associates.

[49] South Bayside Systems Authority, About Us. http://www.sbsa.org/about-us/, accessed December 31, 2012.

[50] South Bayside Systems Authority, About Us. http://www.sbsa.org/about-us/, accessed December 31, 2012.

[51] Teresa Herrera, South Bayside Systems Authority. Personal correspondence with PlaceWorks, January 21, 2013.

[52] South Bayside Systems Authority, *10-Year Capital Improvements Plan,* Press Release. http://www.sbsa.org/storage/assets/CIP_Press_Release5-9-08.pdf.

[53] West Bay Sanitary District, 2011. *Wastewater Collection System Master Plan,* prepared by West Yost Associates.

The WBSD and SVCW have a lease agreement that allows SVCW to use the FEF during wet weather events. When needed, SVCW requests that the WBSD bypass the Menlo Park Pump Station and flow directly to the FEF. When SVCW system-wide flows have decreased after the wet weather event, the WBSD-owned transfer pump station returns stored flow back to the Menlo Park Pump Station. This transfer pump station, which is operated by SVCW, has a capacity of 8,660 GPM.[54]

PARK AND RECREATION FACILITIES

Public park and recreation facilities are an important facet of Menlo Park's high quality of life and are generally considered to be in adequate or good states of repair. Menlo Park currently has 265.1 acres of park space, and community and recreation facilities, with these facilities spread out across the city. Table 8 shows the acreages for all City park, recreation, and community facilities, and Figure 12 shows their locations.

A significant portion of Menlo Park's parkland is contained in Bedwell Bayfront Park, which also represents a potential opportunity for improvements to existing facilities. Going forward, planning for improvements to this and other park facilities will require carefully balancing competing needs. For example, Bedwell Bayfront Park could potentially benefit from increased tree cover and from new picnic facilities; however, such improvements could serve to attract birds of prey, which would impact the ecosystem of the park. Alternatively, improvements to the restrooms at Bedwell Bayfront Park could be carried out in an environmentally sensitive manner; however, although these upgrades have been considered by Capital Improvements Plans for the future, funding is not currently in place for the project.

Similarly, there are a number of improvements for parks and recreation facilities that are planned for in applicable Capital Improvements Plans, although funding has yet to be secured. For example, at Kelly Park, a new soccer field with new fixtures and turf has seen sustained high use, but a project to install a sound wall adjacent to the field has yet to receive funding. The Belle Haven Swimming Pool is another popular recreation facility where funding could allow for new upgrades. Originally designed for brief, seasonal use, the pool has become a year-round attraction, leading to a need for an improved heating system for the pool, new lighting, and expanded locker and shower facilities. Funding is currently in place to conduct an audit to determine the full extent of these needs; but the additional funding necessary to make improvements to the pool has not yet been secured. In addition, dog park facilities in Menlo Park are in need of improvement. Currently, the softball field at Nealon Park doubles as both a ball field and as a dog park during weekday mornings. Although this arrangement has worked for some time, a need to separate facilities is contemplated in the Capital Improvements Plan.

[54] West Bay Sanitary District, 2011. *Wastewater Collection System Master Plan,* prepared by West Yost Associates.

TABLE 8 PARK, RECREATION, AND COMMUNITY FACILITIES IN MENLO PARK

Facility Name	Acreage
CITY PARK FACILITIES	
Bedwell Bayfront Park	155
Burgess Park	9.3
Fremont Park	0.4
Hamilton Park	1.2
Jack W. Lyle Park	4.6
Joseph P. Kelly Park	8.3
Market Place Park	1
Nealon Park	9
Seminary Oaks Park	3.5
Sharon Hills Park	12.5
Sharon Park	9.8
Stanford Hills Park	3.1
Tinker Park	0.5
Willow Oaks Park	2.6
Subtotal	**220.8**[a]
COUNTY PARK FACILITIES	
Flood Park	24.1
Total of All Park Facilities	**245**
CITY RECREATION/COMMUNITY FACILITIES	
Belle Haven Child Development Center	0.7
Belle Haven Community Library	0.6
Belle Haven Neighborhood Service Center and Substation	0.1
Menlo Park Civic Center	14.7 [b]
Onetta Harris Community Center	3.9
Total of Recreation/Community Facilities	20.1
Grand Total	**265.1**

a. Subtotal has appearance of being off by 0.1 acres due to rounding errors.
b. Acreage for this facility excludes Burgess Park acreage.
Source: City of Menlo Park Zoning Map data and PlaceWorks, 2014.

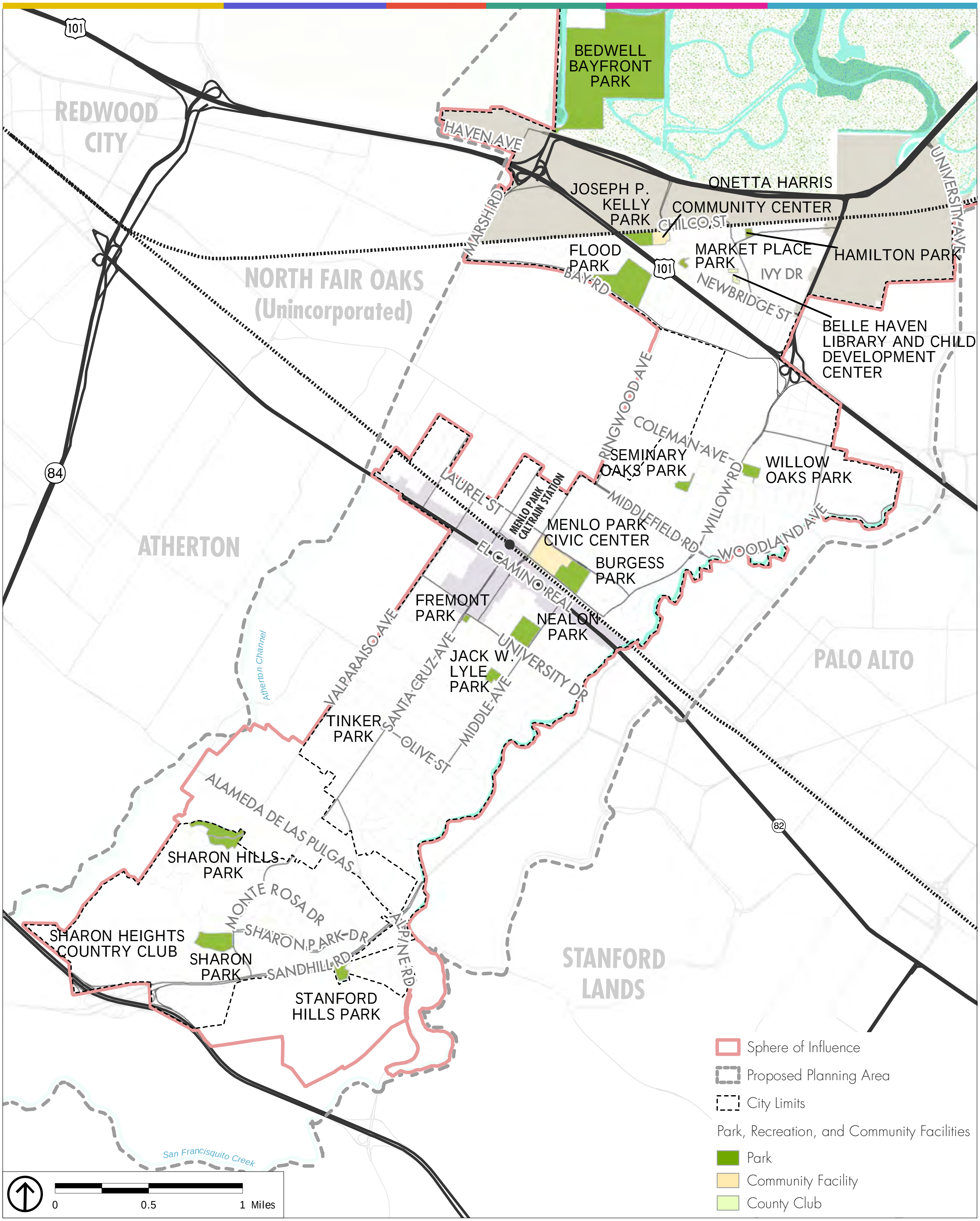

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FIGURE 12: PARK, RECREATION, AND COMMUNITY FACILITIES

Additional underserved service needs in Menlo Park include child care and senior center services. With regard to Senior Centers, operating hours are currently limited to 9:00 a.m. to 3:00 p.m., but there are members of the senior population who could benefit from extended hours of operation. Additional staff and staff training could allow future service expansions, potentially including additional capacity to host and provide support for special-needs populations. Similarly, childcare programs for low-income households in Belle Haven are currently at capacity and experience long waiting lists for childcare at the more highly subsidized slots serving the lowest income categories. Additional funding for new classroom space and staff positions at the Belle Haven childcare center could allow for capacity increases that would help reduce or eliminate waitlists.

LIBRARY

Menlo Park libraries are part of the Peninsula Library System, a regional library cooperative which offers access to a wide variety of materials and databases shared by member libraries. Menlo Park operates two libraries that provide a diversity of services to Menlo Park residents and visitors. The Menlo Park Main Library is a 34,200-square-foot building located at 800 Alma Street in the Menlo Park Civic Center. The Main Library has a collection of 200,000 plus items, and offers a variety of spaces, services, and equipment. Equipment includes 17 computers for adult use with internet and office software, nine computers dedicated to children's use (three of which include literacy software), a paired computer and flatbed scanner, Scanning and Reading Appliance (SARA), two printers, and a copier. Main library services include free wireless internet access, book borrowing, eBooks, eMagazines, database access, and a wide variety of programs for children and adults such as seven weekly storytimes for children and a monthly program for adults on Saturday, and special programs throughout the year. The library also has an active program for teenagers, including a teen advisory group, reading club, and special activities. As of this writing, the Main Library is open seven days a week, but is closed during federal holidays.

In 1999, the City opened a 3,600-square-foot branch library in the Belle Haven Elementary School at 413 Ivy Drive as part of a joint venture with Ravenswood City School District. The Belle Haven Branch offers a variety of services and equipment. The Belle Haven Library provides 13 computer terminals for public use, with an additional two catalog computers. The publically accessible computers feature full internet access, as well as office software, with several of the computers featuring English language learning software and educational children's computer games. The library also features a copy machine, and includes services such as free wireless internet access, book borrowing, eBooks, eMagazines and database access. The Belle Haven Branch is the site for English as a Second Language (ESL) classes through the library's Adult Literacy Program and also has a weekly storytime for children. The library is open five days a week, Tuesday through Saturday. The Belle Haven Library has a collection of 21,000 items, of which 30 percent are in Spanish language.

COMMUNITY HEALTH

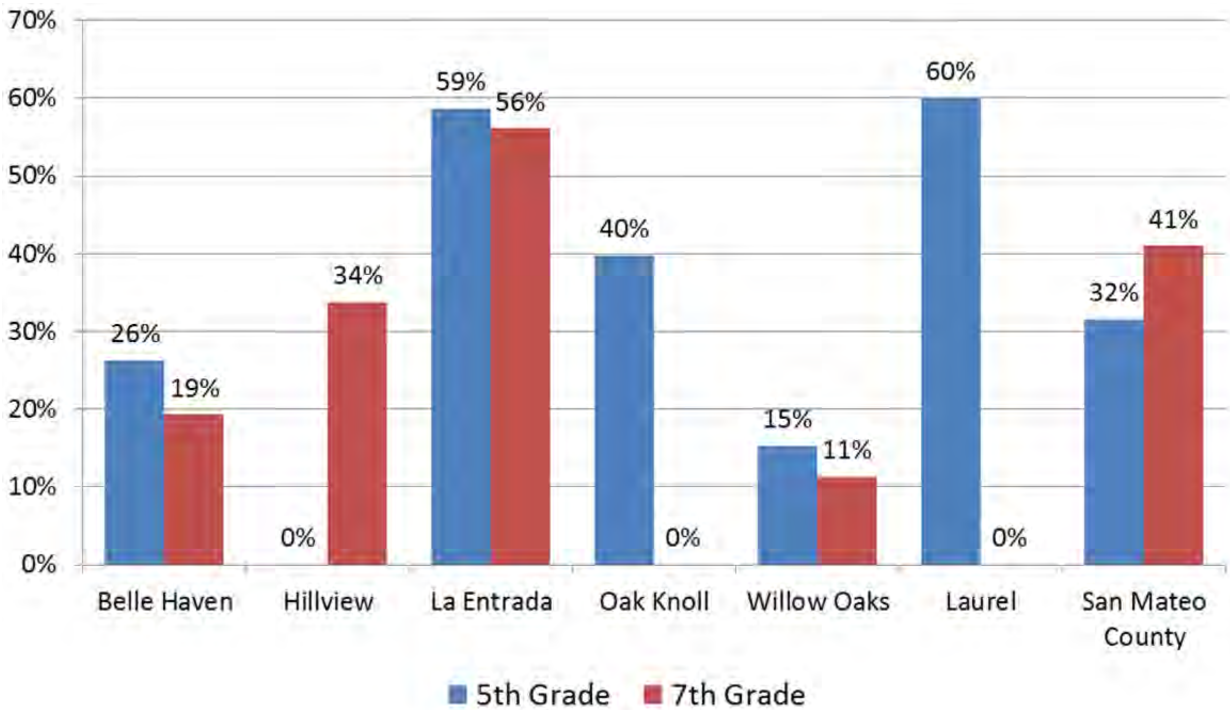
Local hospital discharge records indicate that there are disparities in how certain serious health conditions affect particular segments of the population in Menlo Park. Additionally, 2012 data from San Mateo County (the latest available) indicate that a higher percentage of births for households in the Belle Haven/M-2 Zoning Area are covered by Medi-Cal than for the City of Menlo Park as a whole. Land use and transportation policies in the General Plan can encourage healthier and more active lifestyles, and improve environmental factors that contribute to chronic health problems, such as asthma and heart disease. Active modes of transportation, such as biking and walking, and access to healthy food are potential issues that could be addressed by updated General Plan policies. Physical fitness of local students serves as an indicator of how land use and development may be influencing health outcomes, with lower fitness scores tending to be associated with schools in socioeconomically disadvantaged areas of Menlo Park. Childhood fitness can be an early indicator of potential lifelong health disparities. Table 9 illustrates selected community health statistics for Menlo Park and Figure 13 shows the percent of students meeting "6 of 6 'Healthy Fitness Zone'" Standards at selected schools in Menlo Park and surrounding areas.

TABLE 9 HOSPITALIZATION RATES [A] FOR 94025 AND SAN MATEO COUNTY FOR SELECTED ILLNESSES

	Asthma	COPD[b]	Diabetes	Heart
San Mateo County	7.0	7.0	8.8	72.8
Menlo Park 94025	5.4	5.5	4.4	60.4
Asian Pacific Islander	0	0	0	35.8
Black	0	0	0	108.4
Latino	9.5	0	6.8	25.7
Other	0	0	0	32.0
White	3.6	5.4	2.4	60.1

a. Numbers expressed in discharges per 10,000 population.
b. Chronic obstructive pulmonary disease
Source: Office of Statewide Health Planning and Development (OSHPD), 2010, Hospitalization discharge data (2010).

FIGURE 13 PERCENTAGE OF STUDENTS MEETING "6 OF 6 'HEALTHY FITNESS ZONE'" STANDARDS



Source: San Mateo County, 2014.

SUMMARY OF KEY FINDINGS

- **Regional Context.** Menlo Park's location on the Peninsula, in Silicon Valley, along US 101, and near the Dumbarton Bridge make it both highly desirable as a place to live and work, but also severely congested with traffic. Substantial opportunities exist to better integrate both existing and potential development with transportation improvements and a broader range of transportation options.
- **Land Use Pattern.** Most of Menlo Park maintains a predominantly single-family residential character, with industrial and business parks as the next most common land uses. Downtown and El Camino Real continue to serve as Menlo Park's commercial core, while smaller commercial nodes serve a number of neighborhoods. Parks and open space areas are well-used and could benefit from additional improvements and safe and convenient access to such facilities. The M-2 Area between US 101 and the Bay is experiencing rapid change as industrial buildings are no longer sought after and regional demand for technology, office, and research and development space is very strong.
- **Connectivity.** Menlo Park has multiple options for transit users and bicyclists, but US 101 and pass-through regional commute traffic create barriers to mobility. Minimal pedestrian and bicycle-

friendly facilities across US 101 in particular make these forms of transportation less convenient and discourage walking and biking.

- **Development Potential.** Existing zoning regulations limit the type of land uses in the M-2 Area, including a mix of residential and retail that could help limit traffic impacts. Additional development in the M-2 Area without offsetting community benefits would likely have impacts on mobility and connectivity. With rezoning to allow additional and different types of development, the M-2 Area could yield not only revenue to the City, but also direct support of programs that address traffic congestion, provide neighborhood-serving commercial uses, and support needed improvements to local parks, schools, libraries, other community-serving facilities and programs.
- **Community Health.** Individual health and fitness in Menlo Park is influenced by geographic factors, connectivity and mobility barriers, and development patterns. Updated General Plan and zoning provisions regarding land use and circulation would greatly assist in ensuring that all community members have access to high quality of life.

CIRCULATION

EXISTING CONDITIONS REPORT

PUBLIC REVIEW DRAFT

JANUARY 2015

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Public Review Existing Circulation Conditions Report

OVERVIEW

This report provides an overview of the City of Menlo Park's existing plans, policies, and regulations that affect circulation patterns in Menlo Park. It also describes the travel characteristics, roadway system, parking standards and management, pedestrian and bicycle networks, and public transit system in Menlo Park. In addition, the report focuses on key issues and opportunities in the M-2 Area and ends with a summary of key findings citywide.

One of the most significant transportation issues in Menlo Park is the amount of regional commute traffic that passes through the M-2 Area and Belle Haven, causing severe congestion as far south as Middlefield Road along Marsh and Willow Roads in particular (see Table 5 of the Economics Report for a breakdown of commute flows denoting where Menlo Park Residents work and where Menlo Park workers live). A simple analysis of traffic to and from the Dumbarton Bridge using counts on Willow Road, Bayfront Expressway, and University Avenue during peak commute hours– and subtracting trips that did not originate from or travel to streets in the M-2 Area – indicates that 79 percent of morning peak and 88 percent of evening peak traffic is regional pass-through travel. These estimates might be affected slightly by vehicles turning into Belle Haven streets, both downward to reflect drivers going to and from homes, but also upward to include traffic cutting through Belle Haven at rush hour to bypass the major streets.

CURRENT PLANS, POLICIES, AND REGULATIONS

1994 CITY OF MENLO PARK GENERAL PLAN

The City of Menlo Park's most recent General Plan update occurred in 1994 and includes now outdated land use and traffic projections (only through 2010). The Circulation Element identified goals, policies, and actions, many of which were supportive of a balanced and multimodal transportation system as well as a Complete Streets approach (see Table 1). Circulation and transportation goals include:

- To maintain a circulation system using the Roadway Classification System that will provide for the safe and efficient movement of people and goods throughout Menlo Park for residential and commercial purposes.

TABLE 1 CURRENT GENERAL PLAN CIRCULATION AND TRANSPORTATION GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Roadway Network	
Goal II-A	To maintain a circulation system using the Roadway Classification System that will provide for the safe and efficient movement of people and goods throughout Menlo Park for residential and commercial purposes.
Policy II-A-1	Level of Service D (40 seconds average stopped delay per vehicle) or better shall be maintained at all City-controlled signalized intersections during peak hours, except at the intersection of Ravenswood A venue and Middlefield Road and at intersections along Willow Road from Middlefield Road to US I 0 I.
Policy II-A-2	The City should attempt to achieve and maintain average travel speeds of 14 miles per hour (Level of Service D) or better on El Camino Real and other arterial roadways controlled by the State and at 46 miles per hour (Level of Service D) or better on US 101. The City shall work with Caltrans to achieve and maintain average travel speeds and intersection levels of service consistent with standards established by the San Mateo County Congestion Management Plan.
Policy II-A-3	The City shall work with Caltrans to ensure that average stopped delay on local approaches to State-controlled signalized intersections does not exceed Level of Service E (60 seconds per vehicle).
Policy II-A-4	New development shall be restricted or required to implement mitigation measures in order to maintain the levels of service and travel speeds specified in Policies II-A-I through II-A-3.
Policy II-A-5	The City shall employ appropriate modem technology traffic signal equipment with the objective of limiting average vehicle delay to Level of Service E (60 seconds average vehicle delay) on any approach to a City-controlled signalized intersection during peak hour periods and attempt to approach demand control during off-peak periods in conjunction with good fiscal planning.
Policy II-A-6	The City shall work with Caltrans to ensure they use appropriate modem technology traffic signal equipment on State routes with the objective of limiting average vehicle delay to Level of Service E (60 seconds average vehicle delay) on all minor approach movements during peak hour periods and attempt to approach demand control during off-peak periods in conjunction with good fiscal planning.
Policy II-A-7	All streets should operate consistent with the Roadway Classification System Guidelines in Part II of the General Plan. To protect local streets, the City shall develop and implement a Residential Traffic Management Program that defines a process to initiate and evaluate neighborhood traffic issues, identifies acceptable levels of traffic volumes, speed and diversion and establishes a process whereby the City will use good faith efforts to implement all reasonable design and traffic management improvements to attain traffic volumes on local residential streets not to exceed 1 ,500 to 2,500 vehicles per day depending on the size and characteristics of the street. In order to determine priority of funding and urgency, the Residential Traffic Management Program shall include a point system that includes rating of streets based on such criteria as speed, volume, accidents, near-accidents, and pedestrian activities. Any proposed design or traffic management improvements should not divert a substantial volume of traffic to other Menlo Park streets of the same or lower classification. Any proposed design changes or traffic management improvements shall invite public input from all residents living on adjacent streets which might be affected by any traffic management improvements and/or design changes which could divert traffic onto their street.
Policy II-A-8	New development shall be reviewed for its potential to generate significant traffic volumes on local streets in residential areas and shall be required to mitigate potential significant traffic problems.
Policy II-A-9	The City shall establish, as a priority, the protection of local streets in residential areas from excessive speeding and excessive volumes of through traffic. For the purposes of this policy, 'through traffic' shall mean traffic having neither an origin nor a destination within the relevant neighborhood. Adequate capacity on arterial streets should be provided to encourage, to the extent possible, their use for Menlo Park residential traffic.
Policy II-A-10	The City shall review all plan lines on City streets.
Policy II-A-11	The City shall institute and maintain a congestion monitoring program for City and State facilities.

TABLE 1 CURRENT GENERAL PLAN CIRCULATION AND TRANSPORTATION GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Policy II-A-12	The City shall endeavor to provide for the safe, efficient, and equitable use of streets by pedestrians and bicyclists through good roadway design, maintenance, and effective traffic law enforcement.
Policy II-A-13	The City shall work with adjacent jurisdictions to secure adequate funding for improvements and to develop methods to reduce traffic impacts on a regional and subregional basis.
Policy II-A-14	The City staff shall work and consult actively with other agencies that have transportation impacts on the city of Menlo Park.
Policy II-A-15	The City shall carefully review and evaluate any proposal by the City of Palo Alto and/or Stanford University to connect Sand Hill Road to El Camino Real to evaluate the potential impacts and benefits of such connection on the City of Menlo Park. Included in such evaluation shall be an alternative analysis of a Sand Hill Road/El Camino Real intersection with and without a connection to Alma Street in Palo Alto as well as an analysis of no direct connection to El Camino Real north of the Stanford Shopping Center. It shall be the policy of the City to oppose any specific Sand Hill Road connection proposal unless (a) the City Council makes findings that the benefits of such proposal(s) outweigh the impacts to the City of Menlo Park and the San Francisquito Creek and (b) Sand Hill Road between Arboretum and El Camino Real remains a minimum distance of I 00 feet from the San Francisquito Creek. The City Council shall consider holding an advisory election on any specific proposal to connect Sand Hill Road to El Camino Real.
Policy II-A-16	The City shall work with appropriate agencies to improve the operation of the freeway and major arterials in the U.S. 1O1 / Bayshore corridor. The City opposes the use of Middlefield Road as an alternative route to relieve freeway congestion. The City supports the extension of the Bayfront Expressway as an appropriate method to provide alternative routes to the Bayshore Freeway. Adequate environmental protection for marsh and wetlands along the route should be provided.
Policy II-A-17	The City shall work cooperatively with the County Congestion Management Agency on the implementation of the Countywide Congestion Management Program and Deficiency Plans. The City will not add any more City streets or intersections to the Countywide Congestion Management Program without a public vote.
Policy II-A-18	The City shall conduct a thorough feasibility study of the grade separation projects included in the Measure A sales tax expenditure plan, including all impacts of such proposed projects and alternatives to the proposed projects, and shall support only those grade separations that provide sufficient traffic and rail service benefits to offset potential negative impacts to the community. The City shall evaluate all alternatives to any grade separations and shall attempt to gauge public opinion, possibly through an advisory election, before proceeding with a grade separation project. Any approval of a grade separation project shall include findings specifying why the alternatives are not suitable and the reasons for proceeding with the grade separation project.
Policy II-A-19	It shall be the intent of the City to design traffic improvement projects to preserve and improve the aesthetics of the city.
Public Transit	
Goal II-B	To promote the use of public transit.
Policy II-B-1	The City shall consider transit modes in the design of transportation improvements and the review and approval of development projects.
Policy II-B-2	As many activities as possible should be located within easy walking distance of transit stops, and transit stops should be convenient and close to as many activities as possible.
Policy II-B-3	The City shall promote improved public transit service and increased transit ridership, especially to office and industrial areas and schools.
Policy II-B-4	The capacity and attractiveness of the commuter railroad service should be increased, and rights-of-ways for future transit service should be protected.

TABLE 1 CURRENT GENERAL PLAN CIRCULATION AND TRANSPORTATION GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Policy II-B-5	The City shall work with appropriate agencies to agree on long-term peninsula transit service that reflects Menlo Park's desires and is not disruptive to the city.
Policy II-B-6	The City shall support extension of Cal Train to the Market Street area in San Francisco.
Policy II-B-7	The City shall oppose termination in Menlo Park of any future extension of BART.
Transportation Demand Management	
Goal II-C	To promote the use of alternatives to the single occupant automobile.
Policy II-C-1	The City shall work with all Menlo Park employers to encourage employees to use alternatives to the single occupant automobile in their commute to work.
Policy II-C-2	The City shall provide information to existing and new Menlo Park employers to assist their employees in identifying potential carpools, transit alternatives and other commute alternatives.
Policy II-C-3	The City will consider working with the school districts to encourage alternatives to single occupancy vehicle use, such as carpools and vanpools, for trips being generated by local schools.
Policy II-C-4	The City shall coordinate its transportation demand management efforts with other agencies providing similar services within San Mateo County.
Policy II-C-5	The City shall identify potential funding sources, including the Bay Area Air Quality Management District, to supplement City and private monies to support transportation demand management activities of the City and local employers.
Policy II-C-6	The City shall, to the degree feasible, assist Menlo Park employers in meeting the Average Vehicle Ridership (A VR) targets established by the Bay Area Air Quality Management District.
Policy II-C-7	Commuter shuttle service between the industrial work centers and the Downtown Transportation Center should be maintained and improved, within fiscal constraints. The City shall encourage Sam Trans and other agencies to provide funding to support shuttle services.
Bicycles	
Goal II-D	To promote the safe use of bicycles as a commute alternative and for recreation.
Policy II-D-1	The City shall endeavor to maintain or improve roadway maintenance through debris removal, intersection sight clearance and pavement quality on all streets and highways except those where bicycle access is prohibited.
Policy II-D-2	The City shall, within available funding, work to complete a system of bikeways within Menlo Park.
Policy II-D-3	The design of streets within Menlo Park shall consider the impact of street cross section, intersection geometries and traffic control devices on bicyclists.
Policy II-D-4	The City shall require new commercial and industrial development to provide secure bicycle storage facilities on-site.
Policy II-D-5	The City shall encourage transit providers within San Mateo County to provide improved bicycle access to transit including secure storage at transit stations and on-board storage where feasible.
Pedestrians	
Goal 11-E	To promote walking as an commute alternative and for short trips.
Policy II-E-1	The City shall require all new development to incorporate safe and attractive pedestrian facilities on-site.
Policy II-E-2	The City shall endeavor to maintain safe sidewalks and walkways where existing within the public right-of-way.
Policy II-E-3	Appropriate traffic control shall be provided for pedestrians at intersections.

TABLE 1 CURRENT GENERAL PLAN CIRCULATION AND TRANSPORTATION GOALS, POLICIES, AND ACTIONS

Goal/Policy #	Goal / Policy Text
Policy II-E-4	The City shall incorporate appropriate pedestrian facilities, traffic control, and street lighting within street improvement projects to maintain or improve pedestrian safety.
Policy II-E-5	The City shall support full pedestrian access across all legs of an intersection at all signalized intersections which are City-controlled and at the signalized intersections along El Camino Real.
Policy II-E-6	The City shall prepare a safe school route program to enhance the safety of school children who walk to school.
Parking	
Goal II-F	To provide adequate parking in the Downtown area, especially for retail customers and CalTrain patrons.
Policy II-F-1	Adequate off-street parking should be required for all new development in the Downtown Area.
Policy II-F-2	Short-term retail customer parking shall be first priority for the allocation of parking spaces in Downtown parking plazas. Long-term employee parking shall be located in such a manner that it does not create a shortage of customer parking adjacent to retail shops.
Policy II-F-3	The City shall work with the Joint Powers Board to provide parking at the Downtown Transportation Center which is adequate and does not negatively impact nearby uses.

- To promote the use of public transit.
- To promote the use of alternatives to the single occupant automobile.
- To promote the safe use of bicycles as a commute alternative and for recreation.
- To promote walking as a commute alternative and for short trips.
- To provide adequate parking in the Downtown area, especially for retail customers and Caltrain patrons.

COMPLETE STREETS POLICY

Adopted in 2013, the Complete Streets Policy of the City of Menlo Park expresses the City's desire and commitment to create and maintain streets that provide safe, comfortable, and convenient travel for all categories of users and abilities through a comprehensive, integrated transportation network. The policy calls for all relevant departments and agencies of the City to work towards making Complete Streets practices a routine part of everyday operations, project approach, and programs. Additionally, Complete Streets infrastructure should be considered for incorporation into all significant planning, funding, design, approval, and implementation of any significant construction, reconstruction, or alteration of streets within the City.

COMPREHENSIVE BICYCLE DEVELOPMENT PLAN

The 2005 Menlo Park Comprehensive Bicycle Development Plan provides a blueprint for a citywide system of bike lanes, bike routes, bike paths, bicycle parking and other related facilities to allow for safe, efficient and convenient bicycle travel within the City and to regional destinations in the Bay Area. The purpose of the plan is to build on the success of previous bicycle infrastructure improvements by enhancing and expanding the existing bikeway network, connecting gaps, addressing constrained areas, and providing for greater local and regional connectivity.

NEIGHBORHOOD TRAFFIC MANAGEMENT PLAN

Established in 2004, the Neighborhood Traffic Management Plan (NTMP) is intended to provide consistent, citywide policies for neighborhood traffic management to ensure equitable and effective solutions that enhance the safety and livability of neighborhoods in Menlo Park. The document provides instruction for residents in identifying appropriate neighborhood traffic management measures such as driver education, enforcement, and physical improvements that can be utilized in addressing specific neighborhood traffic issues. An important component of the NTMP is to build consensus through neighborhood and stakeholder meetings, resident surveys, as well as trial installations prior to permanent installation of physical improvements.

SIDEWALK MASTER PLAN

The 2009 City of Menlo Park Sidewalk Master Plan serves as a guide for the allocation of capital, maintenance, administrative, and matching funds for sidewalk facilities. The primary purpose of the plan is to prioritize sidewalk installation by providing an inventory of existing gaps in the City's walkway network and identifying opportunities to close those gaps in the network. The plan applies prioritization criteria to establish rankings for sidewalk segments into areas of high, medium, and low need.

TRANSPORTATION IMPACT FEE

The City of Menlo Park updated its Transportation Impact Fee (TIF) program in 2009 to help fund transportation improvements that are needed in conjunction with new development. The intent of the fee is to maintain adequate service levels as new development places a strain on the existing transportation network. Transportation impact fees ensure that development pays a proportional fair share of the cost of the transportation infrastructure deemed necessary and reasonably related to accommodating the impact of development in Menlo Park. The transportation impact fees collected may only be used for construction of new arterial streets, sidewalks, bicycle lanes, and other physical enhancements to the transportation network. The City can escalate the TIF rates for various land uses annually based on the Engineering News-Record (ENR) Construction Cost Index percentage change for San Francisco.

SAN MATEO COUNTY COMPREHENSIVE BICYCLE AND PEDESTRIAN PLAN

The 2011 San Mateo County Comprehensive Bicycle and Pedestrian Plan designates Pedestrian Focus Areas and a Countywide Bikeway Network. The plan identifies El Camino Real as the corridor in the county with the highest densities of population and employment, and thus pedestrian activity. The plan notes that the high level of through-movement along this corridor necessitates the need for bicycle and pedestrian improvements. Although biking, walking, and transit percentages in San Mateo County are lower than the averages for the Bay Area, Menlo Park has one of the highest percentages of commuters commuting by bicycle in the Bay Area. In 2000 this figure was 3.7 percent (three times the Bay Area average) and rose to 7.2 percent of workers in 2006-2008.

TRANSPORTATION DEMAND MANAGEMENT GUIDELINES

The City of Menlo Park Transportation Demand Management (TDM) Guidelines provides options for the City to encourage the use of innovative strategies to mitigate the traffic impact of new development projects. For projects that would create between 0.5 second and 1.0 second of delay to any impacted study intersections (with unmitigated significant traffic impacts), an exemption from the EIR review process may be granted if the project applicant is able to develop and implement acceptable TDM measures satisfactory to the City's Transportation Division. TDM measures identified in the Guidelines include, but are not limited to:

- Charging employees for parking
- Employer subsidized transit tickets
- Preferential parking for carpools/vanpools
- Employer shuttles
- Parking cash-out
- Shared parking
- Provision of bicycle storage and showers

In addition to the City's TDM Guidelines, the City/County Association of Governments of San Mateo County provides Congestion Management Program guidelines that must be followed for all development projects that a) generate a net 100 or more peak hour trips on the Congestion Management Program roadway network; and b) the project is subject to CEQA review. The C/CAG list of acceptable TDM measures is similar to the City Guidelines list.

EL CAMINO REAL/DOWNTOWN SPECIFIC PLAN

This El Camino Real/Downtown Specific Plan focuses on new development in an area well-served by transit with a host of mixed uses, it encourages transit and non-motorized modes to reduce reliance on single-occupant vehicles, minimize congestion, limit land dedicated to parking, and reduce greenhouse gas emissions. The specific plan envisions the following:

- A vehicular system that accommodates local traffic on El Camino Real.
- An integrated pedestrian network of expansive sidewalks, promenades and paseos along El Camino Real and within Downtown Menlo Park.
- A bicycle network that builds on existing plans and integrates more fully with Downtown and proposed public space improvements in the area.
- Modified parking rates for private development based on current industry standards.

The City is currently conducting a related study, the El Camino Real Corridor Study, to review potential transportation and safety improvements to El Camino Real between Sand Hill Road and Encinal Avenue. The study will evaluate potential impacts to traffic, active transportation, safety, parking and aesthetics.

TRAVEL CHARACTERISTICS

Travel characteristics are indicators of the success of a transportation system. A successful transportation system should balance all modes of travel, increase mobility and access, contribute to quality of life, and provide options for residents and workers. This section reviews current travel characteristics associated with Menlo Park in an effort to measure its current performance.

Journey-to-work mode splits are integral to understanding transportation habits and patterns in Menlo Park, representing 30% of all trips. As shown in Table 2, residents of Menlo Park typically drive alone at rates comparable to San Mateo County, whereas neighboring Santa Clara County exhibits higher drive-alone rates. Menlo Park commuters use alternative modes of transportation, including bicycling and working from home, at rates higher than San Mateo County residents. In addition, Menlo Park has proportionally more public transportation users and bicyclists than neighboring cities in Santa Clara County. However, Menlo Park residents take public transportation and walk less than residents in other San Mateo County cities. These trends provide context for understanding vehicle ownership rates. Table 2 also provides trends over time, illustrating the significant increase in Menlo Park residents commuting by bike between 1990, when 3 percent cycled, and 2013, when 7 percent cycled to work.

TABLE 2 JOURNEY-TO-WORK MODE SPLIT

	City of Menlo Park			San Mateo County			Santa Clara County		
Journey-to-Work Mode Split	2013	2000	1990	2013	2000	1990	2013	2000	1990
Drive Alone	71%	76%	72%	70%	72%	72%	76%	77%	78%
Carpool	7%	7%	12%	11%	13%	13%	11%	12%	12%
Public Transportation	4%	4%	5%	9%	7%	7%	3%	4%	3%
Walk	3%	2%	3%	3%	2%	3%	2%	2%	2%
Bicycle	7%	4%	3%	1%	1%	1%	2%	1%	1%
Other means	0%	1%	1%	1%	1%	1%	1%	1%	1%
Work from home	9%	7%	3%	5%	4%	3%	5%	3%	3%

Source: US Census Bureau 2013 (2009-2013, 5-year average), 2000 and 1999 (Percentages may not total 100% due to rounding)

VEHICLE OWNERSHIP

As shown in Table 3, a greater percentage of Menlo Park households own one or two vehicles than the San Mateo countywide average, but fewer households in Menlo Park own more than three vehicles. Similar to trends nationwide, renter-occupied households own fewer vehicles than owner-occupied units. In Menlo Park, 9 percent of renter households are car-free, as compared to 1 percent of owners. The vast majority of owner-occupied households own two or more vehicles, whereas the majority of renters own no more than one vehicle.

TABLE 3 VEHICLE OWNERSHIP RATES

Number of Vehicles Available	Menlo Park Owner Occupied	Menlo Park Renter Occupied	San Mateo County Owner Occupied	San Mateo County Renter Occupied	Santa Clara County Owner Occupied	Santa Clara County Renter Occupied
No Vehicles	1%	9%	3%	10%	2%	8%
1 Vehicle	25%	49%	22%	44%	19%	42%
2 Vehicles	46%	35%	43%	33%	45%	36%
3+ Vehicles	27%	8%	31%	13%	34%	14%

As a percentage of total households, Menlo Park households own fewer vehicles on average than San Mateo County households at large. In Menlo Park, 13 percent of households do not own a vehicle, whereas only 3 percent of San Mateo County households and 5 percent of Santa Clara County households are car-free. In addition, Menlo Park households average fewer than two vehicles, and San Mateo County households average more than two vehicles.

Combining this information with the journey-to-work data, it is evident that Menlo Park is home to a population that relies on alternative modes of transportation. With nearly a quarter of the population walking, biking, and using public transportation, it is necessary to ensure transit connectivity and quality bicycle and pedestrian infrastructure. All streets cater to automobile traffic, while only some provide infrastructure for pedestrians, cyclists, and transit users. In school zones, streets are well-balanced, but key traffic corridors lack complete infrastructure for additional modes of transportation.

Figures 1 and 2, which depict vehicle ownership in Menlo Park by Census Tract, show that Downtown residents are less dependent on automobiles, with the highest rates of zero-car households.

SAFE ROUTES TO SCHOOL

The City of Menlo Park is home to four elementary/middle school districts, which cross into neighboring jurisdictions: Menlo Park City School District, Ravenswood City School District, Las Lomitas Elementary School District, and Redwood City School District. Figure 3 shows the locations of both public and private schools within Menlo Park and nearby communities.

Menlo Park City School District has been particularly active in promoting Safe Routes to School (SR2S) programs for Oak Knoll, Encinal, Hillview, Menlo, Sacred Heart, and St. Raymond's Schools, all of which rely on Valparaiso Avenue and surrounding streets. The program began in 1997 at Oak Knoll School, with plan updates in 2002 and 2013. Each plan identifies issues and opportunities, with the goal of obtaining grant funding for infrastructure improvements and programs at the schools. The Ravenswood City School District also has a SR2S program funded by the San Mateo County Office of Education and the City/County Association of Governments of San Mateo County. The Ravenswood District promotes walking and bicycling to school through programs like Walking School Buses, Bicycle Trains, and various other special events.

Over the years, the Menlo Park City School District's SR2S program has reduced the number of automobile trips significantly. During the October 8, 2014 International Walk to School Day event, the District survey found 13 percent of students walk to school, 24 percent bicycle, 10 percent take public transit, 10 percent carpool, and 41 percent are driven alone by parents. Hillview School, in particular, has the highest rate of bicycling in the district, with an average of 36 percent, along with a high usage of public transportation

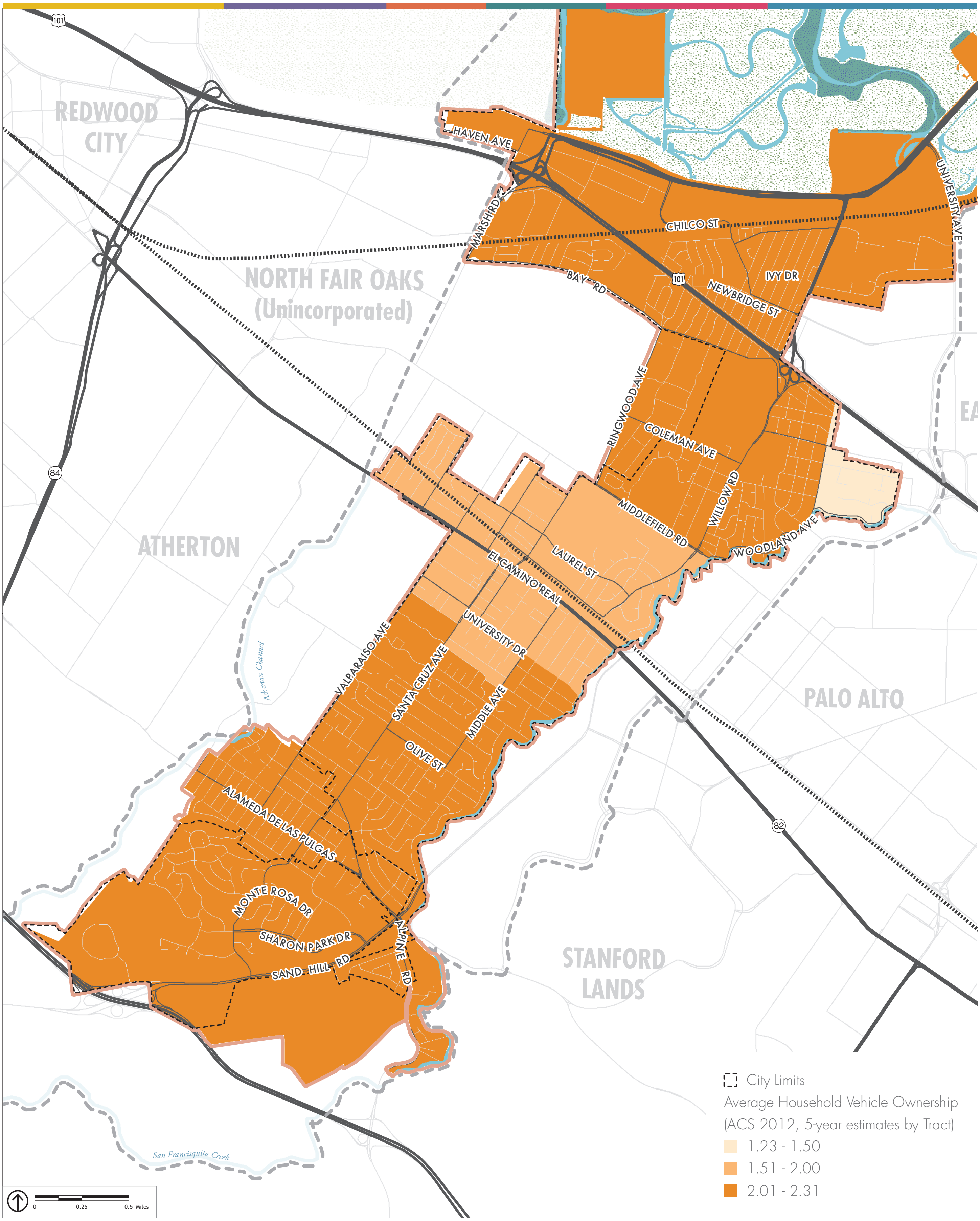

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FIGURE 1: AVERAGE VEHICLE OWNERSHIP BY CENSUS TRACT

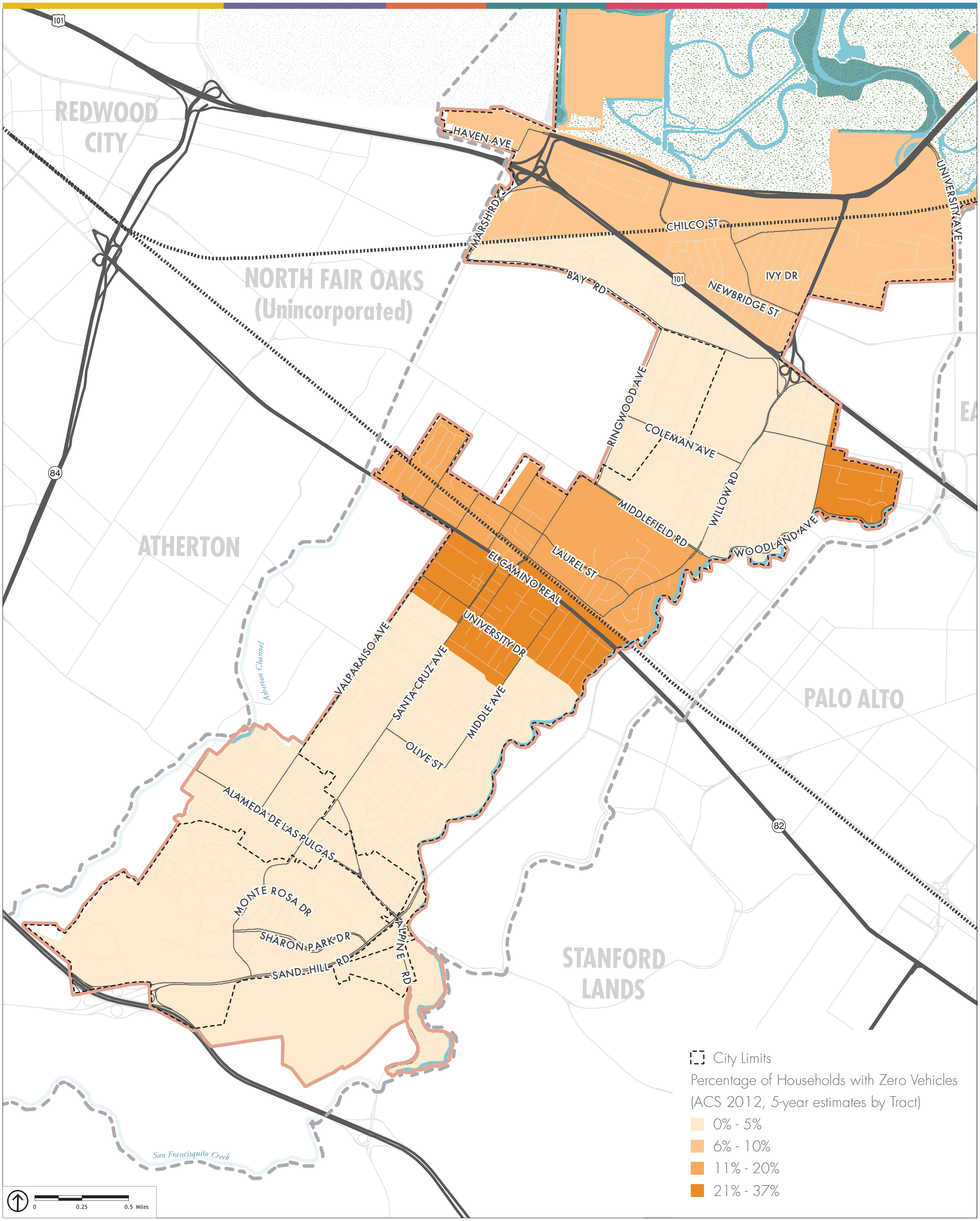

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FIGURE 2: ZERO VEHICLE HOUSEHOLDS BY CENSUS TRACT

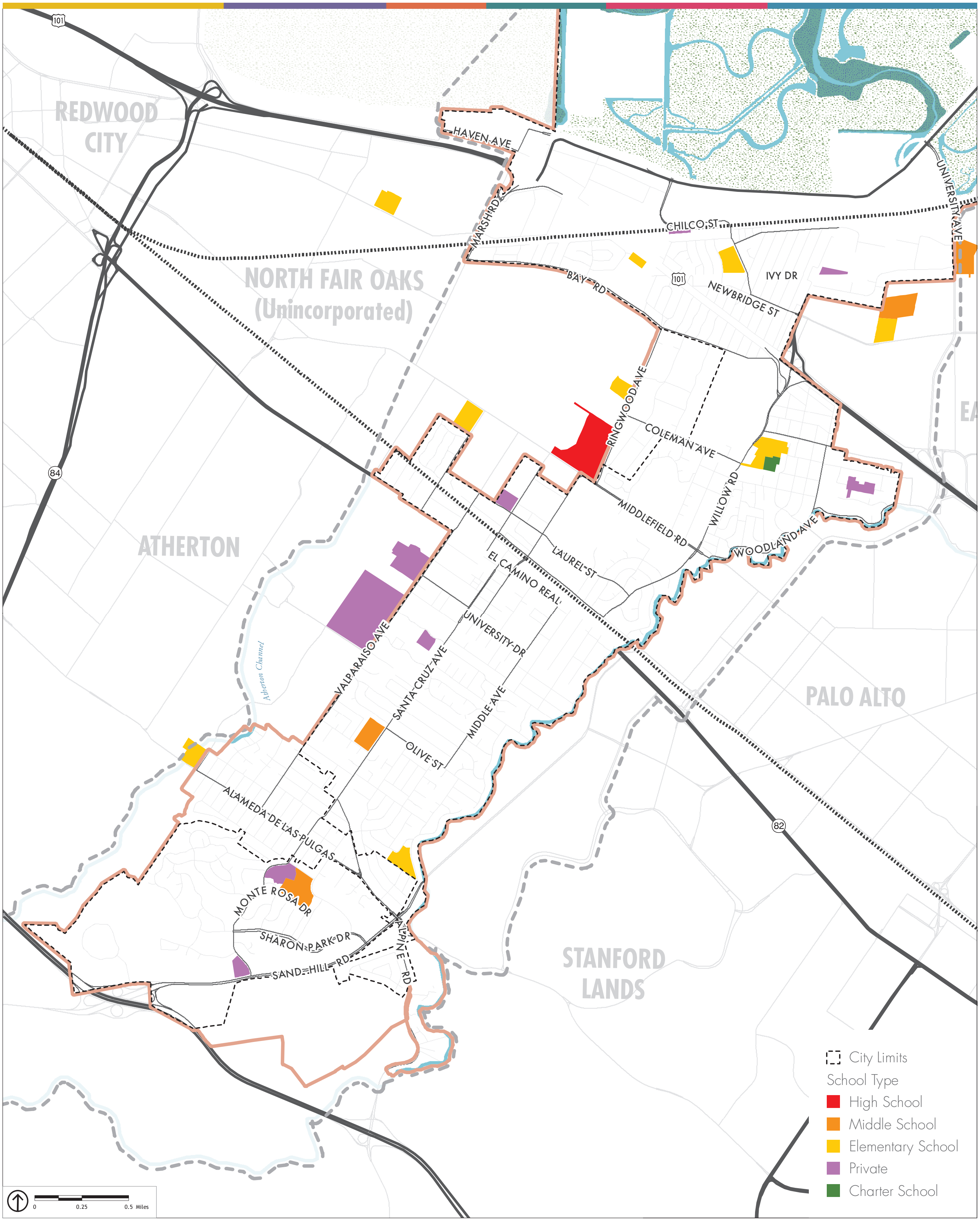

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FIGURE 3: SCHOOL LOCATIONS

(19 percent). The Safe Routes to School program has also encouraged public transportation for schools such as Encinal Elementary, where walking and bicycling infrastructure is beyond Menlo Park's control as the routes lie in neighboring Atherton. At Encinal, 13 percent of students use public transportation to travel to school.

In support of the SR2S program in Menlo Park, key streets around schools have restricted turns and parking during morning arrival and afternoon dismissal to reduce cut-through traffic and school drop-off traffic. This creates safer pedestrian and bicycling conditions by reducing potential automobile conflicts.

ROADWAY SYSTEM

DESCRIPTION OF ROADWAY NETWORK

The current General Plan designates a roadway classification system for the existing roadway network in the City of Menlo Park. It includes Freeway/Expressway, Primary Arterial, Minor Arterial, Collector and Local. Figure 4 shows the existing roadway network in the City of Menlo Park.

REGIONAL ROADWAY CONTEXT

Within Menlo Park, the following freeways/expressways/state highways are designated as Routes of Regional Significance:

- *US 101 (Bayshore Freeway)* is an eight-lane, north-south freeway that runs between Los Angeles, California and Olympia, Washington, and is a major regional freeway on the San Francisco Peninsula. It connects Menlo Park with the other cities on the Peninsula. There is one high occupancy vehicle (HOV) lane in both directions through Menlo Park. Two interchanges serve Menlo Park, at Willow Road and Marsh Road.
- *I-280 (Junipero Serra Freeway)* is an eight-lane, north-south freeway that connects San Jose with San Francisco. There is one HOV lane in both directions through Menlo Park. One interchange serves Menlo Park at Sand Hill Road.
- *Bayfront Expressway (SR 84)* is a six-lane, east-west expressway that connects the Peninsula to the east via the Dumbarton Bridge. Within the City of Menlo Park, it connects Marsh Road with the Dumbarton Bridge.

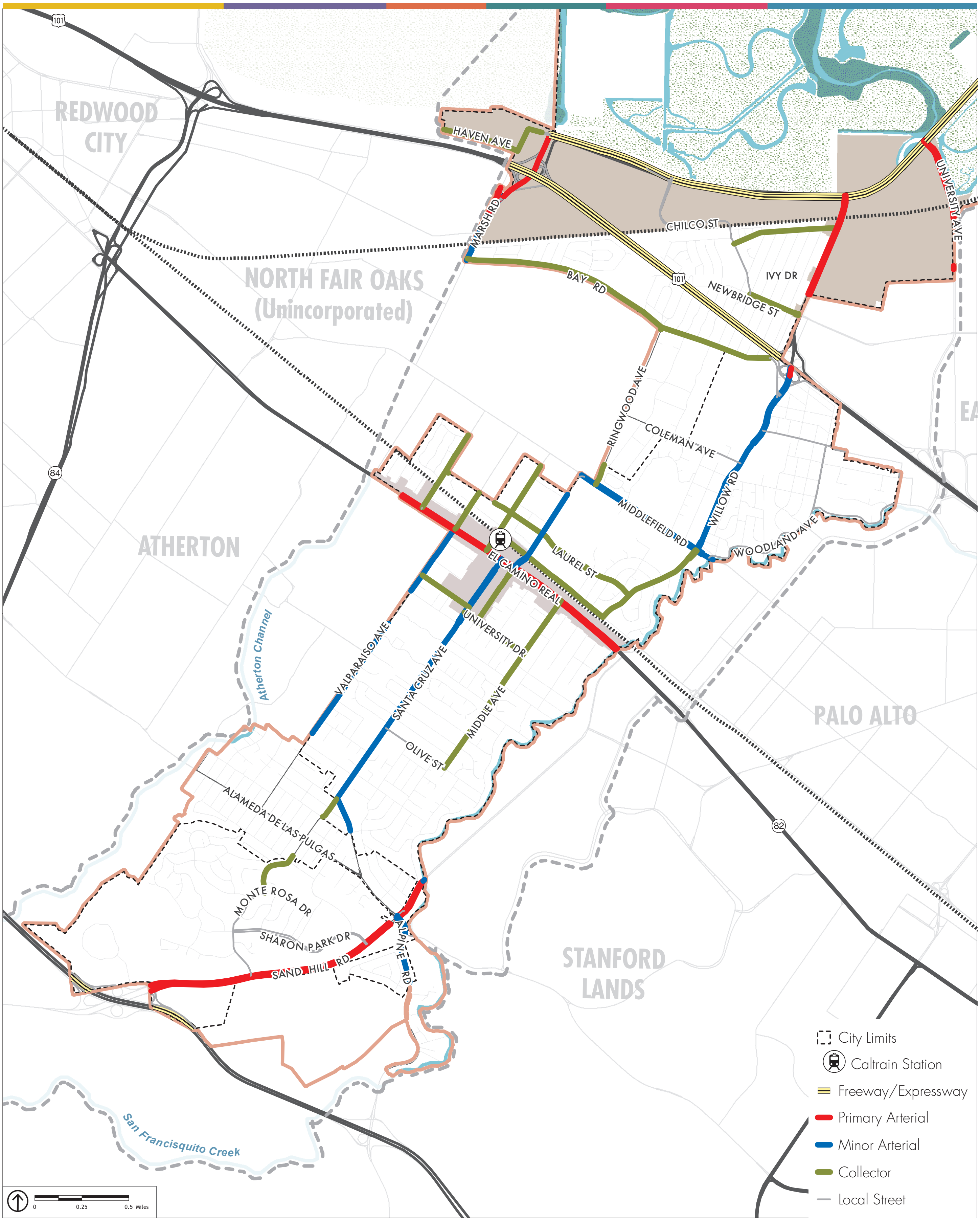

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FIGURE 4: CITY CIRCULATION SYSTEM

- *El Camino Real (SR 82)* is a primary north-south arterial that connects San Jose with San Francisco. It enters Menlo Park north of Sand Hill Road as a six-lane arterial, becomes a four-lane arterial near Downtown Menlo Park, and exits the city as a five-lane arterial (three southbound lanes and two northbound lanes) north of Encinal Avenue.

CITY OF MENLO PARK STREET SYSTEM

Freeways and Expressways

As designated in the Menlo Park General Plan, freeways/expressways are access-controlled or limited-access-controlled facilities that carry regional and/or sub-regional traffic. The following facilities are designated as freeways/expressways in Menlo Park (see Figure 4). Caltrans controls all of the below listed facilities.

TABLE 4 FREEWAYS/EXPRESSWAYS

Roadway	From	To
US 101	Marsh Road	Willow Road
I-280	N. City Limits	S. City Limits
Bayfront Expressway (SR 84)	Marsh Road	University Avenue

Primary Arterial Streets

Primary Arterial Streets serve major activity centers and high-volume traffic corridors within the urbanized area and accommodate a high proportion of through trips. Within Menlo Park, the following streets are designated as primary arterial streets:

TABLE 5 PRIMARY ARTERIAL STREETS

Roadway	From	To
El Camino Real (SR 82)[a]	Alejandra Avenue	S. City Limits
Junipero Serra Boulevard	Alpine Road	City Limits
Marsh Road	Bohannon Drive	Bayfront Expressway (SR 84)
Sand Hill Road	I-280	Santa Cruz Avenue
University Avenue (SR 109)[a]	City Limits	Bayfront Expressway (SR 84)
Willow Road (SR 114)[a]	City Limits	Bayfront Expressway (SR 84)

a. Caltrans controls this roadway.

Minor Arterial Streets

Minor Arterial Streets interconnect with and augment the freeway and primary arterial street network. Minor Arterial Streets provide greater access to abutting property and carry more locally-oriented traffic than do the Primary Arterial Streets. Within the City of Menlo Park, the following streets are designated as minor arterial streets:

TABLE 6 MINOR ARTERIAL STREETS

Roadway	From	To
Alpine Road	City Limits	Sand Hill Road
Marsh Road	Bay Road	Bohannon Drive
Middlefield Road	N. City Limits	S. City Limits
Ravenswood Avenue	El Camino Real (SR 82)	Middlefield Road
Sand Hill Road	Santa Cruz Avenue	San Francisquito Creek
Santa Cruz Avenue	Oakdell Drive	El Camino Real (SR 82)
Valparaiso Avenue	City Limits	El Camino Real (SR 82)
Willow Road	Middlefield Road	Bayshore Freeway (US 101)

Collector Streets

Collector Streets serve to channel traffic from local streets within residential, commercial, and industrial areas into the arterial system. The streets shown in Table 7 are designated as collector streets in Menlo Park.

Local Streets

Local Streets primarily carry traffic from the immediately adjacent land use and typically serve relatively low volumes of short trips. Within the City of Menlo Park, all streets not otherwise classified are designated local streets.

Plan Lines and Reserved Rights of Way

Through Municipal Code Chapter 13.16 and through reservations on subdivision maps, the City has identified locations on private property for potential future right-of-way improvements. Examples of corridors include Hamilton Avenue, Willow Road, Middlefield Road, Burgess Drive, Garwood Way, and Oak Grove Avenue. As part of the General Plan Update, the City may want to determine whether or not to

TABLE 7 COLLECTOR STREETS

Roadway	From	To
Alma Street	Willow Road	Oak Grove Avenue
Avy Road	Monte Rosa Drive	Santa Cruz Drive
Bay Road	Willow Road	Marsh Road
Bohannon Drive	Marsh Road	Scott Drive
Chilco Street	Constitution Drive	Bayfront Expressway (SR 84)
Chrysler Drive	Constitution Drive	Bayfront Expressway (SR 84)
Constitution Drive	Chilco Street	Chrysler Drive
Crane Street	Oak Grove Avenue	Menlo Avenue
Encinal Avenue	El Camino Real (SR 82)	City Limits
Glenwood Avenue	El Camino Real (SR 82)	Laurel Street
Hamilton Avenue	Chilco Street	Willow Road
Haven Avenue	Marsh Road	City Limits
Laurel Street	Willow Road	Glenwood Avenue
Menlo Avenue	University Drive	El Camino Real (SR 82)
Middle Avenue	Olive Street	El Camino Real (SR 82)
Newbridge Street	Willow Road	Chilco Street
O'Brien Drive	Willow Road	University Avenue
Oak Grove Avenue	University Drive	City Limits
Ringwood Avenue	Middlefield Road	City Limits
Scott Drive	Bohannon Drive	Marsh Road
Sharon Park Drive	Sand Hill Road	Monte Rosa Drive(East)
Sharon Road	Sharon Park Drive	Alameda de las Pulgas
University Drive	Middle Avenue	Valparaiso Avenue
Willow Road	Alma Street	Middlefield Road

abandon claims to certain land for future right-of-way and whether other land may be needed for other potential public right of way improvements, including bicycle and pedestrian access.

Emergency Response Routes

The Menlo Park Fire Protection District (MPFPD) identified Primary Emergency Response routes (see Figure 5) to better manage rapid deployment of emergency vehicles and maintain acceptable emergency response times for the community. These routes are used in response to emergency medical calls, vehicle accidents, hazardous materials incidents, and fire incidents. The specific routes were chosen to balance public safety, traffic calming, and emergency response issues. Special consideration should be given to the use of traffic calming devices and their impacts to emergency response vehicles on MPFPD primary response routes.

STUDY INTERSECTION LEVEL OF SERVICE

LEVEL OF SERVICE ANALYSIS METHODOLOGY

Level of service (LOS) is a qualitative description of intersection operations and is typically reported using an A through F letter rating system to describe vehicle travel delay and congestion. LOS A indicates free flow conditions with little or no vehicle delay, and LOS F indicates jammed conditions with excessive vehicle delays and long back-ups.

Operating conditions at the study intersections were evaluated using the 2000 Highway Capacity Manual (HCM 2000) Operations methodology. Peak-hour traffic operational conditions for signalized intersections are reported as average control delay for the overall intersection in seconds per vehicle with corresponding LOS. The LOS methodology is detailed in Appendix A.

PERFORMANCE METRICS

Under the local jurisdiction standards, the performance of an intersection or a segment is measured based on the following metrics:

Intersections are evaluated using a metric focused on average stopped delay per vehicle during peak hours. LOS D (40 seconds average stopped delay per vehicle) or better is to be maintained at all City-controlled signalized intersections during peak hours, except at the intersection of Ravenswood Avenue and Middlefield Road and at intersections along Willow Road from Middlefield to US 101.

The City attempts to achieve and maintain average travel speeds of 14 miles per hour (LOS D) or better on El Camino Real and other arterial roadways controlled by the State and 46 miles per hour (LOS D) or better on US 101.

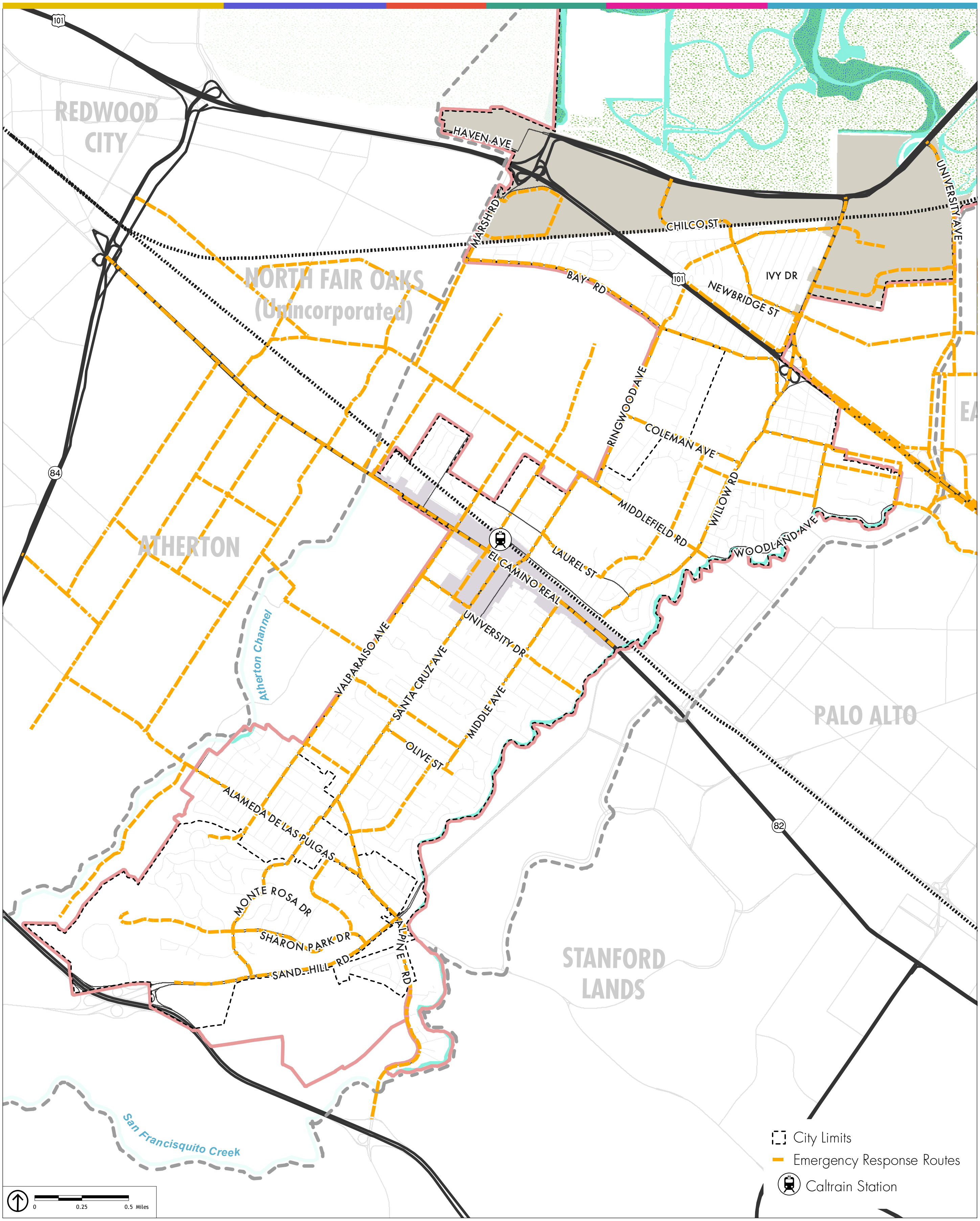

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FIGURE 5: EMERGENCY RESPONSE ROUTES

EXISTING PEAK HOUR VOLUMES

The vehicular turning movement volumes for all the 50 study intersections were received from the City of Menlo Park (see Figures 6-6D).

INTERSECTION LEVEL OF SERVICE ANALYSIS RESULTS

Table 8 summarizes the results of LOS Analysis. Detailed LOS calculations are contained in Appendix B.

EXISTING AVERAGE DAILY TRAFFIC VOLUMES

The existing average daily traffic volumes for all the 86 study segments were received from the City of Menlo Park. Table 9 summarizes current roadway segment and freeway segment average daily traffic (ADT), respectively. Appendix C includes the data sheets for the roadway segment ADT counts.

MULTI-MODAL LEVEL OF SERVICE

The State Office of Planning and Research is currently considering means other than LOS to measure transportation system performance. Potential metrics may include vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, and automobile trips generated. Another more detailed and data-intensive candidate is Multimodal Level of Service (MMLOS), which considers pedestrian, bicycle, and transit efficiency in addition to automobile delays. The 2010 Highway Capacity Manual (HCM) contains the most commonly used method for calculating MMLOS: a qualitative description of operations at intersections or along roadway segments characterizing perceptions of safety and quality of service. The metrics quantifying MMLOS vary by travel mode, and a separate rating is given for each mode.

Examples of types of measurements used in the MMLOS methodology include but are not limited to: quality of the pavement and perceived separation for bicycle LOS, bus stop amenities and waiting times for transit LOS, and perceived separation between pedestrians and vehicles as well as average intersection delay for pedestrian LOS. It should be noted that there are limitations in this method, including lacking qualitative measures of the surrounding infrastructure and environment as well as the assumption that the conditions analyzed are in a steady state. The 2010 HCM method was tested on a few case study segments and intersections in Menlo Park by calculating the MMLOS for pedestrians, bicyclists, and transit service. The findings illustrated some limitations with the methodology. For example, one travel direction of the Marsh Road/Bayfront Expressway intersection scored as well for pedestrian LOS as the Laurel Street/Oak Grove Avenue intersection, which highlights the importance of analyzing each travel direction for each mode. In

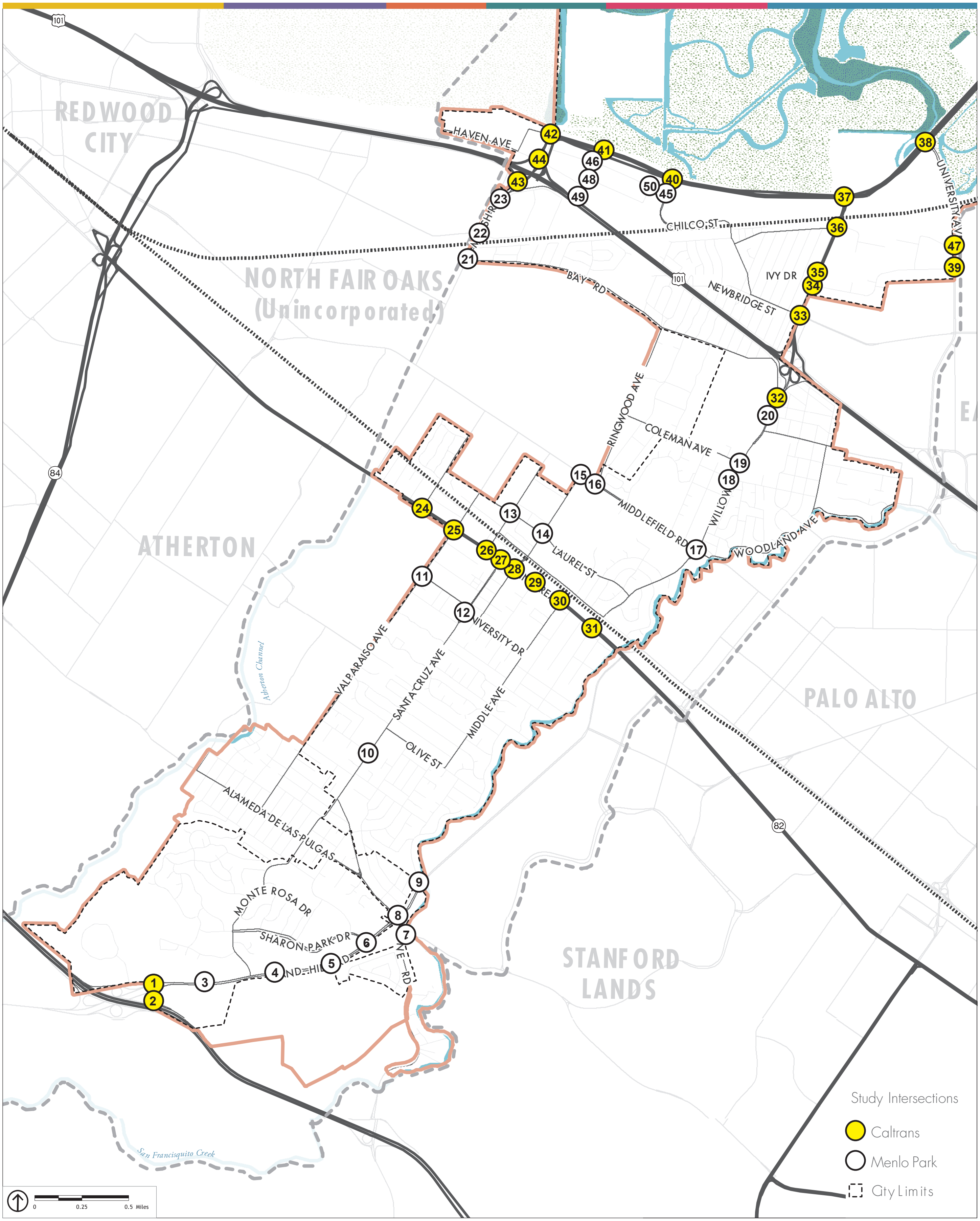

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FIGURE 6: STUDY INTERSECTIONS

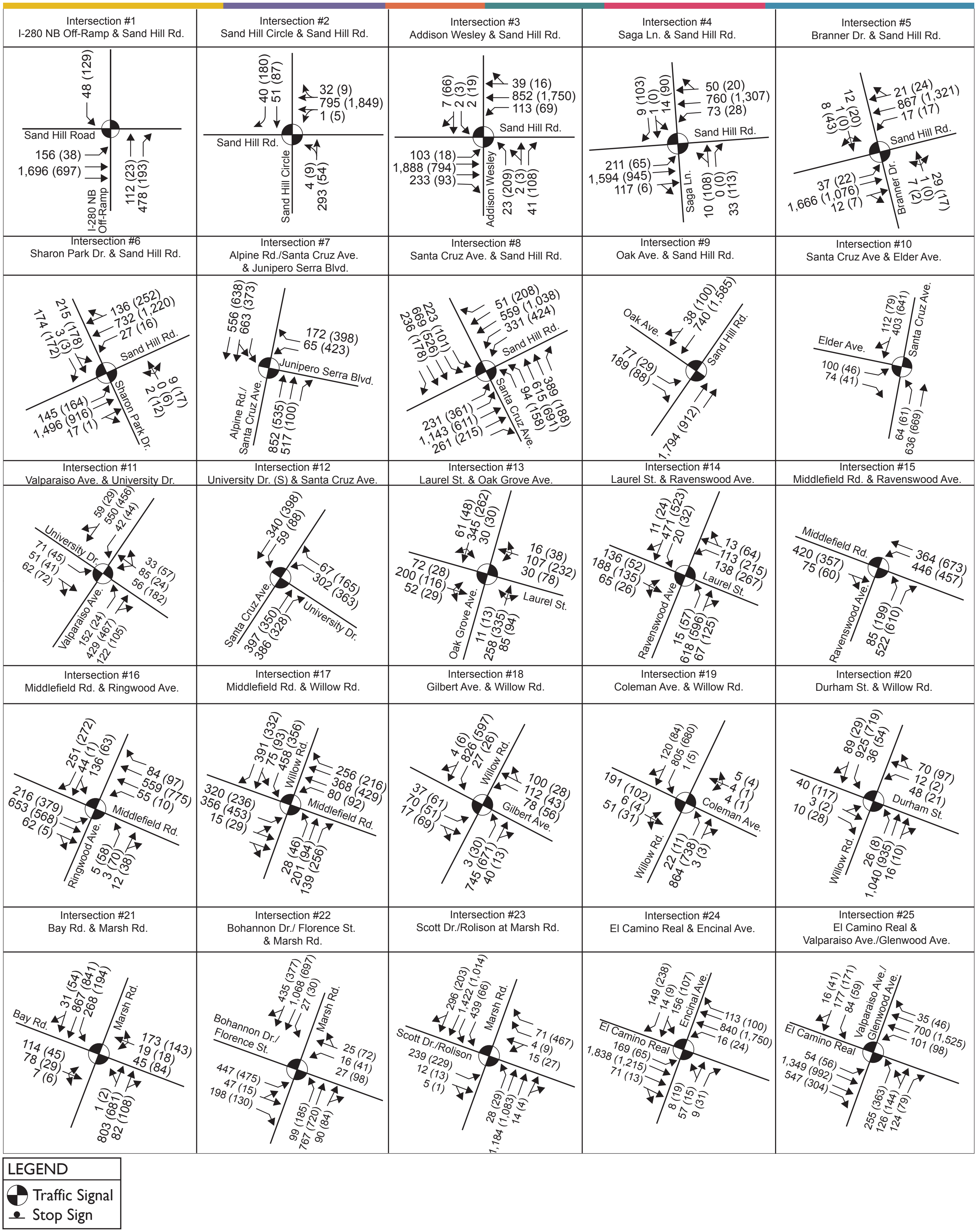
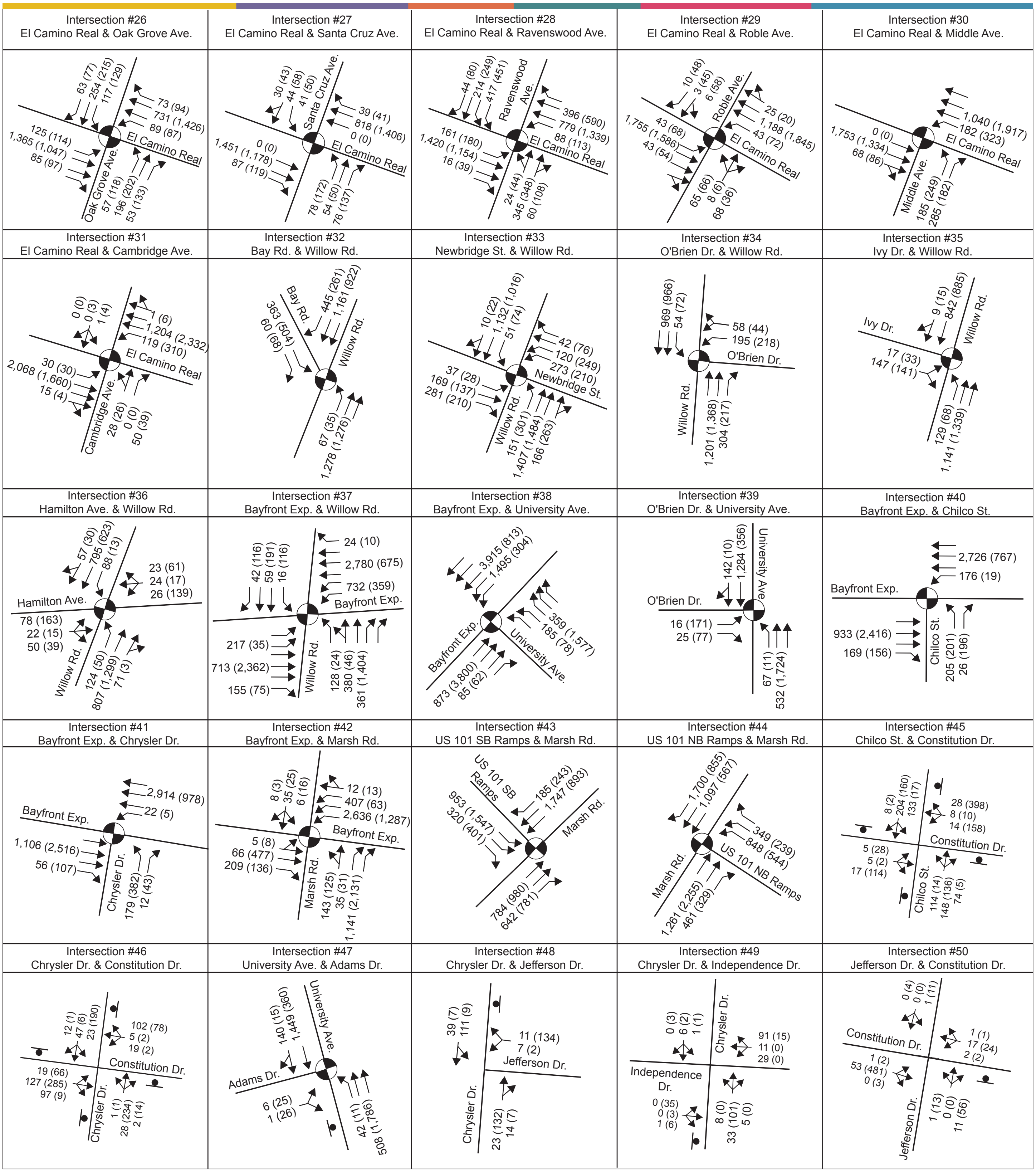


FIGURE 6-A: TRAFFIC VOLUMES, LANE GEOMETRY, AND TRAFFIC CONTROLS



LEGEND
- Traffic Signal
- Stop Sign

FIGURE 6-B: TRAFFIC VOLUMES, LANE GEOMETRY, AND TRAFFIC CONTROLS

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FIGURE 6-C: TRAFFIC VOLUMES, LANE GEOMETRY, AND TRAFFIC CONTROLS

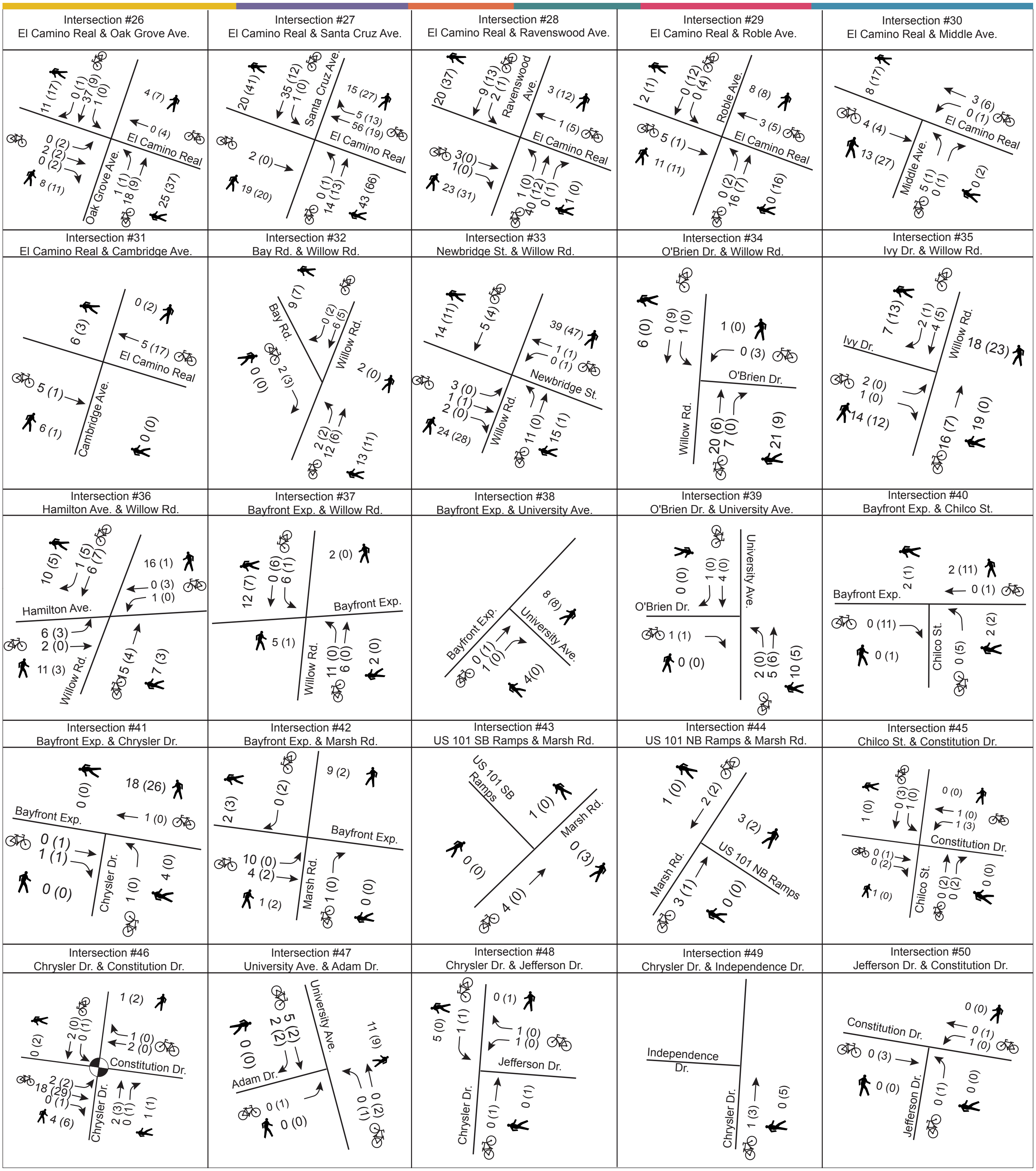

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FIGURE 6-D: TRAFFIC VOLUMES, LANE GEOMETRY, AND TRAFFIC CONTROLS

TABLE 8 PEAK HOUR INTERSECTION LEVELS OF SERVICE – EXISTING CONDITIONS

Int No.	Intersection	Control	Jurisdiction	LOS Threshold	AM Peak Hour LOS	PM Peak Hour LOS
1	Sand Hill Rd. & Hwy 280 NB Off-Ramp	Signal	Caltrans	D	C	C
2	Sand Hill Rd. & Sand Hill Cir.	Signal	Caltrans	D	B	D
3	Sand Hill Rd. & Addison-Wesley	Signal	Menlo Park	D	D	C
4	Saga Ln. & Sand Hill Rd.	Signal	Menlo Park	D	D	D
5	Branner Dr. & Sand Hill Rd.	Signal	Menlo Park	D	D	C
6	Sharon Park Dr. & Sand Hill Rd.	Signal	Menlo Park	D	C	D
7	Alpine Rd./ Santa Cruz Ave. & Junipero Serra Blvd	Signal	Menlo Park	D	D	D
8	Santa Cruz Ave. & Sand Hill Rd.	Signal	Menlo Park	D	D	D
9	Oak Ave./ Vine Rd. & Sand Hill Rd.	Signal	Menlo Park	D	B	A
10	Santa Cruz Ave. & Elder Ave.	Signal	Menlo Park	D	B	A
11	Valparaiso Ave. & University Dr.	Signal	Menlo Park	D	B	C
12	Santa Cruz Ave. & University Dr. (S)	Signal	Menlo Park	D	B	B
13	Oak Grove Ave. & Laurel St.	Signal	Menlo Park	C	B	B
14	Ravenswood Ave. & Laurel St.	Signal	Menlo Park	D	C	C
15	Middlefield Rd. & Ravenswood Ave.	Signal	Menlo Park	D	D	C
16	Middlefield Rd. & Ringwood Ave.	Signal	Menlo Park	D	C	D
17	Middlefield Rd. & Willow Rd.	Signal	Menlo Park	D	D	D
18	Willow Rd. & Gilbert Ave.	Signal	Menlo Park	D	B	C
19	Willow Rd. & Coleman Ave.	Signal	Menlo Park	D	C	B
20	Willow Rd. & Durham St.	Signal	Menlo Park	D	B	C
21	Marsh Rd. & Bay Rd.	Signal	Menlo Park	D	C	C
22	Marsh Rd. & Bohannon Dr.	Signal	Menlo Park	D	C	D
23	Marsh Rd. & Scott Dr.	Signal	Menlo Park	D	C	D
24	El Camino Real & Encinal Ave.	Signal	Caltrans	D	B	B
25	El Camino Real & Glenwood Ave.	Signal	Caltrans	D	D	D
26	El Camino Real & Oak Grove Ave.	Signal	Caltrans	D	C	C
27	El Camino Real & Santa Cruz Ave.	Signal	Caltrans	D	B	B
28	El Camino Real & Ravenswood Ave.	Signal	Caltrans	D	D	D
29	El Camino Real & Roble Ave.	Signal	Caltrans	D	A	B

TABLE 8 PEAK HOUR INTERSECTION LEVELS OF SERVICE – EXISTING CONDITIONS

Int No.	Intersection	Control	Jurisdiction	LOS Threshold	AM Peak Hour LOS	PM Peak Hour LOS
30	El Camino Real & Middle Ave.	Signal	Caltrans	D	B	B
31	El Camino Real & Cambridge Ave.	Signal	Caltrans	D	A	B
32	Willow Rd. & Bay Rd.	Signal	Caltrans	D	C	C
33	Willow Rd. & Newbridge St.	Signal	Caltrans	D	D	D
34	Willow Rd. & O'Brien Dr.	Signal	Caltrans	D	B	B
35	Willow Rd. & Ivy Dr.	Signal	Caltrans	D	B	B
36	Willow Rd. & Hamilton Ave.	Signal	Caltrans	D	C	C
37	Willow Rd. & Bayfront Expwy.	Signal	Caltrans	D	C	D
38	Bayfront Expwy. & University Ave.	Signal	Caltrans	D	C	**F**
39	University Ave. & O'Brien Dr.	Signal	Caltrans	D	A	A
40	Bayfront Expwy. & Chilco St.	Signal	Caltrans	D	B	B
41	Bayfront Expwy. & Chrysler Dr.	Signal	Caltrans	D	B	C
42	Bayfront Expwy. & Marsh Rd.	Signal	Caltrans	D	C	**E**
43	Marsh Rd. & US-101 SB	Signal	Caltrans	D	D	C
44	Marsh Rd. & US-101 NB	Signal	Caltrans	D	B	D
45	Chilco St. & Constitution Dr.	All-Way Stop	Menlo Park	C	B	C
46	Chrysler Dr. & Constitution Dr.	All-Way Stop	Menlo Park	C	A	B
47	University Ave. & Adams Dr.	Side-street Stop	Caltrans	D	**F**	**F**
48	Chrysler Dr. & Jefferson Dr.	Side-street Stop	Menlo Park	C	B	B
49	Chrysler Dr. & Independence Dr.	Side-street Stop	Menlo Park	C	B	A
50	Jefferson Dr. & Constitution Dr.	Side-street Stop	Menlo Park	C	A	C

Notes:
1. LOS = Level of Service, Delay = Average control delay per vehicle
2. Delay / LOS are for overall intersection
3. **Bold** indicates unacceptable operational conditions based on applicable city/Caltrans standards.

another case, a segment roadway could not be analyzed using the HCM methodology because it does not have signalized intersections at both ends of the segment.

TABLE 9 ROADWAY SEGMENTS AVERAGE DAILY TRAFFIC – EXISTING CONDITIONS

Segment No.	Roadway	Segment Between		Jurisdiction	Classification	Existing ADT
1	Alameda De Las Pulgas	Avy Ave.	Santa Cruz Ave.	Menlo Park	Minor Arterial	12,400
2	Alameda De Las Pulgas	Valparaiso Ave.	Avy Ave.	San Mateo County	Minor Arterial	15,300
3	Alameda De Las Pulgas	City Limits	Valparaiso Ave.	San Mateo County	Minor Arterial	16,100
4	Alma St.	Ravenswood Ave	Oak Grove Ave.	Menlo Park	Collector	1,600
5	Alma St.	Willow Rd.	Ravenswood Ave.	Menlo Park	Collector	3,200
6	Alpine Rd.	City Limits	Junipero Serra Blvd.	Menlo Park	Minor Arterial	23,300
7	Avy Ave.	City Limit	Alameda de las Pulgas	Atherton	Collector	4,600
8	Avy Ave.	Alameda de las Pulgas	Santa Cruz Ave.	Menlo Park	Collector	5,900
9	Bay Rd.	Greenwood Dr.	Marsh Rd.	Menlo Park	Collector	5,500
10	Bay Rd.	Ringwood Ave.	Greenwood Dr.	Menlo Park	Collector	5,700
11	Bay Rd.	Willow Rd.	Ringwood Ave.	Menlo Park	Collector	7,600
12	Bohannon Dr	Cambpell Ave.	Marsh Rd.	Menlo Park	Collector	3,900
13	Chilco St	Constitution Dr.	Bayfront Expwy.	Menlo Park	Collector	7,000
14	Chrysler Dr.	Constitution Dr.	Bayfront Expwy.	Menlo Park	Collector	4,000
15	Constitution Dr.	Chilco St.	Chrysler Dr.	Menlo Park	Collector	2,400
16	Crane St.	Oak Grove Ave.	Santa Cruz Ave.	Menlo Park	Collector	2,700
17	Crane St.	Santa Cruz Ave.	Menlo Ave.	Menlo Park	Collector	2,400
18	Encinal Ave.	El Camino Real	Laurel St.	Menlo Park	Collector	5,600
19	Encinal Ave.	Laurel St.	Middlefield Rd.	Menlo Park	Collector	5,000
20	Glenwood Ave.	El Camino Real	Laurel St.	Menlo Park	Collector	6,000
21	Hamilton Ave.	Willow Rd.	Chilco St.	Menlo Park	Collector	2,800
22	Haven Ave.	Bayfront Expwy./Marsh Rd.	City Limit	Menlo Park	Collector	7,400

TABLE 9 ROADWAY SEGMENTS AVERAGE DAILY TRAFFIC – EXISTING CONDITIONS

Segment No.	Roadway	Segment Between		Jurisdiction	Classification	Existing ADT
23	Junipero Serra Blvd.	City Limit	Alpine Rd.	Menlo Park	Primary Arterial	16,000
24	Laurel St.	Oak Grove Ave.	Glenwood Ave.	Menlo Park	Collector	4,100
25	Laurel St.	Ravenswood Ave.	Oak Grove Ave.	Menlo Park	Collector	4,400
26	Laurel St.	Willow Rd.	Ravenswood Ave.	Menlo Park	Collector	4,500
27	Marsh Rd.	City Limit	Bay Rd.	Menlo Park	Minor Arterial	22,900
28	Marsh Rd.	Bay Rd.	Bohannon Dr.	Menlo Park	Primary Arterial	25,800
29	Marsh Rd.	Bohannon Dr.	Scott Dr.	Menlo Park	Primary Arterial	32,400
30	Menlo Ave.	University Ave.	Crane St.	Menlo Park	Collector	7,400
31	Menlo Ave.	Crane St.	El Camino Real	Menlo Park	Collector	8,600
32	Middle Ave.	Olive St.	University Dr.	Menlo Park	Collector	7,200
33	Middle Ave.	University Dr.	El Camino Real	Menlo Park	Collector	8,900
34	Middlefield Rd.	Ravenswood Ave.	Oak Grove Ave.	Atherton	Minor Arterial	14,800
35	Middlefield Rd.	Willow Rd.	Ravenswood Ave.	Menlo Park	Minor Arterial	19,700
36	Middlefield Rd.	City Limits	Willow Rd.	Menlo Park	Minor Arterial	18,400
37	Newbridge St.	Willow Rd.	Chilco St.	Menlo Park	Collector	7,000
38	Oak Grove Ave.	University Dr.	Crane St.	Menlo Park	Collector	6,400
39	Oak Grove Ave.	Crane St.	El Camino Real	Menlo Park	Collector	7,700
40	Oak Grove Ave.	El Camino Real	Laurel St.	Menlo Park	Collector	9,600
41	Oak Grove Ave.	Laurel St.	Middlefield Rd.	Menlo Park	Collector	8,700
42	O'Brien Dr.	Kavanaugh Dr.	Willow Rd.	Menlo Park	Collector	6,400
43	O'Brien Dr.	University Ave.	Kavanaugh Dr.	Menlo Park	Collector	3,300
44	Ravenswood Ave.	El Camino Real	Alma St.	Menlo Park	Minor Arterial	24000

TABLE 9 ROADWAY SEGMENTS AVERAGE DAILY TRAFFIC – EXISTING CONDITIONS

Segment No.	Roadway	Segment Between		Jurisdiction	Classification	Existing ADT
45	Ravenswood Ave.	Alma St.	Laurel St.	Menlo Park	Minor Arterial	18,800
46	Ravenswood Ave.	Laurel St.	Middlefield Rd.	Menlo Park	Minor Arterial	16,600
47	Ringwood Ave.	Middlefield Rd.	Bay Rd.	San Mateo County	Collector	7,300
48	Sand Hill Rd.	I-280	Sharon Park Dr.	Menlo Park	Primary Arterial	28,000
49	Sand Hill Rd.	Santa Cruz Ave.	Sharon Park Dr.	Menlo Park	Primary Arterial	30,800
50	Sand Hill Rd.	Santa Cruz Ave.	City Limits	Menlo Park	Minor Arterial	32,700
51	Santa Cruz Ave.	Junipero Serra Blvd	Sand Hill Rd.	Menlo Park	Minor Arterial	26,500
52	Santa Cruz Ave.	Sand Hill Rd.	Alameda de las Pulgas	San Mateo County	Minor Arterial	23,200
53	Santa Cruz Ave.	Alameda de las Pulgas	Avy Ave./Orange Ave.	Menlo Park	Minor Arterial	10,900
54	Santa Cruz Ave.	Avy Ave./Orange Ave	Olive St.	Menlo Park	Minor Arterial	14,500
55	Santa Cruz Ave.	Olive St.	University Dr.	Menlo Park	Minor Arterial	15,300
56	Santa Cruz Ave.	University Dr.	Crane St.	Menlo Park	Minor Arterial	7,600
57	Santa Cruz Ave.	Crane St.	El Camino Real	Menlo Park	Minor Arterial	7,400
58	Scott Dr.	Marsh Rd.	Campbell Ave.	Menlo Park	Collector	4,800
59	Sharon Park Dr.	Sand Hill Rd.	Sharon Rd.	Menlo Park	Collector	10,000
60	Sharon Rd.	Sharon Park Dr.	Alameda de las Pulgas	Menlo Park	Collector	3,800
61	University Dr.	Middle Ave.	Menlo Ave.	Menlo Park	Collector	5,900
62	University Dr.	Menlo Ave.	Santa Cruz Ave.	Menlo Park	Collector	9,300
63	University Dr.	Santa Cruz Ave.	Oak Grove Ave.	Menlo Park	Collector	7,200
64	University Dr.	Oak Grove Ave.	Valparaiso Ave.	Menlo Park	Collector	5,100
65	Valparaiso Ave.	Alameda de las Pulgas	Cotton St.	Menlo Park	Minor Arterial	12,100
66	Valparaiso Ave.	Cotton St.	University Ave.	Menlo Park	Minor Arterial	14,400

TABLE 9 ROADWAY SEGMENTS AVERAGE DAILY TRAFFIC – EXISTING CONDITIONS

Segment No.	Roadway	Segment Between		Jurisdiction	Classification	Existing ADT
67	Valparaiso Ave.	University Dr.	El Camino Real	Menlo Park	Minor Arterial	13,000
68	Willow Rd.	Alma St.	Laurel St.	Menlo Park	Collector	3,400
69	Willow Rd.	Laurel St.	Middlefield Rd.	Menlo Park	Collector	5,200
70	Willow Rd.	Middlefield Rd.	Gilbert Ave.	Menlo Park	Collector	24,330
71	Chilco St.	Hamilton Ave.	Terminal Ave.	Menlo Park	Collector	4,800
72	Chilco St.	Ivy Dr.	Hamilton Ave.	Menlo Park	Collector	2,700
73	Chilco St.	Newbridge St.	Ivy Dr.	Menlo Park	Collector	2,100
74	Hamilton Ave.	Willow Rd.	Hamilton Ct.	Menlo Park	Collector	2,600
75	Willow Rd.	Gilbert Ave.	Coleman Ave.	Menlo Park	Minor Arterial	24,400
76	Willow Rd.	Coleman Ave.	Durham St.	Menlo Park	Minor Arterial	41,200
77	Willow Rd.	Durham St.	Bay Rd.	Menlo Park	Minor Arterial	34,100
78	Chilco St.	Terminal Ave.	Constitution Dr.	Menlo Park	Collector	5,100
79	Chrysler Dr.	Constitution Dr.	Independence Dr.	Menlo Park	Collector	3,300
80	Chrysler Dr.	Independence Dr.	Commonwealth Dr.	Menlo Park	Collector	1,100
81	Adams Dr.	University Dr.	Adams Ct.	Menlo Park	Local	1,300
82	Olive St.	Santa Cruz Ave.	Middle Ave.	Menlo Park	Local	2,500
83	Olive St.	Middle Ave.	Oak Ave.	Menlo Park	Local	3,100
84	Cambridge Ave.	University Dr.	El Camino Real	Menlo Park	Local	1,600
85	Linfield Dr.	Middlefield Rd.	Waverley St.	Menlo Park	Local	1,800
86	Waverley St.	Laurel St.	Linfield Dr.	Menlo Park	Local	1,700

PARKING STANDARDS AND MANAGEMENT

The Menlo Park Municipal Code, current through September 9, 2014, outlined a variety of parking requirements in sections 16.52, 16.58, 16.72, and 16.74 for the City of Menlo Park, described below.

OFF-STREET PARKING REQUIREMENTS

The existing off-street parking for Menlo Park, outlined in Table 10, has varying requirements based on land uses and/or zoning districts such as single-family homes, multifamily dwellings, restaurants, grocery stores, offices, and other commercial uses. The requirements are placed on new development, and are typically calculated by square footage of the proposed development. In some instances, the parking requirement is calculated by number of units or number of seats/beds (apartments, theaters, hospitals, etc.).

While Table 10 outlines the parking requirements, reductions in parking requirements for commercial and industrial land uses may be allowed through an administrative permit. The current Municipal Code's requirements are higher than industry standard guidelines, such as the Institution of Transportation Engineers (among others). As a result, these requirements were adjusted in the El Camino Real and Downtown Specific Plan to better reflect industry standards for various land uses (discussed below).

In addition to the uses in Table 10, parking near train stations is required to be sufficient for the train passengers. However, there are no specific numerical requirements. The Menlo Park Caltrain Station utilizes a 155-space off-street, paid parking lot with a $5 daily rate or $50 monthly rate.

Menlo Park manages off-street parking in the downtown area in eight parking plazas. In total, there are 1,186 spaces available to the public. With additional parking garages, and reductions for the construction of pocket parks, pedestrian links, and a market place adjacent or on the sites of the existing parking plazas, the future supply will be an estimate of 1,547 to 1,827 pending design approvals and actual implementation.

USE-BASED GUIDELINES

While zoning regulations determine the amount of parking required for a given commercial and industrial use (based on zoning district) property owners may apply for administrative permits to reduce parking requirements for a particular use (see Table 10). In determining parking reduction requests, the following factors may come into consideration: primary use of the building, unique physical features of the building, numbers of employees and customers, transportation demand management measures, hours of operation, shared parking arrangements, availability of on-street parking, surrounding land uses, and proximity to residential neighborhoods.

EL CAMINO REAL/DOWNTOWN SPECIFIC PLAN

The El Camino Real/Downtown Specific Plan calls for parking requirements that are closer to industry standards, and allow for the consolidation of parking in off-site locations. Currently, new development in the downtown area can be provided in the parking plazas for up to 1.0 floor area ratio (FAR). Parking for downtown developments at a density of 2.0 FAR must accommodate the additional parking on-site or nearby. This allows for developments with lower parking requirements to accommodate vehicles in a centralized location, as opposed to on-site. This is an effective means of incentivizing economic development in the city, as it reduces the financial requirements on smaller developments. The plan recommends that the City adhere to a Parking Management Plan to be added to its yearly Capital Improvement Project, thereby ensuring that existing parking is effectively utilized and minimizing the need for new parking spaces.

New minimum parking space requirements are also recommended in the Specific Plan for multi-family dwellings, office space, retail, supermarkets, restaurants, and hotels (See Table 10). In addition, the Specific Plan discusses consolidating downtown parking supply into a few plazas as a means of consolidating traffic at fewer points, and providing downtown development with requirements that reflect the multimodal behavior of its residents and employees. Finally, of special note is the inclusion of station area guidelines, with parking minimums and maximums for dwellings that are within the station area or within its sphere of influence.

Moreover, the Specific Plan recommends managing the existing parking supply and discusses various options including time limits for parking, parking pricing increases, unbundling parking from development (such that each is priced separately), establishing a Parking Benefits District to finance public improvements downtown, car-share programs, and a Parking Implementation Plan. Proposed parking supplies account for the constructions of two parking garages and street-level improvements, such as sidewalk widening.

PUBLIC PARKING

The City of Menlo Park's on-street parking policy places priority in ensuring residents are able to park in their neighborhoods, with little impact from visitor parking. While most housing development is expected to have off-street parking, the on-street policy accounts for situations in which there is insufficient off-street parking for residents. In addition, Menlo Park has initiated a variety of time and payment limits in order to create turnover in the commercial areas where visitors are more likely to park.

TABLE 10 OFF-STREET PARKING REQUIREMENTS

Use	Parking Spaces Required
Dwellings	2 spaces per unit, at least 1 of which shall be in a garage or carport
Housing for Elderly	1 garage space per 3 dwelling units
Boardinghouses	1 space per two occupants, at least half of the required spaces shall be in a garage or carport
Rest Homes, Convalescent Homes	1 space per four beds
Churches	1 space per 5 seats
Offices	1 space per 200 sq. ft. of gross floor area
Public Utility Facilities	1 space for every 2 employees on the maximum working shift, plus 1 space for each company vehicle permanently assigned to the facility
Well-Patient/Short Facility for surgery, medical and post-operative care, and requiring overnight stay	1.25 spaces per bed plus 1 space per employee on largest shift
R-4 District	2 spaces for each unit with 2 bedrooms or more 1.5 spaces for each unit with 1 bedroom 1 space for each studio unit Plus 1 guest space for every 3 units
R-4-S District	2 spaces for units w/2 or more bedrooms; 1.5 spaces for 1 bedroom unit; 1 space per studio,
C-1, C-1-A Districts	1 space per 200 sq. ft. of gross floor area
C-1-C District	1 space per 250 sq. ft. of gross floor area
C-2, C-2-A, C-2-B, C-4 Districts	6 spaces per 1,000 sq. ft. of gross floor area
M-2 and M-3 Districts	1 space per 300 sq. ft. of gross floor area
Use-Based Guidelines	General Office: 3.3 spaces per 1,000 sq. ft. of gross floor area; Medical Office: 5 spaces per 1,000 sq. ft. of gross floor area; Retail and Personal Service: 5 spaces per 1,000 sq. ft. of gross floor area; Restaurants: 6 spaces per 1,000 sq. ft. of gross floor area; Hotel: 1.1 spaces per room
Downtown Specific Plan Rates	Station Area Dwellings: 1 min. - 1.5 max. spaces per unit; Station Area Sphere of Influence Dwellings: 1 min. space per unit; General Office: 3.8 min. spaces per 1,000 sq. ft. of gross floor area; Medical Office: 4.5 min. spaces per 1,000 sq. ft. of gross floor area; Retail and Personal Service: 4 min. spaces per 1,000 sq. ft. of gross floor area; Supermarket: 5.5 min. spaces per 1,000 sq. ft. of gross floor area; Restaurants: 6 min. spaces per 1,000 sq. ft. of gross floor area; Hotel: 1.25 min. spaces per room

Menlo Park currently requires permits for residential areas and prohibits non-permitted vehicles in or within 300 feet of a residential district from 2:00 a.m. to 5:00 a.m., unless a professional activity categorized as an emergency arises. Vehicles with disabled permits are exempt from this ordinance.

For residential units without sufficient off-street parking, the City of Menlo Park grants up to three residential on-street parking permits per unit. In addition, neighborhoods can create residential parking permit districts in order to preserve on-street parking for local residents. To create a parking district, City staff must verify there are visitor parking impacts to the neighborhood of at least 25 percent. In addition, residents can create a parking district with majority approval. Permits are also given to R-3, R-3A, and R-3C zones if the building or complex in which the residential unit is located was not required to have two parking spaces per unit at the time of construction.

Additional on-street parking is available for the downtown plazas, with annual parking permits, full-day parking permits, and half-day parking permits granted. The City also has paid parking available in a pay-by-space format, where the first two hours are free, and the remaining time requires payment. The City of Menlo Park currently manages 409 on-street parking spaces in the downtown area on Santa Cruz Avenue, Chestnut Street, Oak Grove Avenue, and adjacent streets. Along with the 1,186 off-street spaces, Menlo Park manages a total of 1,595 spaces in the downtown area.

The Menlo Park Downtown Parking Plan, adopted in 2011, outlines changes to the parking management for the downtown parking plazas, managed by the City. The plan requires paid parking equipment for three of eight parking plazas for visitors looking to park for more than two hours. In addition, parking spaces along Santa Cruz Avenue were changed from 2-hour time limits to 1-hour time limits to incentivize turnover and enhance retail business. The parking plan also included new 15-minute parking spaces along Santa Cruz Avenue for short-term visits to the downtown area.

BICYCLE PARKING

Bicycle storage is also an integral portion of the Specific Plan with standards for Downtown areas and new commercial development sites outside of the downtown. Currently, bicycle parking requirements exist for areas affected by the Downtown Specific Plan and R-4-S districts (see Table 11). Under the Downtown Specific Plan, new commercial-use buildings or retail store fronts are required to provide bicycle parking within 50 feet of entrances, with number of spaces calculated per 1,000 square feet (sf) gross floor area (gfa) (for commercial uses) and per number of units (for residential uses). Bicycle parking requirements for R-4-S districts are calculated under the same guidelines for multi-family dwellings under the Downtown Specific Plan. Under both guidelines, commercial and residential uses also have short-term bicycle parking requirements to accommodate visitors.

TABLE 11 BICYCLE PARKING REQUIREMENTS

Zoning Guideline	Use	Bike Parking Long Term	Bike Parking Short Term (Visitor)
Downtown Specific Plan	Single Family Dwelling	-	-
	Multi-Family Dwelling – with private garage for each unit	-	1 space for every 10 units
	Multi-Family Dwelling – without private garage	1 space per unit	1 space for every 10 units
	Office and Medical Office	1 space for each 10,000 sq. ft. of floor area; minimum requirement 2 spaces	1 space for each 20,000 sq. ft. of floor area; minimum requirement 2 spaces
	Retail and Personal Service	1 space for each 12,000 sq. ft. of floor area; minimum requirement 2 spaces	1 space for each 5,000 sq. ft. of floor area; minimum requirement 2 spaces
	Supermarket and Restaurant	1 space for each 12,000 sq. ft. of floor area; minimum requirement 2 spaces	1 space for each 2,000 sq. ft. of floor area; minimum requirement 2 spaces
	Hotel	1 space for every 20 rooms; minimum requirement 2 spaces	1 space for every 20 rooms; minimum requirement 2 spaces
	Automotive sales, rental, and delivery; automotive servicing; automotive repair and cleaning	1 space for each 12,000 sq. ft. of floor area; minimum requirement 2 spaces	1 space for each 20,000 sq. ft. of floor area; minimum requirement 2 spaces
	Off-street parking lots and garages available to the general public (with or without fee)	1 space for each 20 automobile spaces; minimum requirement is 2 spaces; unattended surface parking lots excepted	Minimum of 6 spaces or 1 per 20 auto spaces; unattended surface parking lots excepted
R-4-S	Multi-family Dwelling	1 space per unit where a private garage (per unit) is not provided	1 space per every 10 units

PEDESTRIAN NETWORK

This section of the existing conditions analysis summarizes the existing and planned pedestrian facilities. Some areas of Menlo Park have high rates of walking, and the pedestrian network is a critical part of the City's transportation system. Menlo Park's commitment to have a robust, connected, and safe pedestrian network is important for residents and workers that use all modes of transportation because many trips begin or end as pedestrian trips. Menlo Park's General Plan contains policies that support maintaining the existing pedestrian infrastructure and further support providing safe, efficient, and equitable use of streets by pedestrians through good roadway design. There is an additional policy in the General Plan that requires all new development to incorporate safe and attractive pedestrian facilities on-site.

EXISTING FACILITIES

The most recent sidewalk inventory conducted for the City of Menlo Park was in 2009 for the City's Sidewalk Master Plan. The plan analyzed all of the streets in Menlo Park and categorized them based on the existence of sidewalk facilities on the street. The three groups in the inventory for pedestrian facilities are: continuous sidewalks on both sides, partial sidewalk on at least one side, or no sidewalks. Of the 1,203 Menlo Park segments surveyed, less than half (46 percent) have continuous sidewalks on both sides of the roadway. Figure 7 shows the existing pedestrian infrastructure in Menlo Park categorized by the sides of the street sidewalks exist. The figure shows a general pattern of neighborhoods within Menlo Park where there are complete sidewalk facilities. These neighborhoods include Belle Haven, the Willows, Linfield Oaks, and the Downtown core.

The City of Menlo Park contains a street grid that is conducive for many pedestrian crossings. The crossings come in two types: controlled and uncontrolled. The controlled crossings are at locations that are signalized or stop controlled, and can either be marked or unmarked. Menlo Park uses special crosswalk treatments in its downtown area to increase visibility with pavers, and yellow high visibility crosswalks near its schools. For uncontrolled crossings, which are those on street segments without stop signs or signals, Menlo Park generally enhances the crosswalk with higher visibility striping, signage, or in-roadway warning lights. Crosswalks with in-pavement flashing lights in Menlo Park include:

- Ravenswood Avenue at Alma Street
- Middlefield Road at Linfield Drive
- Oak Grove Avenue at Merrill Street
- Oak Grove Avenue between El Camino Real and Hoover Street (midblock)
- Crane Street between Oak Grove Avenue and Valparaiso Avenue (midblock)

Some deficiencies exist within the pedestrian facilities in the City of Menlo Park that reduce the quality of the walking network. For instance, some sidewalks exist with connection to the street via a rolled curb instead of a vertical curb which makes it easier for vehicles to park on. Gaps also exist throughout the network where sidewalks abruptly end at a property line.

PLANNED AND PROPOSED FACILITIES

The recommendations in the Sidewalk Master Plan guide future implementation of pedestrian and sidewalk facilities. Included in these guidelines is the requirement that sidewalks shall be provided on at least one side of the roadway and preferably on both sides wherever possible. The Master Plan also details design criteria for the facilities, which include a recommendation for 5 feet of clearance with a minimum standard of 4 feet as well as a buffer between the sidewalk and roadway where high vehicle volumes exist. Vertical curbs and gutters are recommended where there is a high level of pedestrian activity, and American with Disabilities Act (ADA) compliant curb ramps are also required. The total cost to install sidewalks citywide in 2009 was estimated at approximately $45,000,000.

The Sidewalk Master Plan does not identify any specific sidewalk segments planned for implementation; instead the document analyzes sidewalk deficiencies by using a mathematical ranking system. Weighting for the rankings was based on many factors including priority areas, proximity to pedestrian attractors, vehicle volume, presence of "informal" walking areas off-street, and availability of space for a sidewalk. The rankings are divided into three priority categories: high, medium, and low. The Sidewalk Master Plan makes it clear that although sidewalks are recommended in locations according to this ranking system, individual circumstances may arise where construction of pedestrian facilities is not recommended due to the land use in that particular neighborhood. The Community Character Report addresses pedestrian connectivity in each of the city's neighborhoods and notes where vertical curbs are typically lacking. If sidewalks are not desirable in specific portions of the City, Menlo Park can explore other ways to accommodate pedestrians safely on residential streets under the Complete Streets framework and policy.

PEDESTRIAN SAFETY

Pedestrian collisions in Menlo Park between 2007 and 2012 are shown in Figure 7. Though there were no fatal pedestrian collisions in this 5-year period, there were a total of 50 injury collisions. Just over half (27) of these injury collisions were at intersections. An analysis of the map shows some trends in the locations of these collisions. There are two high collision concentration areas: in Menlo Park's Downtown central business district, and in the Belle Haven neighborhood north of US 101 along Willow Road, Ivy Drive, and Newbridge Street. The concentration of pedestrian collisions in the Downtown core is most likely due to a high rate of walking as well as a high level of auto traffic. Vehicle speeds in this district are relatively low, so collisions may be a result of other reasons such as unsignalized crossings, poor visibility, etc. The concentration of collisions in Belle Haven may be a result of high vehicle speeds and unmarked crosswalks at uncontrolled intersections. These concentrations in collisions also highlight the need for infrastructure improvements in their respective areas. Although statistics for 2013 are not available yet, two pedestrians were fatally struck by a vehicle on Chilco Street in October 2013.

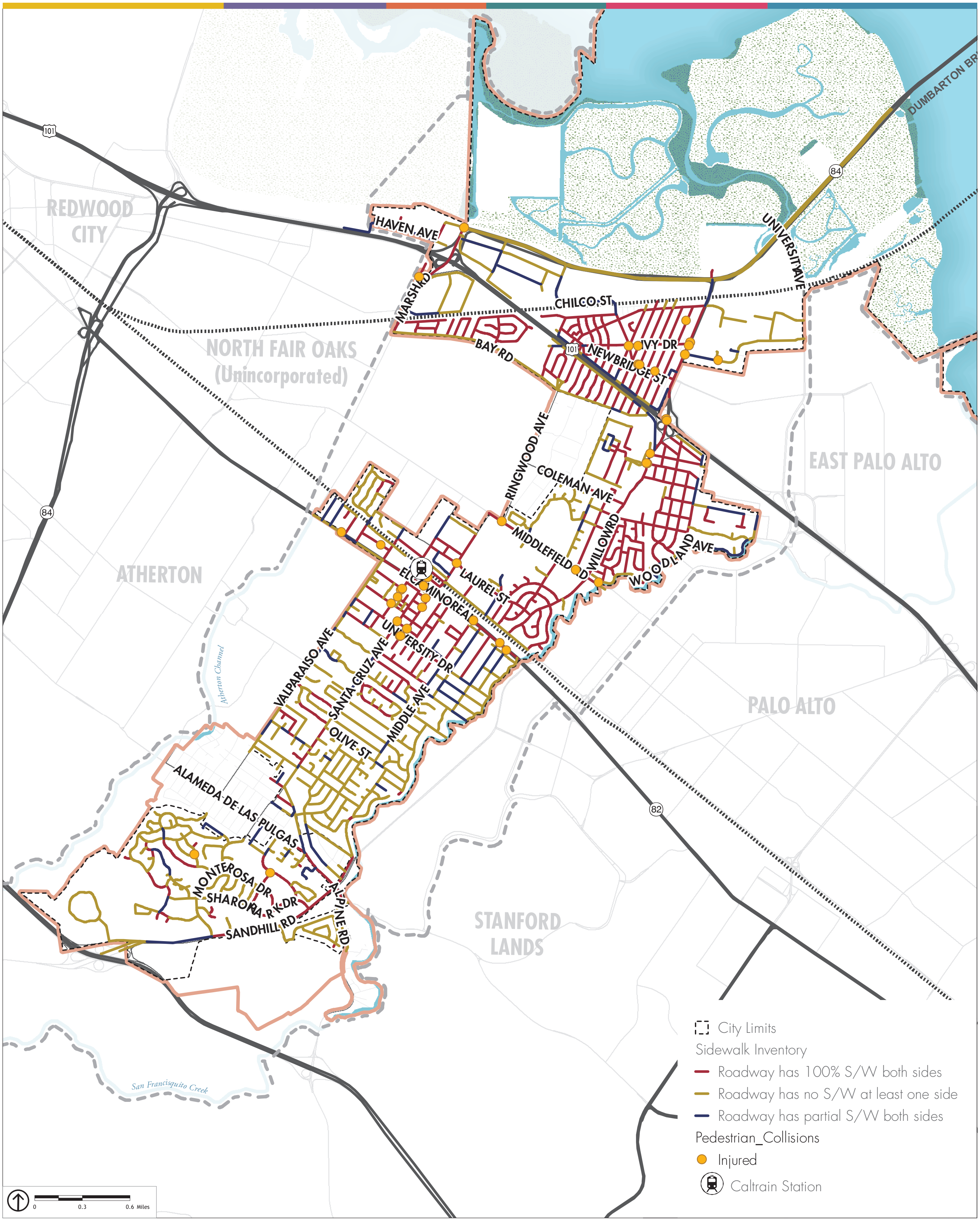

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FIGURE 7: SIDEWALK INVENTORY AND PEDESTRIAN COLLISIONS

BICYCLE NETWORK

This section of the existing conditions analysis describes the existing and planned bicycle facilities. Menlo Park has an existing bicycle route network with connections to neighboring city facilities. The bicycle network contains a variety of facilities and is labeled according to California's system of classification of bikeways:

- Class I Bikeway – bike paths within exclusive right-of-way, sometimes shared with pedestrians
- Class II Bikeway – bike lanes for bicycle use only that are striped within the paved area of roadways
- Class III Bikeway – bike routes are shared with motor vehicles on the street. Class III bikeways may be defined by a wide curb lane and/or use of a shared use arrow stencil marking on the pavement known as a "sharrow"
- Class IV Bikeway – cycle tracks or separated bikeways that contain dedicated right of way with physical separation, such as grade separation, flexible posts, or on-street parking

EXISTING FACILITIES

Menlo Park has several different types of bicycle infrastructure that both provide a network for transportation within the city as well as important connections to neighboring communities. Figure 8 shows the existing bicycle infrastructure in and adjacent to Menlo Park, planned infrastructure, and the 5-year bicycle collision history. Several Class I off-street bike paths exist both as major routes and bridges or undercrossings. The San Francisco Bay Trail runs through Menlo Park along the Bayfront Expressway and crosses the Dumbarton Bridge. The Trail generally follows the north side of the Bayfront Expressway, except for at Willow Road, where the Trail switches to the south side of the Expressway. A gap exists at University Avenue, where there is no trail connection east to where it begins again in the Ravenswood Open Space Preserve. A small network of mixed-use paths for bicycles and pedestrians exist in Burgess Park. There are also three trail crossings across the San Francisquito Creek with connections to Palo Alto or the Stanford University campus, located at San Mateo Drive, Alma Street, and Willow Place.

Major Class II marked on-street bicycle lanes include Willow Road, Sand Hill Road, Santa Cruz Avenue, Valparaiso Avenue, Alma Street, Middlefield Road, and Bay Road, and Ringwood Avenue. In Summer 2014, Willow Road was upgraded with the City's first installation of green paint treatment. The Class II facility on Ringwood Avenue between Middlefield Road and Bay Road is not within the jurisdiction of Menlo Park, but is used by residents. This Class II facility resumes further north and crosses US-101 with a combined bicycle and pedestrian bridge. This route also offers connections to the Belle Haven neighborhood and the San Francisco Bay Trail.

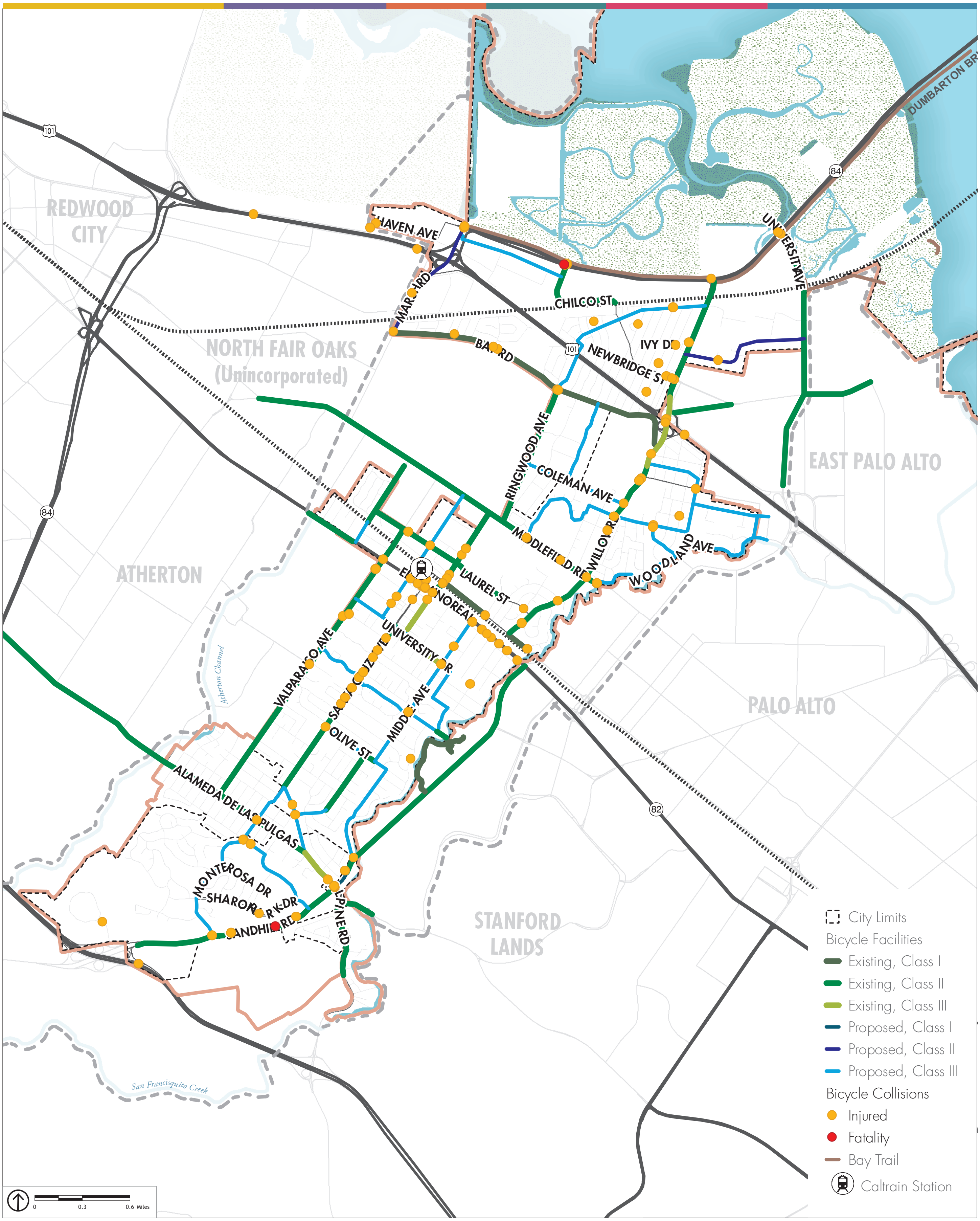

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FIGURE 8: CITYWIDE BICYCLE NETWORK AND COLLISION HISTORY

Some Class III bicycle routes exist in Menlo Park that connect neighborhoods and Class II facilities. These routes include Laurel Street south of Burgess Drive, Menlo Avenue, Willow Drive, and University Drive. Some of these facilities are painted with shared lane "sharrow" pavement markings.

Gaps in the network exist at several locations where Class II bicycle lanes end without any connections. In some cases, these facilities begin again further downstream. Willow Road is one of the most prominent locations where this occurs, for example a Class II bike lane ends at Durham Street and no bike infrastructure exists through the US-101overpass. Menlo Park also lacks an adequate number of east-west route connections, especially in the neighborhoods south of downtown.

EXISTING BRIDGE VOLUMES

The existing pedestrian / bicycle volumes for the pedestrian/ bicycle only bridges were received from the City of Menlo Park. Table 12 summarizes existing volumes for pedestrians and bikes. Appendix D includes the data sheets for the bridge counts.

TABLE 12 EXISTING BRIDGE VOLUMES

	Pedestrians				Bicycles				Total Per Bridge
Bridge	EB	WB	NB	SB	EB	WB	NB	SB	
Pierce Rd. & Ringwood Overcrossing	215	42	-	-	164	171	-	-	**592**
Willow Pl. Bike Bridge	-	-	207	182	-	-	381	403	**1,173**
San Mateo Bike Bridge	-	-	13	16	-	-	82	77	**188**
Alma St. Bike Bridge	-	-	188	220	-	-	329	281	**1,018**
Pedestrian & Bicyclist Subtotals	**215**	**42**	**408**	**418**	**164**	**171**	**792**	**761**	
Totals			1,083			1,888			2,971

PLANNED AND PROPOSED FACILITIES

A number of planned bicycle improvements are identified in City documents. A major source is the 2005 Menlo Park Comprehensive Bicycle Development Plan. This document details the potential expansion of the bicycle network with a variety of proposed projects as well as city-wide infrastructure improvements.

Figure 8 shows a number of planned bicycle facilities in Menlo Park. These facilities range from Class I bike paths, Class II striped lanes, and Class III routes. The proposed bicycle facilities seek to close gaps, improve connections to community centers, schools, parks, libraries, employment centers, commercial and retail centers, and provide regional connections. The proposed improvements are prioritized in the Development Plan as short, medium, or long term. Implementation strategies and potential funding sources are also identified. Other bicycle infrastructure improvements recommended in the 2005 Bicycle Development Plan focus on several items including bicycle parking within the City. Bike parking should be focused towards public destinations, including park-and-ride lots, major bus stops, community centers, parks, and schools. Improvements also include upgrades to the Caltrain shelter as well as developing a unique citywide wayfinding system and signing all proposed Class III bikeways. Transportation Development Act funding is currently being used to install green paint on the street in bicycle facilities in transitional zones approaching intersections throughout Menlo Park.

Menlo Park's Downtown Specific Plan also includes refined bike routes and recommendations within the plan area that are not part of the Bicycle Development Plan. Some of these plans include upgrading University Avenue and Menlo Avenue to Class II bicycle facilities and a new Class II bicycle lane on Oak Grove Avenue by the removal of on-street parking. The Downtown Specific Plan also calls for bicycle facilities on El Camino Real from Encinal Avenue to the Palo Alto border.

Another major capital project in Menlo Park scheduled for 2016-2018 is the reconstruction of US 101/Willow. This project proposes a Class I path and Class II bike lanes in addition to ramp alignment more conducive to pedestrian and bicycle safety.

BICYCLE SAFETY

Figure 8 also shows the 2007-2012 bicycle collisions in Menlo Park, along with the existing bicycle network. These collisions are any collision involving a bicycle, whether it is with an automobile, pedestrian, or a single vehicle collision. There were two fatal bicycle collisions in this 5-year period, and 133 injury collisions. Over half (79) of these injury collisions were at intersections, while the rest were at mid-block locations. One of the fatal collisions was at the intersection of State Route 84 (Bayfront Expressway) and Chilco Street, and the other was on Sand Hill Road near Branner Drive. While 2013 data is still being compiled, it should be noted that there was one bicycle fatality in 2013 at the intersection of Marsh Road and Bayfront Expressway.

Patterns in bicycle collisions show a concentration of injury collisions on El Camino Real, Santa Cruz Avenue, the Downtown core, and Willow Road north of where Class II striped bike lane ends. El Camino Real is a four- to six-lane divided arterial under Caltrans jurisdiction with no existing bicycle infrastructure.

The street is a major automobile and transit route that runs through downtown Menlo Park and connects to many other cities in San Mateo and Santa Clara Counties. At the time of this report, the ongoing El Camino Real Corridor Study is exploring alternatives that will possibly add bicycle infrastructure and safety improvements on this arterial. Willow Road north of the end of the Class II bicycle lane is also an area of higher bicycle collisions where there is limited bicycle infrastructure, with only Class III shared lane markings on the street. The reason for larger numbers of bicycle collisions in the Downtown core may be similar to that of the concentration of pedestrian collisions: higher bicycle volumes, a high level of auto traffic, and many conflict points. There may be a variety of reasons for more bicycle collisions on Santa Cruz Avenue, including higher vehicle speeds, greater number of conflict points with driveways and side streets, and lack of separation between vehicles and bicycles.

PUBLIC TRANSIT

Transit service is a vital component of the transportation system in Menlo Park, particularly for regional access to employment centers and residential areas, local access to schools, and for those residents in low vehicle ownership areas. This section presents an overview of existing service (see Table 13) and system characteristics, as well as planned and proposed transit service.

EXISTING TRANSIT SERVICE AND FREQUENCY

Caltrain operates through the Menlo Park Caltrain Station with three types of service: Local, Limited Stop, and Baby Bullet. During peak hours, Caltrain runs Local and Limited Stop service every six minutes to 54 minutes, with an average interval of 32 minutes. For northbound service, three Baby Bullet trains operate in the evening peak, and southbound trains have Baby Bullet service in the morning peak. Caltrain allows residents to connect with job centers around the Silicon Valley, as well as San Francisco and San Jose. In addition to Caltrain service, multiple SamTrans bus routes operate within city limits. These routes fall under three categories: routes connecting to Caltrain stations, routes connecting to Caltrain and BART stations, and school-day only routes. In 2014, SamTrans underwent service changes by eliminating some lower-ridership routes in Sharon Heights (formerly Route 295) and increased the frequency on other routes, including ECR and Route 281.

Routes connecting to Caltrain Stations:

- **Route 270:** Serves the M-2 area near Marsh/Haven, and Bayfront Expressway; Travels to Redwood City Transit Center

- **Route 276:** Travels to Redwood City Transit Center, Kaiser Hospital, and Redwood City Hall via Marsh/Haven/ Bayfront Expressway.
- **Route 281:** Serves the Palo Alto Transit Center at Downtown Palo Alto Caltrain station, University Village Shopping Center, and Onetta Harris Community Center
- **Route 286:** Connects to Menlo-Atherton High School, Menlo Park Caltrain Station, and La Entrada Middle School
- **Route 296:** Serves Menlo Park Caltrain Station, VA Medical Center, Redwood City Caltrain Station, Sequoia High School, and East Palo Alto
- **Route 297:** Connects to University Village Shopping Center, VA Medical Center, Palo Alto Transit Center, and Redwood City Transit Center

Routes connecting to Caltrain and BART:

- **Route ECR:** Primarily serves stations from Daly City BART to Milbrae BART and Hillsdale Caltrain to Palo Alto Caltrain
- **Route 397:** Connects to Downtown San Francisco and Milbrae BART

School-Day Only:

- **Route 80:** Accesses Hillview Middle School and Oak Knoll School via Santa Cruz/Elder
- **Route 82:** Serves Hillview Middle School, VA Hospital, Menlo Park Caltrain, and Flood Park
- **Route 83:** Connects VA Hospital, City Hall, Menlo Park Caltrain, and Hillview Middle School
- **Route 84:** Accesses Encinal School, Hillview Middle School, and Menlo Park Caltrain
- **Route 85:** Travels from Tripp/Woodside to Portola Valley, Ormondale Elementary, and Corte Madera School
- **Route 86:** Connects to Menlo Atherton High School, Menlo Park Caltrain, Sharon Park, and Portola Valley
- **Route 87:** Serves Woodside High School, Ormondale Elementary School, and Portola Valley
- **Route 88:** Access to Encinal Elementary School, Menlo Park Library and City Hall, VA Hospital, and Flood Park
- **Route 89:** Travels to Encinal Elementary School via Santa Monica/San Andreas

TABLE 13 EXISTING TRANSIT SERVICE

Service Provider	Peak Headways	Service Hours
Caltrain	32 minutes (average)	5:04am to 12:56am (weekdays) 7:34am to 1:02am (weekends)
SamTrans 80	No peak service	1:40pm to 3:30pm (weekdays)
SamTrans 82	1 run (morning) 60 minutes (afternoon)	7:47am to 3:47pm (weekdays)
SamTrans 83	5 minutes (morning)	7:38am to 3:52pm (weekdays)
SamTrans 84	1 run (morning)	7:52am to 3:45pm (weekdays)
SamTrans 85	1 run (morning)	7:09am to 3:45pm (weekdays)
SamTrans 86	40 minutes	7:04am to 4:05pm (weekdays)
SamTrans 87	55 minutes	7:10am to 4:01pm (weekdays)
SamTrans 88	1 run (morning) 2 runs (afternoon)	7:27am to 3:41pm (weekdays)
SamTrans 89	1 run (afternoon)	1:33pm to 3:39pm (weekdays)
SamTrans 270	60 minutes	6:30am to 7:12pm (weekdays) 7:30am to 7:08pm (weekends)
SamTrans 276	60 minutes	6:00am to 6:46pm (weekdays)
SamTrans 281	15 minutes	6:00am to 10:32pm (weekdays) 8:03am to 7:58pm (weekends)
SamTrans 286	65 - 74 minutes	7:16am to 5:59pm (weekdays only)
SamTrans 296	15 minutes	5:18am to 11:00pm (weekdays) 8:45am to 7:59pm (weekends)
SamTrans 297	60 minutes	12:43pm to 12:22am (weekdays) 12:43pm to 12:22am (weekends)
SamTrans 397	60 minutes	12:48pm to 6:22pm (weekdays only)
SamTrans ECR	11 – 13 minutes	3:56am to 2:09am (weekdays) 4:47am to 2:21am (weekends)
AC Transit DB	16 – 34 minutes	5:22am to 8:51pm (weekdays)
AC Transit DB1* Limited stop	15 – 26 minutes	5:26am to 7:39pm (weekdays)

In addition to SamTrans buses, AC Transit has two Transbay bus routes that serve Menlo Park from Union City (Route DB and DB1), which have mirror routes, with different operational hours. Both Route DB and DB1 serve the VA Administration Medical Center and continue on to Union City BART and Stanford University, depending on the direction.

In addition to regional transportation agency services, the City provides shuttle service, catering to commuters and seniors (see Table 14). The city first initiated shuttle service in 1989 and has expanded to

TABLE 14 SHUTTLE SERVICE DETAILS

Shuttle	Peak Headways	Service Hours
Caltrain Shuttle	60 mins	6:39am to 6:28pm (weekdays)
Midday Shuttle	No peak hour service	9:30am to 3:30pm (weekdays)
Shoppers Shuttle	No peak hour service	9:30am to 1:00pm (Tuesday/Wednesday/Saturday)

provide three types of services, funded by San Mateo City/County Association of Governments, Bay Area Air Quality Management District, Peninsula Joint Powers Board, Metropolitan Transportation Commission, and city funds.

- **Caltrain Shuttle** serves the Menlo Park Caltrain station and travels to businesses in Menlo Park along Marsh Road and Willow Road.
- **Midday Shuttle** serves seniors and stops at many destinations including Menlo Park and Palo Alto Caltrain stations, Downtown Menlo Park and Downtown Palo Alto, Menlo Medical Clinic, Menlo Park Library, Menlo Park Senior Center, Safeway, and Stanford Shopping Center.
- **Shoppers Shuttle** is specifically designed to accommodate seniors, operating three days per week to Sharon Heights Safeway, downtown Menlo Park, and Stanford Shopping Center. The bus can accommodate two wheelchairs and multiple walkers, with operator assistance available for passengers with packages.
- **Marguerite Shuttle** is Stanford University's free public shuttle service, which travels around campus and connects to nearby transit including Caltrain, VTA, SamTrans, and the Dumbarton Express, as well as shopping, dining, and entertainment locations, including Stanford Shopping Center, Downtown Palo Alto, California Avenue, Town & Country Village, the Bookstore, Visitor Center, and Bohannon Drive.

Lastly, there are several private shuttles that operate in Menlo Park to various employment centers. Facebook operates a private shuttle for employees from Menlo Park Caltrain Station with hourly service to directly to its campus. There are also private shuttles operating for Menlo School, Menlo Business Park, and the VA Hospital.

PLANNED AND PROPOSED TRANSIT SERVICE

The most significant planned high-capacity transit service in Menlo Park is the proposed Dumbarton Rail service, which would connect Menlo Park to Union City across San Francisco Bay. The Dumbarton Rail service would operate on a currently partially abandoned rail corridor and would require reconstructing the

Dumbarton Rail Bridge to extend commuter service across the Bay, rather than around the Bay. The service would connect to Caltrain, Altamont Commuter Express, Amtrak Capitol Corridor, and BART to increase regional transportation system connectivity. There would be a station in Menlo Park. Should funding fall short to complete this project, alternatives discussed include a bus rapid transit service serving the same corridor. In addition, an alternative option would be to utilize the railway between Menlo Park and Redwood City to promote local transit. Figure 9 shows the proposed transit improvements with the existing network in Menlo Park.

In addition to Dumbarton Rail, electrification of Caltrain between San Jose and San Francisco would improve travel times in the Caltrain corridor, and would provide the infrastructure needed for High Speed Rail through the corridor. Electrified rail service would permit faster speeds, shorter travel times, reduced headways, and overall connectivity with regional transit systems. An increase in the number of trains would also result in increased number of trains stopping at Menlo Park. Caltrain certified the Peninsula Corridor Electrification Project Final Environmental Impact Report (FEIR) in January, 2015. With electrification and subsequently High Speed Rail, the Peninsula would be connected to Southern California, the Central Valley, and San Francisco. The City of Menlo Park has formed a Rail Council Subcommittee to advocate for ways to reduce the negative impacts and enhance the benefits of High Speed Rail in Menlo Park. The Subcommittee has also established principles that are based on the City Council's position on High Speed Rail. The High Speed Rail Authority is still reviewing passing track options in the proposed blended system with Caltrain. One of these options includes a third track through Menlo Park, which is currently not desired by the community.

Another potential key transit improvement involves Bus Rapid Transit (BRT). SamTrans was awarded a grant by the California Department of Transportation in 2012 to conduct a feasibility study of the potential for BRT service along the El Camino Real corridor between Daly City and Palo Alto. This corridor carries the highest ridership in the SamTrans bus system, with over 13,000 daily weekday boardings. SamTrans is currently completing a BRT Phasing Plan Study that identifies a plan for the phased implementation of BRT in the El Camino Real corridor over an extended time period. In the early phases of the project, a limited-stop service with current vehicles is proposed. A longer-term scenario involves capital-intensive transit priority through new vehicles, facilities, and signal-priority. A bus-only lane is not currently proposed by SamTrans in Menlo Park as part of this study.

While these long-term investments are among the high-capacity, high-visibility transit service improvements discussed for the region, local scale improvements are also planned, including public and private shuttle improvements. The El Camino Real/Downtown Specific Plan recommends improved shuttle headways with an increase of service hours to include morning and evening hours, and weekends. The Specific Plan also calls for increased service to the eastern and western parts of the city, and to downtown Menlo Park.

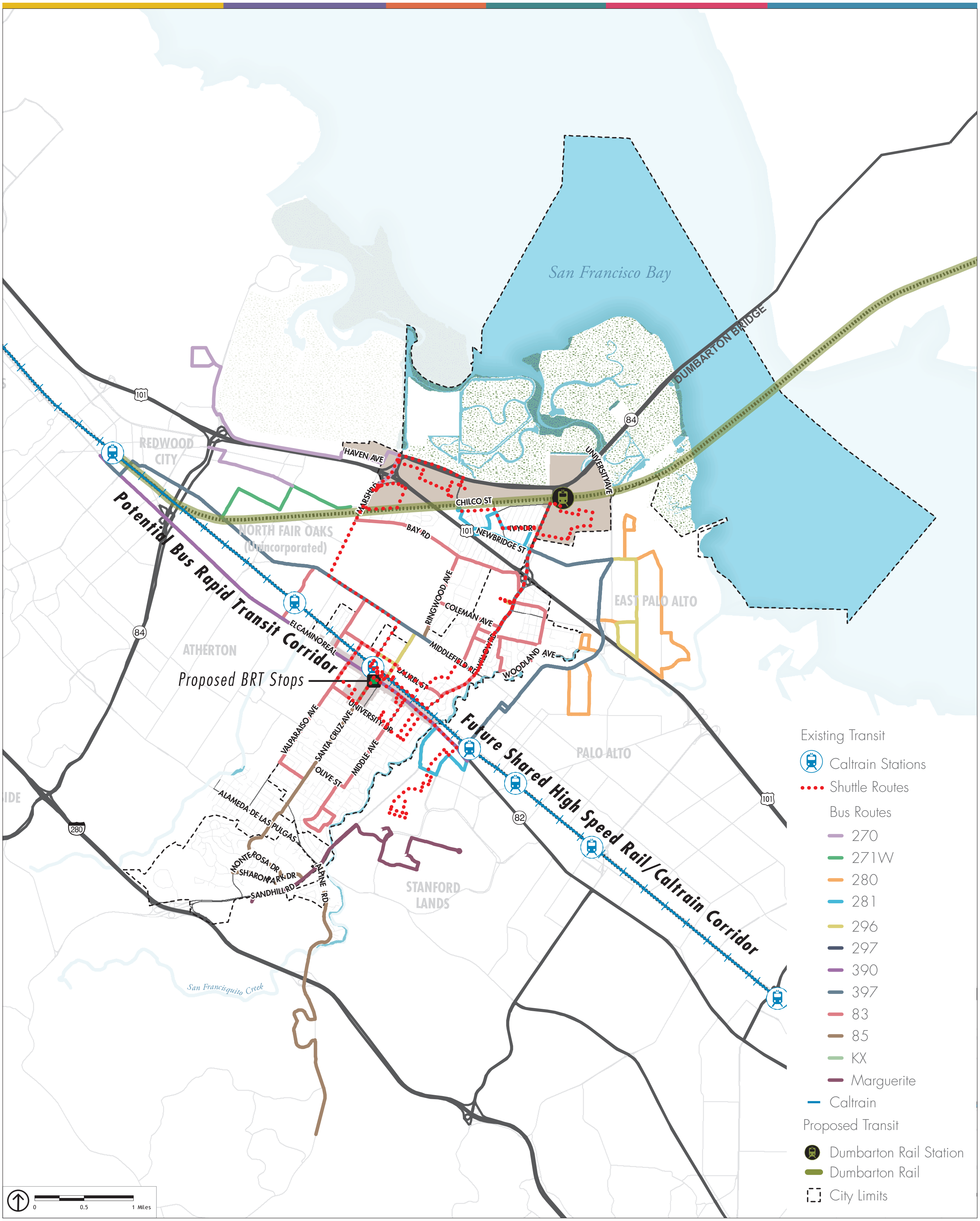

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FIGURE 9: EXISTING AND PROPOSED TRANSIT INFRASTRUCTURE

Furthermore, opportunities to improve connectivity from Redwood City Caltrain to Belle Haven and the M-2 Area are being explored as part of the General Plan community outreach process.

M-2 AREA

The transit network in the M-2 Area is very limited. AC Transit's DB and DB1 Dumbarton Express routes cross the Dumbarton Bridge and stop on the edge of the M-2 Area on Willow Road at Hamilton Avenue and Ivy Drive. The major public bus routes serving the M-2 Area are SamTrans Route 270, Route 276, and a few City-provided and private shuttle routes. Route 270 loops through the western end of the M-2 Area using Marsh Road and Haven Avenue and serves a connection to the Redwood City Transit Center and Caltrain. Route 276 terminates at the western edge of the M-2 Area at Marsh Road and also serves the Redwood City Caltrain Station. The Marsh Road Shuttle and Willow Road Shuttle, operated by the City of Menlo Park, each connect several offices in the M-2 Area with the Menlo Park Caltrain Station via Marsh Road and Willow Road, respectively. The City of Menlo Park Midday Shuttle serves the Menlo Park Senior Center located just outside of the M-2 Area south of the Dumbarton rail corridor and travels to several retail areas in downtown Menlo Park. SamTrans Route 281 does not serve the M-2 Area specifically, but terminates at the Onetta Harris Community Center located just south of the Dumbarton rail corridor. The route connects to Downtown Palo Alto and Stanford Shopping Center. Private Facebook shuttles travel to and from the Facebook Campus on Willow Road and the Bayfront Expressway to the Menlo Park Caltrain Station using Willow Road. Other private shuttle services, such as the Menlo Business Park shuttle, also provide service to the M-2 Area; it is publically accessible. The existing, limited transit service does not make short trips within the M-2 Area and to adjacent neighborhoods attractive or feasible.

The lack of adequate transit is an issue for this area, and more residential and commercial development is being planned or already under construction. The western area of M-2, which already has new higher density residential construction, only has transit access via SamTrans to the Redwood City Caltrain Station. No transit access exists to retail areas in Downtown Menlo Park and the City shuttles' operating times and frequency are limited. The shuttle routes primarily serve work trips, with only the Midday Shuttle servicing the Menlo Park retail centers. Housing in this area and Belle Haven also creates a need for transit that serves both work and non-work trips. Limited-stop service in both SamTrans' El Camino Real corridor and along potential privately operated shuttle routes could also boost transit ridership.

Bicycle facilities are also limited in the M-2 Area, with only marked bike lanes on Willow Road, University Avenue, and Chilco Street. The San Francisco Bay Trail is also located in the M-2 Area. The only bicycle and pedestrian connection south towards Caltrain and the retail center of Menlo Park is via a bridge crossing US 101 at Ringwood Avenue between the Belle Haven and Flood Park neighborhoods. The Marsh Road, Willow Road, and University Avenue interchanges contain no bicycle facilities, and the lack of connections can discourage future residents of this area from riding their bicycle for short trips to either Caltrain or downtown Menlo Park. There is also a lack of connectivity between the M-2 Area communities and the San Francisco Bay Trail. At the time of this report, Facebook is constructing an undercrossing for bicycle and pedestrians at the Bayfront Expressway that will create better connectivity in this area. Safe connections should be in place for future residents to make recreational trips to the Trail and neighboring Parks.

Pedestrian facilities are also lacking, with many streets having partial or no sidewalks. Some notable street segments with sidewalks on both sides of the street are the Marsh Road and Willow Road overpasses at US 101. The Dumbarton rail corridor and US 101, on the other hand, limit pedestrian access and isolate M-2 and Belle Haven areas from the rest of the community. A robust and complete pedestrian network is needed in the M-2 Area to promote walking where residents live and employees work. Better connections are also needed that provide safe and convenient access to the rest of Menlo Park and adjacent cities.

SUMMARY OF KEY FINDINGS

- **Traffic.** Menlo Park faces regional traffic impacts due primarily to the cluster of technology firms on the Peninsula, the volume of residents traveling through the city to San Jose and San Francisco, and commuters passing through the city heading to employers in nearby Redwood City, Palo Alto, Mountain View, and other mid-peninsula cities. With many critical regional transportation routes running through Menlo Park, planning efforts must be made in collaboration with Atherton, Redwood City, unincorporated San Mateo County, Palo Alto, East Palo Alto, Caltrans, and transit operators to better develop the regional transportation network. A Transportation Management Association (TMA) to manage travel options in the city could focus on the M-2 Area and the emerging housing and office space there, and additionally could provide resources and information on choices to the Belle Haven community. The goal of the TMA would be to reduce vehicle trips to the existing and planned developments in the area, including sites on Willow Road, Hamilton Avenue, and Haven Avenue.
- **Transit.** Menlo Park lacks frequent transit service, aside from Caltrain, that connects commuters, visitors, and residents to destinations throughout the day. The frequency of service in off-peak hours is limited, as well as the hours of service. Menlo Park's ability to connect regionally is expected to increase with the planned and proposed transit services. Caltrain electrification would improve frequency and reliability for connections to San Jose, San Francisco, and points along the rail line. In addition, the Dumbarton Rail Corridor would allow future connections to Redwood City Caltrain Station and across the Bay in the future. The proposed transit service improvements will benefit the city by enhancing regional connections and increasing the amount of reliable, fast service through bus rapid transit.
- **Pedestrian and Bicycle Connectivity Gaps.** Basic infrastructure for the bicycle and pedestrian networks in many areas of the city is in place. However, gaps at several critical locations discourage

many from walking or biking for transportation purposes. For example, many streets lack sidewalks on one or both sides of the street; the bicycle network is spotty, with discontinuous facilities and physical barriers that create separation between neighborhoods. These obstacles include US 101, railroad tracks, Bayfront Expressway, and El Camino Real. A number of bicycle and pedestrian infrastructure improvements are identified in both the Menlo Park Comprehensive Bicycle Plan (2005) and the Sidewalk Master Plan (2009). Sidewalks on Santa Cruz Avenue south of the Downtown core are incomplete south of Johnson Street, where neither valley gutter nor sidewalks exist. Santa Cruz Avenue is a major north-south walking route used by children walking to school and has several school crosswalks along it. However, in some cases the school crossings do not connect to any pedestrian infrastructure. The El Camino Real/Downtown Specific Plan does not address this gap, unfortunately. Also, the interchange of US 101 at Willow Road is slated for Caltrans improvements with construction occurring in 2016-2019. The improvements at this location will result in improved bicycle and pedestrian connections, as well as signal and lane configuration upgrades at the interchange.

- **Performance Metrics.** The City's performance metrics used to evaluate the transportation network under the current General Plan focus on vehicular travel –for example, automobile delay and vehicular travel speeds. Under the City's Complete Streets Policy, there is a need to measure and quantify the overall performance of the network to better include all users and modes of travel. Such analysis should allow for the evaluation of trade-offs between improvements for different travel modes–for example, if a roadway is widened to include additional travel or turn lanes, how does this affect pedestrian and bicycle safety? Additionally, refined metrics might include an assessment of user-comfort, safety, amenities (e.g., street lighting, type of crosswalk, bicycle facility, or transit shelter), the surrounding environment (e.g., whether a person feels safe walking or riding a bicycle), and/or the extent of the facilities (e.g., citywide bikeway length, sidewalk coverage, or total bus ridership). The metrics can also be even broader in scope, taking into account vehicle miles traveled per capita, greenhouse gas emissions, economic impacts, tree canopy coverage, and socio-economic benefits of Complete Streets.

- **Parking Requirements.** Existing parking requirements exceed minimums recommended by industry standards for many land uses. Higher parking minimums can increase the cost of development and reduce the footprint for productive space such as offices, retail, restaurants, and open space. In addition, excessive parking creates an environment where driving is more attractive, and can result in additional vehicular demand and traffic congestion, thus detracting from the pedestrian environment.

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ECONOMICS
EXISTING CONDITIONS REPORT

PUBLIC REVIEW DRAFT

JANUARY 2015

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Public Review Draft Existing Economic Conditions Report

OVERVIEW

This Report examines current economic conditions in Menlo Park in order to inform the General Plan and M-2 Zoning Update (also referred to as ConnectMenlo). Key findings are summarized first, followed by more detailed analysis of demographic, employment, economic, real estate, and fiscal trends for the City of Menlo Park that are compared to the region. The analysis of economic conditions provides background information to inform future consideration of community benefits that could be provided by future development in the M-2 Area. The potential community benefits include land uses desired by the community, improvements to support various transportation modes such as bicycles and shuttles, open space and park improvements, community-oriented programs, or other benefits. Alternative M-2 Area land use programs will be studied and tested for feasibility in order to quantify the amount of community benefits that can be obtained. Then the City will consider the specific public improvements it will seek from new M-2 Area development.

Potential General Plan Update land use changes will be focused on the M-2 Area, and potentially the Belle Haven neighborhood for local-serving retail uses. Because the M-2 Area consists primarily of commercial and industrial uses, much of the following discussion focuses on employment and commercial land use conditions and trends. Since the Belle Haven neighborhood is primarily residential, a portion of the following discussion focuses on demographic trends in Belle Haven and how they affect the potential for new retail. One land use trend that may affect both areas is the shift in companies' and workers' desire for environments that offer a mix of employment, residential, and retail and entertainment uses, also referred to as "live-work-play" environments. This is particularly relevant in the M-2 Area because it is home to campus office environments, which provide on-site food and other services.

DEMOGRAPHIC TRENDS

This section details demographic and housing trends for the City of Menlo Park. Demographic data were compiled from several sources. The American Community Survey (ACS) publishes estimates of demographic conditions over 1-year, 3-year, and 5-year periods, depending on the type of data and population in the geographical area being sampled.[1] While these data cannot represent conditions at a specific point in time, they are updated on an annual basis and do offer a valuable means to compare characteristics across neighborhoods. Nielsen Market Data, a private provider of demographic analytic services, was also used to provide data on certain demographic conditions. Resident employee profile data was provided by the California Employment Development Department. To the extent that data were available, information is presented for the City of Menlo Park benchmarked against the combination of Santa Clara and San Mateo counties, as representative of most of the Silicon Valley area and referred to throughout this analysis as the "Combined Counties," and the greater Bay Area.[2]

POPULATION AND HOUSEHOLDS

The City of Menlo Park is home to 32,896 residents with an average of 2.6 persons per household, according to current California Department of Finance estimates. Between 2000 and 2014, Menlo Park saw a population increase of 7 percent, compared to a 9 percent increase in the Combined Counties and the larger Bay Area. Unlike growth in the region, Menlo Park's growth is marked by an increase in household size rather than an increase in the total number of households. Between 2000 and 2014, the average household size increased from 2.4 to 2.6 persons per household (Figure 1), or nearly 8 percent. Household growth in the Combined Counties and the Bay Area only grew by 2 percent during the same time period. However, average household size in Menlo Park (2.6) is still smaller than the Combined Counties and the Bay Area (2.9 and 2.8, respectively).[3]

Counter to these citywide trends, Belle Haven experienced a decrease in population in recent years, from 6,095 residents in 2000 to 5,605 residents during the 2008-2012 ACS survey period. During the same time period, the number of households in Belle Haven (1,336 in 2008-2012) remained relatively constant. These changes are reflected in a smaller average household size in Belle Haven during the 2008-2012 ACS survey period (3.2 persons per household) compared to 2000 (4.6 persons per household), although the average household size in Belle Haven remains above the citywide average.[4]

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[1] The ACS provides data for small geographies, including the Census Tract that encompasses Belle Haven, based on surveys conducted over a 5-year period. While these data are not directly comparable to data collected over a three-year period for the City and other larger geographic areas, it does provide a way to approximate differences between various geographic areas.

[2] The Bay Area as defined here consists of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.

[3] California Department of Finance, 2014. *Census 2000*.

[4] American Community Survey (ACS), 2008-2012. *Census 2000*.

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FIGURE 1 AVERAGE HOUSEHOLD SIZE, 2000 & 2014

Note: (a) Includes Santa Clara and San Mateo Counties.
Sources: US Census, 2000; California Department of Finance, 2014; BAE, 2014.

Between 2000 and 2010, the number of single person households and households with two or more persons without children under 18 years of age decreased in Menlo Park, as shown in Table 1. At the same time, the number of households with children increased, which reflects the increase in average household size. The Combined Counties and Bay Area also experienced an increase in the number of households with children under 18, but, counter to trends in Menlo Park, also saw an increase in the number of single person households.[5] The growth in households with children in Menlo Park suggests increased demand for school enrollment and family- and youth-oriented retail and services.

AGE

Between 2000 and 2014, the median age of Menlo Park residents increased from 37.4 to 39.0, consistent with national and regional trends as the Baby Boomer generation ages. This resulted in a slightly higher median age in Menlo Park than in the Combined Counties, where the median was 38.0 in 2014.[6] The median age among Belle Haven residents increased from 25.4 in 2000 to 28.7 during the 2008-2012 ACS survey period, remaining considerably below the citywide median (and without Belle Haven, the median age of the balance of Menlo Park's population would be above 40 years).[7]

[5] Census, 2000 & 2010.

[6] Census, 2000; Nielsen, 2014.

[7] Census, 2000; ACS, 2008-2012.

TABLE 1 HOUSEHOLD COMPOSITION, 2000-2010

	Menlo Park		Palo Alto		Mountain View		Combined Counties		Bay Area[a]	
Household Type	2000	2010	2000	2010	2000	2010	2000	2010	2000	2010
Single Person	3,979	3,672	8,209	7,982	11,133	10,961	183,735	194,725	637,575	680,925
2+ Persons w/o Child <18										
Married Couple	3,144	2,931	6,568	6,832	7,117	7,141	225,726	222,977	597,346	639,283
Other Family	677	550	1,164	1,060	1,938	1,716	64,880	61,693	149,931	183,530
Non-Family	1,271	1,082	2,361	1,995	4,111	3,408	66,615	62,588	225,000	234,135
2+ Persons w/Child(ren) <18										
Married Couple	2,595	3,232	5,660	7,143	5,373	6,665	219,791	242,773	618,030	623,824
Other Family	704	860	1,201	1,442	1,481	1,993	56,413	74,988	229,163	239,335
Non-Family	17	20	53	39	89	73	2,806	2,297	8,974	6,991
Total	**12,387**	**12,347**	**25,216**	**26,493**	**31,242**	**31,957**	**819,966**	**862,041**	**2,466,019**	**2,608,023**

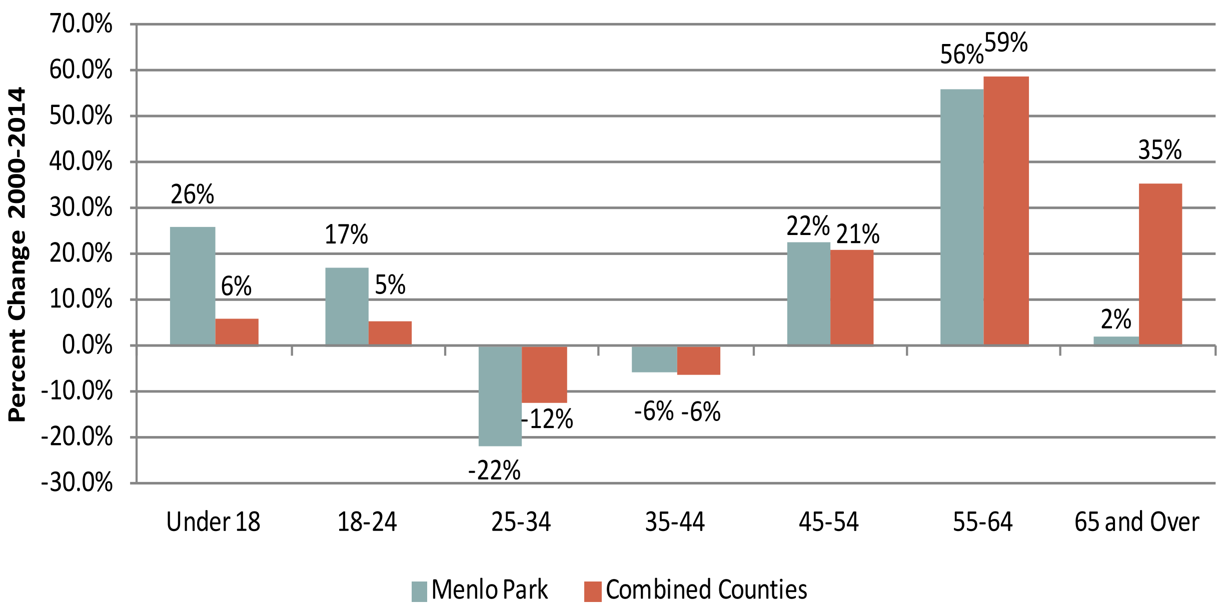
	Menlo Park		Palo Alto		Mountain View		Combined Counties		Bay Area[a]	
Household Type	2000	2010	2000	2010	2000	2010	2000	2010	2000	2010
Single Person	32%	30%	33%	30%	36%	34%	22%	23%	26%	26%
2+ Persons w/o Child <18										
Married Couple	25%	24%	26%	26%	23%	22%	28%	26%	24%	25%
Other Family	5%	4%	5%	4%	6%	5%	8%	7%	6%	7%
Non-Family	10%	9%	9%	8%	13%	11%	8%	7%	9%	9%
2+ Persons w/Child(ren) <18										
Married Couple	21%	26%	22%	27%	17%	21%	27%	28%	25%	24%
Other Family	6%	7%	5%	5%	5%	6%	7%	9%	9%	9%
Non-Family	0.1%	0.2%	0.2%	0.1%	0.3%	0.2%	0.3%	0.3%	0.4%	0.3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

a. The nine-county Bay Area includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties.
Sources: US Census 2000, 2010; BAE, 2014.

Between 2000 and 2014, Menlo Park saw a larger increase in the proportion of residents under the age of 18 and a smaller increase in the proportion of residents over the age of 65 compared to the region. While the entire population grew by 10 percent from 2000 to 2014, the under 18 population grew by nearly 26 percent, and the population over 65 grew by just 2 percent. Compared to the Combined Counties, Menlo

Park has seen a much larger increase in the share of population under 18, and a much slower increase in the share of population over 65 (Figure 2).[8] The increase in Menlo Park families with children is driving this change, along with a decline in seniors continuing to live in Menlo Park as they age.

FIGURE 2 CHANGE IN AGE DISTRIBUTION, 2000 & 2014



Sources: US Census, 2000; Nielsen Marketplace, 2014; BAE, 2014.

Both Menlo Park and the Combined Counties saw a decrease in the population between ages 25 and 34.[9] This could be due to a variety of factors, including children raised in Menlo Park leaving for other locations, the preference for many in this age range to live in more urban environments, or the inability to afford to live in Menlo Park, especially for younger persons early in their careers and young families.

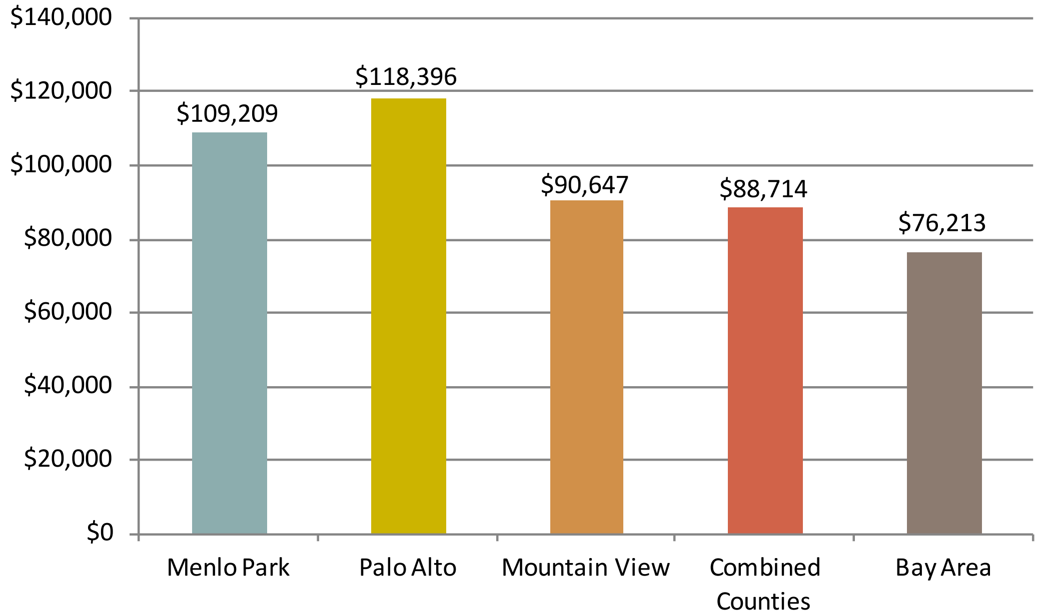
INCOME AND EDUCATIONAL ATTAINMENT

Menlo Park residents have significantly higher median incomes when compared to the larger region, as shown in Figure 3. As of 2012, the median household income in Menlo Park was approximately $109,200, which was 23 percent higher than the median in the Combined Counties and 43 percent higher than the median in the Bay Area that year. Just over 26 percent of Menlo Park households have annual incomes of

[8] Census, 2000; Nielsen, 2014.
[9] Census, 2000; Nielsen, 2014.

$200,000 or more, a much greater proportion than the Combined Counties (15 percent) and the Bay Area (12 percent).[10]

FIGURE 3 MEDIAN INCOME, 2012



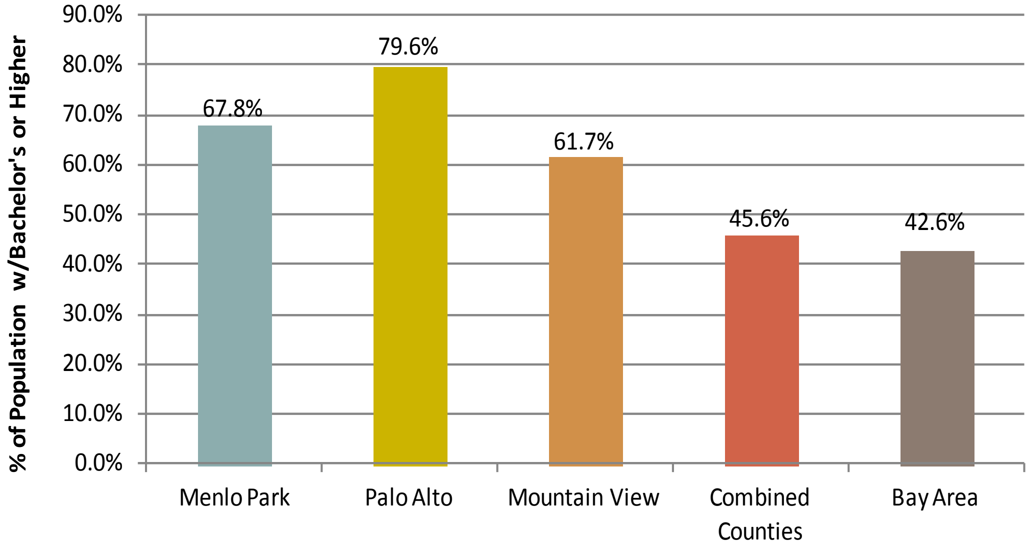
Note: Estimate from American Community Survey (ACS) 2010-2012 3-year data, based on a survey conducted continuously over the 3-year period. All incomes adjusted to 2012 dollars.
Sources: ACS, 2010-2012; BAE, 2014.

While incomes citywide tend to be high relative to the region, incomes in the Belle Haven neighborhood are lower compared to the region overall. According to ACS data collected between 2008 and 2012, the median income in Belle Haven was $51,250, less than half of the citywide median.

Residents of Menlo Park have high levels of educational attainment. According to ACS data collected between 2010 and 2012, nearly 68 percent of residents age 25 or older had a bachelor's degree or higher, compared to 46 percent of residents age 25 or older in the Combined Counties and 43 percent of Bay Area residents age 25 or older (Figure 4). Palo Alto and Mountain View also have a high percentage of residents with bachelor's degrees or higher, indicating a wealth of well-educated persons in the area.

[10] ACS, 2010-2012.

FIGURE 4 POPULATION WITH A BACHELOR'S DEGREE OR HIGHER, 2012



Note: Based on population age 25 or greater. Estimate from American Community Survey (ACS) 2010-2012 3-year data, based on a survey conducted continuously over the 3-year period.
Sources: ACS, 2010-2012; BAE, 2014.

RESIDENT EMPLOYMENT PROFILE

This section provides information on occupations and industries of employment for Menlo Park residents. Occupation data relate to the type of tasks workers perform, whereas industry data relate to the economic sector in which a worker is employed. Data on the industries represented among jobs located in Menlo Park, which may or may not be held by Menlo Park residents, are presented separately in the Economic Development Overview section of this chapter.

OCCUPATION

The majority of Menlo Park residents work in the management, business, science, and arts occupations, as shown in Table 2. According to 2008-2012 ACS data, just over 65 percent of residents were employed in these occupations. This is significantly higher than the Combined Counties (48 percent) and the Bay Area (45 percent). Menlo Park also had fewer residents employed in service occupations and sales and office occupations when compared to the region.

TABLE 2 EMPLOYED RESIDENTS BY OCCUPATION, 2012[a]

	Menlo Park		Combined Counties		Bay Area[b]	
Occupation	Number	% Total	Number	% Total	Number	% Total
Management, Business, Science, Arts	10,276	65.4%	573,411	47.9%	1,538,486	45.2%
Service	1,803	11.5%	186,396	15.6%	564,941	16.6%
Sales & Office	2,519	16.0%	260,348	21.8%	775,027	22.8%
Natural Resources, Construction, Maintenance	472	3.0%	79,329	6.6%	238,540	7.0%
Production, Transportation, Material Moving	635	4.0%	96,491	8.1%	276,784	8.1%
Military Specific Occupations	0	0.0%	237	0.0%	6,421	0.2%
Total	**15,705**	**100.0%**	**1,196,212**	**100.0%**	**3,400,199**	**100.0%**

a. Estimate from American Community Survey (ACS) 2008-2012 5-year data, based on a survey conducted continuously over the 5-year period.
b. The nine-county Bay Area includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.
Sources: ACS, 2008-2012; BAE, 2014.

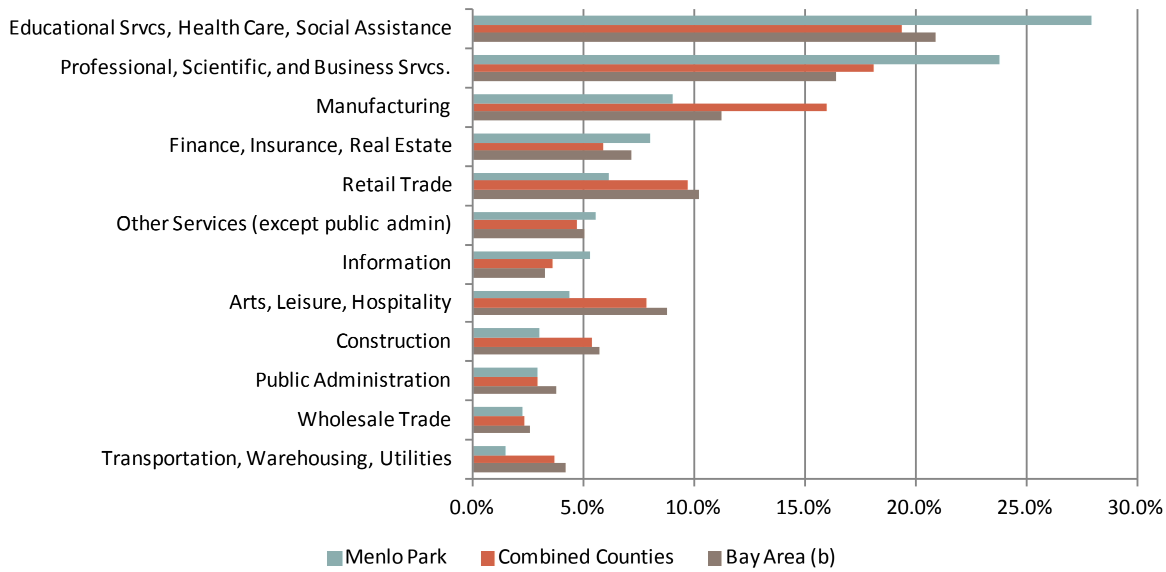
INDUSTRY

The educational services, healthcare, and social assistance industry is the most common industry of employment among Menlo Park residents, according to ACS data collected between 2008 and 2012. Twenty-eight percent of employed residents held jobs in this industry, while the Combined Counties and Bay Area only had 19 and 21 percent of their respective residents employed in the same industry. A significant portion of Menlo Park residents were employed in the professional, scientific, and business services industry, which accounted for 24 percent of jobs among Menlo Park residents, but only 18 percent of jobs among residents in the Combined Counties and 16 percent of jobs among Bay Area residents (Figure 5). Both the educational services, healthcare, and social assistance industry, and the professional, scientific, and business services industry are large and growing industries in the region, suggesting stable employment for many Menlo Park residents. Other employment industries accounted for less than half of jobs held by Menlo Park residents.

The educational services, healthcare, and social assistance industry and the professional, scientific, and business services industry accounted for a smaller share (21 percent and 20 percent, respectively) of jobs held by Belle Haven residents than among residents of the city as a whole, but were nonetheless the largest employment industries among Belle Haven residents. Compared to the city as a whole, a larger share of Belle Haven residents held jobs in the service industry (16 percent of employed residents) and leisure and hospitality industry (10 percent of employed residents).[11]

[11] ACS, 2008-2012.

FIGURE 5 EMPLOYED RESIDENTS BY INDUSTRY, Q3 2012[a]



a. Estimate from American Community Survey (ACS) 2008-2012 five-year data, based on on a survey conducted continuously over the 5-year period.
b. The nine-county Bay Area includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.
Source: ACS, 2008-2012; BAE, 2014.

POPULATION AND HOUSEHOLD PROJECTIONS

The Association of Bay Area Governments (ABAG) provides population, household, and employment projections for each city and county in the Bay Area. These projections are based on a regional model that estimates overall population, household, and employment growth in the region. This growth is then allocated to various jurisdictions based on available land for development and policy objectives.

Menlo Park is expected to grow at a relatively moderate pace through 2040, according to ABAG estimates. As shown in Table 3, the population of Menlo Park is projected to increase by 19 percent between 2010 and 2040, while the number of households in the city is projected to increase by 18 percent. Projections show a faster rate of population and household growth in San Mateo County (26 percent and 22 percent, respectively), and the Bay Area (30 percent and 27 percent, respectively). Although projections estimate that growth in Menlo Park will be somewhat limited, the city's robust employment opportunities and position within Silicon Valley suggest that the city has the potential to capture a larger share of regional residential demand than projected.

TABLE 3 POPULATION AND HOUSEHOLD PROJECTIONS, 2010-2040

	2010	2015	2020	2025	2030	2035	2040	% Change 2010-2040
Population								
Menlo Park	32,026	32,900	33,800	34,700	35,800	36,900	38,100	19%
San Mateo County	718,451	745,400	775,100	805,600	836,100	869,300	904,400	26%
Bay Area[a]	7,150,739	7,461,400	7,786,800	8,134,000	8,496,800	8,889,000	9,299,100	30%
Households								
Menlo Park	12,347	12,700	13,070	13,420	13,790	14,150	14,520	18%
San Mateo County	257,837	267,150	277,200	286,790	296,280	305,390	315,100	22%
Bay Area[a]	2,608,023	2,720,410	2,837,680	2,952,910	3,072,920	3,188,330	3,308,090	27%

a. The nine-county Bay Area includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.
Source: ABAG, 2013; BAE, 2014.

ECONOMIC DEVELOPMENT OVERVIEW

Economic development is essential to the city's future, and involves the attraction, retention, and growth of companies in Menlo Park and the jobs they create. This requires providing companies with the facilities they need. All residents in Menlo Park have a stake in successful economic development because the fiscal revenues that it creates are key to the long-term sustainability of the City's budget. Economic development also creates job opportunities for local residents, which can reduce congestion impacts from cross-commuting. Additionally, economic development supports expanded choices in housing, retail, and services that enhance the city and can fund community benefits and improvements via new projects.

This section of the report presents information on employment and commute flow for workers in Menlo Park. Employment data was supplied by the Quarterly Census of Employment and Wages (QCEW), as provided by the California Employment Development Department (EDD). Commute flow data was provided by the American Community Survey's (ACS) Census Transportation Planning Package (CTPP) that contains statistical survey data collected between 2006 and 2010.

EMPLOYMENT

This section provides information on jobs in Menlo Park. While some jobs located in Menlo Park are held by Menlo Park residents, a large share of jobs in Menlo Park are held by residents of other communities. Likewise, a large share of Menlo Park residents are employed in jobs located outside of the City of Menlo Park (commute data are discussed in greater detail below). As a result, the data presented in this section are distinct from the data presented in the section above on Menlo Park residents' occupation and industry of employment.

The M-2 Area is the key to the city's economy; in 2012 it contained 48 percent of the city's jobs.[12] It is also home to clusters in three rapidly growing high-tech sectors:

- Information/Social Media (such as Facebook and related companies)
- Life Sciences (including Pacific Biosciences and CS Bio)
- Medical Devices (such as Evalve and Abbot Vascular)

The diverse economy in the M-2 Area includes traditional manufacturing, firms that provide services to the high-tech industry (including the Orrick, Herrington & Sutcliffe law firm), and traditional industrial users who offer jobs to medium- and lower-skill workers (like Gachina Landscape Management and Cupertino Plumbing Supply).

The largest employers in Menlo Park span a number of industries, including high tech, government, biotechnology, financial services, and retail. The ten largest employers in Menlo Park represent nearly one-third of wage and salary employment in Menlo Park. The largest employer by far is Facebook, located in the M-2 Area, followed by SRI International, which is located outside of the M-2 Area near the Caltrain station. The largest employers in Menlo Park are listed in Table 4.

TABLE 4 TOP EMPLOYERS IN MENLO PARK, 2012-2013

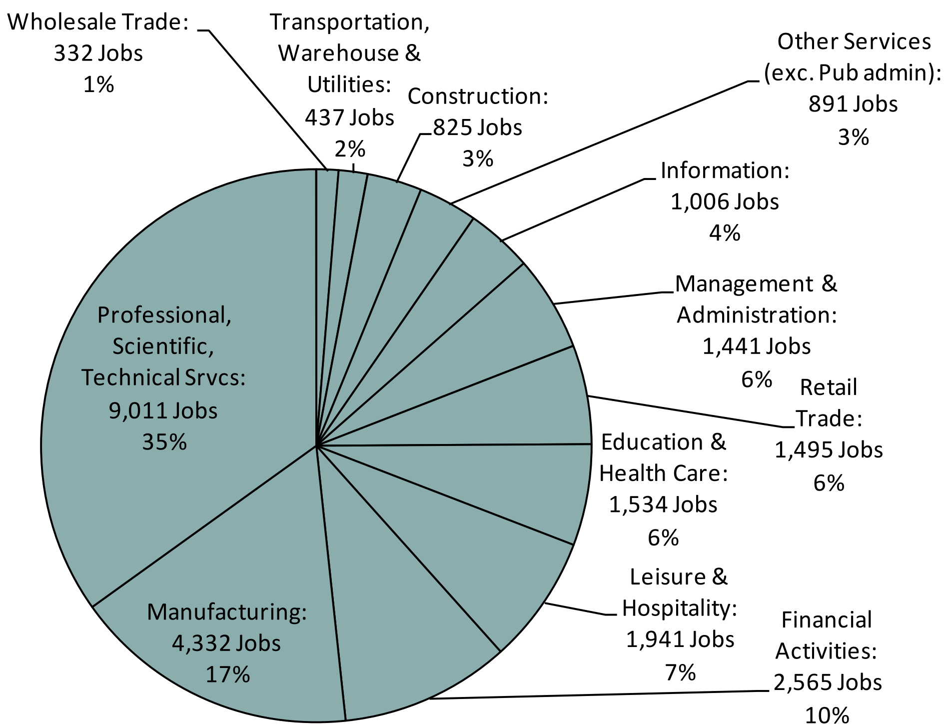
Firm Name	Number of Employees
Facebook, Inc.	2,865
SRI International	1,421
Menlo Park VA Medical Center	837
TE Corporation	747
SHR Hotel, L.L.C.	458
US Geological Survey	454
E*Trade Financial Corporation	370
Evale Inc	328
Pacific Biosciences of California	300
Safeway Stores, Inc.	264

Note: All employment estimates from City of Menlo Park Business License Database, annual data from 2013, except for Federal employment, which is 3Q 2012 from BLS/EDD QCEW program.
Sources: City of Menlo Park; U.S. Department of Labor, Bureau of Labor Statistics QCEW Program; California Employment Development Department, 2014; BAE, 2014.

The professional, scientific, and technical services industry is the largest employment industry in Menlo Park, accounting for 35 percent of jobs located in the City (see Figure 6). The second largest industry that employs workers in Menlo Park is manufacturing, followed by financial activities, leisure and hospitality, and education and health care. These data demonstrate the difference between the predominant industries of employment for Menlo Park residents (as shown in Figure 5) and the predominant industries among jobs located in Menlo Park (as shown in Figure 6).

[12] US Department of Labor, Bureau of Labor Statistics QCEW Program, 2012.

FIGURE 6 EMPLOYMENT BY INDUSTRY BY PLACE OF WORK IN MENLO PARK, Q3 2012



Notes: The Quarterly Census of Employment and Wages (QCEW) program publishes a quarterly count of employment and wages reported by employers covering 98 percent of US wage and salaried jobs, available at the county, MSA, state and national levels by industry. Data are derived from the quarterly tax reports submitted to State workforce agencies by employers, subject to State UI laws and from Federal agencies subject to the Unemployment Compensation for Federal Employees (UCFE) program. Data here are average monthly employment for the third quarter of 2012.
Sources: US Department of Labor, Bureau of Labor Statistics QCEW Program; California Employment Development Department, 2014; BAE, 2014.

With the relocation of Facebook to Menlo Park, Menlo Park experienced a 71 percent increase in the professional, scientific, and technical services industry and a 201 percent increase in the information industry between 2007 and 2012. During the same time period, Menlo Park lost workers in construction, manufacturing, wholesale trade, and financial industries. The largest employment losses were in the construction industry, which decreased in employment by nearly 40 percent between 2007 and 2012. The construction industry was also the industry with the largest employment losses in the Combined Counties during this period, although the decrease was smaller (23 percent).[13] Losses in employment in the construction industry in Menlo Park and the region may be temporary due to the recent recession. It should

[13] US Department of Labor, Bureau of Labor Statistics QCEW Program, 2014.

be noted that Facebook reports that by mid-2014 the Facebook workforce reached 5,000 employees, with an expected 20 percent increase for the coming year.[14]

COMMUTE FLOW

Most residents of Menlo Park commute elsewhere for work. Of the 30,885 jobs in Menlo Park, only 3,440 are held by Menlo Park residents. Menlo Park residents primarily travel to work in Palo Alto/Stanford (27 percent), Redwood City (8 percent), San Francisco (6 percent), or other locations within San Mateo and Santa Clara counties. Conversely, more than 27,000 workers who live in other cities commute to jobs in Menlo Park. Workers commute into Menlo Park from San Jose (10 percent), Redwood City (9 percent), San Francisco (8 percent), and other locations in San Mateo, Santa Clara, and Alameda counties (Table 5).[15] According to the Circulation Existing Conditions Report, approximately 79 percent of commuters pass through Menlo Park; these commuters do not work or live in Menlo Park, but use Menlo Park's road network daily. This cross-commute pattern is typical in most suburban environments and is a major cause of traffic congestion.

As shown in part in Figure 5 and Figure 6 above, employment industries for Menlo Park residents differ from industries of employment for jobs located in Menlo Park, suggesting a disconnect between the jobs located in the city and residents' professional skills. Increasing the number of jobs that fit the skills of residents could help ease traffic congestion, as could providing additional lower cost housing, though a variety of other investments in alternative modes of transportation, such as shared shuttles and transit to reduce the number of single-vehicle trips, will also be needed to address congestion.

RETAIL DEMAND

There are currently three small retail nodes along Willow Road. The first, at Hamilton Avenue, is a strip center with several fast food/fast casual restaurants and an ATM, along with an adjacent gas station, that target the daytime worker population in the area and serves the Belle Haven residents. There is a small, good-quality grocery store specializing in Latino food at Ivy Drive that also sells prepared food. On either side of Newbridge Street, there is a small cluster of older retail buildings that include another small,

[14] Facebook, 2014.

[15] CTTP, 2006-2010 and ACS, 2006-2010. CTTP data and ACS data vary from employment figures shown elsewhere (e.g., Figure 6) due to differences in the time periods used for data collection and the source of the data. The QCEW data in Figure 6 are based on persons in the regular Unemployment Insurance program, which excludes certain categories of workers (e.g., federal employees and some independent contractors, among others), and are provided for the third quarter of 2012. The CTTP and ACS data shown in Table 5 are for all workers age 16 and over, and was collected between 2006 and 2010.

TABLE 5 COMMUTE FLOWS, 2006-2010[a]

Menlo Park Residents by Place of Work			Menlo Park Residents by Place of Residence		
	Employed Persons			Employed Persons	
Place of Work	Number	Percentage	Place of Work	Number	Percentage
San Mateo County	6,953	45.0%	San Mateo County	13,410	43.4%
Menlo Park	3,440	22.3%	Menlo Park	3,440	11.1%
Redwood City	1,250	8.1%	Redwood City	2,880	9.3%
San Mateo	330	2.1%	San Mateo	1,440	4.7%
South San Francisco	305	2.0%	East Palo Alto	990	3.2%
Foster City	210	1.4%	Santa Clara County	9,075	29.4%
Atherton	155	1.0%	San Jose	2,990	9.7%
Santa Clara County[b]	6,775	43.9%	Sunnyvale	1,450	4.7%
Palo Alto/Stanford	4,090	26.5%	Palo Alto/Stanford	1,215	3.9%
San Jose	820	5.3%	Mountain View	1,100	3.6%
Mountain View	650	4.2%	Alameda County	3,635	11.8%
Sunnyvale	405	2.6%	Fremont	1,160	3.8%
Santa Clara	390	2.5%	San Francisco	2,500	8.1%
San Francisco	900	5.8%	Other Bay Area Locations	890	2.9%
All Other Locations	822	5.3%	All Other Locations	1,375	4.5%
Total[c]	**15,450**	**100%**	**Total[c]**	**30,885**	**100.0%**

a. The American Community Survey (ACS) data used for the most recent Census Transportation Planning Package (CTPP) uses demographic estimates based on statistical sampling conducted between 2006-2010. Data is reported for workers age 16 and over. This is the most recent commute flow data available.
b. Data captures total Menlo Park residents working in incorporated cities, towns and Census Designated Places in Santa Clara County. Persons working in other unincorporated areas of Santa Clara County are included in "All Other Locations."
c. Totals may not match employed residents in other tables because this table was derived from the ACS 2006-2010 rather than the 2010-2012 three-year ACS data used in other tables.
Sources: 2006-2010 Census Transportation Planning Package; ACS, 2006-2010; BAE, 2014.

good-quality Latino specialty grocery store, a couple of restaurants, a beauty salon, and a barbershop. The approved Menlo Gateway project, at the western end of the M-2 Area, will include a restaurant, health club, and up to 10,000 square feet of additional retail targeting tenants of that project and the surrounding area; however, it has yet to commence construction.

Throughout the ConnectMenlo process, Belle Haven residents have expressed interest in a new supermarket providing a broader range of food choices, as well as additional retail choices to provide more convenient access to retail and convenient services. There is need for a bank and/or ATMs, a pharmacy, and other daily-needs services, particularly during peak commute times when Willow and Marsh Roads, the only means of crossing US 101 by automobile, become extremely congested. An analysis of the potential to support an additional grocery store in Belle Haven, based on a calculation of estimated grocery expenditures for residents alone, showed support for up to 25,000 square feet of grocery store space, as shown in Table 6. Assuming the two existing markets represent approximately 8,000 square feet, there remains support for 15,000 to 20,000 square feet of new grocery store space. While this is much less than a typical new 60,000 square foot supermarket, it is sufficient for a specialty grocery store, such as a Sprouts or Fresh & Easy Market. These stores offer a full selection of a variety of fresh produce, meat, grocery items, households goods, along with prepared ready to eat food items. Additional demand from new employment and other sources could potentially support additional grocery store square footage.

TABLE 6 SUPPORTABLE GROCERY STORE SQUARE FOOTAGE, BELLE HAVEN, 2012

	Low Estimate	High Estimate
Supportable Grocery Store Square Footage, Belle Haven	**17,553**	**25,075**
Assumptions		
Taxable Sales Per Capita in Grocery Stores, 2012, CA	$469.74	
Estimated Total Sales Per Capita in Grocery Stores, 2012, CA[a]	$1,566	
Estimated Belle Haven Grocery Expenditures, 2012	$8,776,326	
Dollars/sq.ft. Needed to Support a New Grocery Store (Annual)	$350	$500

a. Total Sales per capita are estimated based on an assumption that 30% of all grocery store sales are taxable.
Sources: California State Board of Equalization, 2012; BAE, 2014.

In addition to the demand for retail among residents, employees in the M-2 Area provide potential support for new retail offerings. Employees, and therefore companies seeking to locate in Menlo Park, prefer a more mixed-use, "live-work-play" environment. The current M-2 Area does not meet this requirement, particularly for retail uses, and landlords report that a lack of retail and services impacts their ability to attract new office tenants. M-2 Area firms, including those with on-site food service, also report that their employees are seeking a more diverse choice of neighborhood retail and services, such as restaurant options and convenience retailers.

One key to attracting new retailers to the Belle Haven area will be creating locations that are convenient for both Belle Haven residents and workers in the M-2 Area, as well as pass-through travelers. The combined spending of these two sources of demand creates support for more retail than would be possible based on just resident population, and may also help make retailers aware that viable alternatives exist in locations other than the El Camino Real or Downtown area. For example, it may be difficult to attract a standard bank branch to the area because Belle Haven will be a less attractive location relative to other areas of Menlo

Park where bank operators believe they will attract higher-income customers. However, a business branch of a bank that targets firms in the M-2 Area could also provide services and ATM access to Belle Haven residents, such as the Wells Fargo Business Center branch in West Berkeley. The same would apply for other retail and services, such as restaurants, pharmacy, cleaners, coffee shops, and other businesses.

There may be support for two new distinct retail nodes in the M-2 Area, one focused on or near Willow Road, and the other near the western end of the M-2 Area, closer to Marsh Road. These locations are sufficiently accessible to Belle Haven residents, M-2 Area workers, and pass-through traffic, and are best able to meet the accessibility and visibility requirements of potential retailers.

EMPLOYMENT PROJECTIONS

Similar to projected population and household growth, ABAG employment projections estimate more limited growth in Menlo Park than in San Mateo County and the Bay Area overall. ABAG Employment projections estimate that employment will grow by 21 percent in Menlo Park, 29 percent in San Mateo County, and 33 percent in the Bay Area (Table 7).[16] However, as with population and household growth, the city has the potential to capture a larger share of future regional employment than projected, particularly if policies are put in place to facilitate growth in the M-2 Area.

CITY FISCAL TRENDS

REVENUE SOURCES AND EXPENDITURES

Menlo Park relies on a range of revenue sources to fund public services and government operations. The City's FY 2014-2015 Budget estimates a total of $46.5 million in revenue to the City's General Fund. Property tax revenues constitute the largest General Fund revenue source, accounting for an estimated $14.7 million (32 percent) of General Fund revenue in 2014-2015. Due to Proposition 13, property taxes from individual properties cannot increase by more than 2 percent per year unless property changes ownership or new improvements are constructed, which limits growth in property tax revenue in Menlo Park. As a result, local governments must increasingly rely on other revenue sources to maintain balanced budgets.

[16] ABAG, 2013.

TABLE 7 PROJECTED EMPLOYMENT GROWTH, 2010-2040

	2010	2015	2020	2025	2030	2035	2040	% Change 2010-2040
Employment								
Menlo Park	28,890	30,910	33,060	33,310	33,660	34,280	34,980	21%
San Mateo County	345,190	374,940	407,550	414,240	421,500	432,980	445,070	29%
Bay Area[a]	3,385,300	3,669,990	3,987,150	4,089,320	4,196,580	4,346,820	4,505,230	33%

a. The nine-county Bay Area includes Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.
Source: ABAG, 2013; BAE, 2014.

Additional large General Fund revenue sources in Menlo Park include charges for service (18 percent of General Fund revenues), sales tax (14 percent of General Fund revenues), licenses and permits (10 percent of General Fund revenues) and transient occupancy tax (9 percent of General Fund revenues). Remaining revenue sources, including franchise fees, utility user tax revenue, and intergovernmental transfers, account for a combined total of approximately 17 percent of total General Fund revenues (Figure 7).[17]

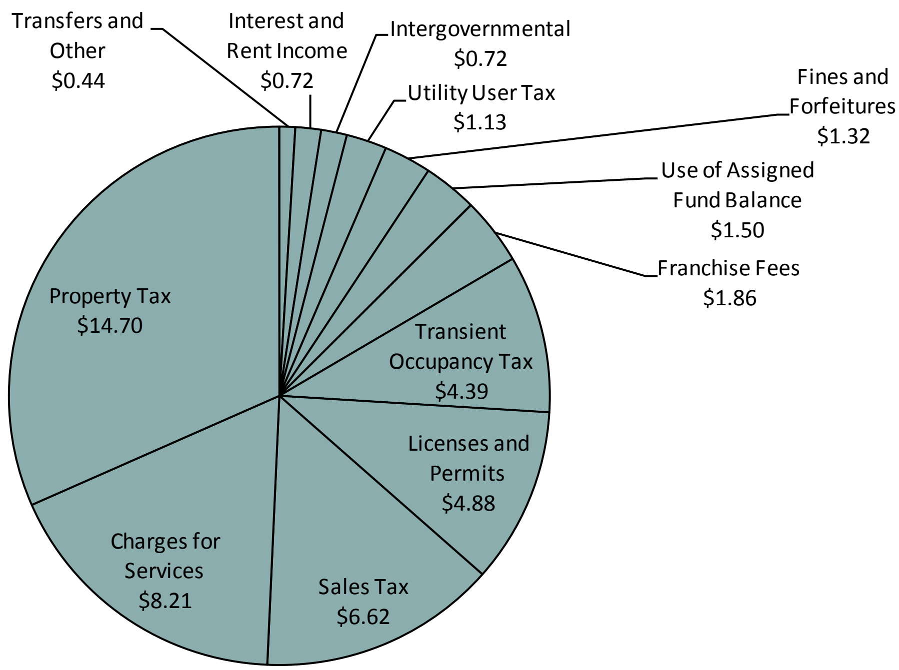
The Police Department has the largest projected budget in Menlo Park, accounting for 33 percent of General Fund expenditures. Menlo Park does not operate its own Fire Department, which means that approximately 15 percent of the property tax revenues collected from Menlo Park residents instead go to the Menlo Park Fire Protection District, an independent special district, to fund its operations. Across all departments, personnel costs (wages, salaries, and benefits) account for approximately two-thirds of General Fund expenditures ($30.6 million).

FISCAL IMPACTS OF NEW DEVELOPMENT

New development brings increased demands on local government services and infrastructure, but also generates new local government revenues through additional taxes and fees. Fiscal impact analysis provides long-term estimates of these increased expenditures and revenues in order to evaluate whether proposed new development would generate sufficient new fiscal revenues to cover new fiscal costs on a permanent basis.

[17] City of Menlo Park Budget, 2014-15

FIGURE 7 GENERAL FUND REVENUE SOURCES (IN MILLION $) IN MENLO PARK, FY 2014-2015



Source: Menlo Park Budget, FY 2014-15; BAE 2014.

In addition to the City of Menlo Park, there are a number of special districts that provide services to the City that may experience fiscal impacts from new development due to increases in service costs as well as increases in revenue sources such as property taxes. The Menlo Park Fire Protection District, Sequoia Union High School District, Menlo Park City School District, and Las Lomitas School District are the special districts that are most likely to experience fiscal impacts from new development, as discussed in greater detail below.

Menlo Park requires fiscal impact analyses for most major projects and plans in the city, and an overall fiscal impact analysis will be prepared later in the General Plan Update process once a preferred land use alternative has been identified. Previous fiscal impact analyses conducted by the City to identify impacts on its General Fund, as well as impacts to special districts, include the Facebook Campus, a residential development at 389 El Camino Real, Menlo Gateway (a mixed-use project in the M-2 Area), the El Camino Real/Downtown Specific Plan, the City's Housing Element, and development that would be allowed under the City's current General Plan, including an estimated 1.5 million square feet of additional unentitled commercial development potential in the M-2 Area.

ONGOING FISCAL IMPACTS FOR THE CITY OF MENLO PARK

Overall, the major planned development projects in Menlo Park and the additional development potential in the city under the current General Plan are projected to have a combined positive net fiscal impact on the City's General Fund, as shown in Figure 8. The fiscal analysis for the Housing Element, one of the required elements of a General Plan, assumed a large number of affordable housing units that would be exempt from property taxes, which resulted in a net negative fiscal impact; however, that impact is offset more than two times over by the positive net fiscal impact on the City's General Fund that would result from all of the other development allowed by the City's General Plan.

FIGURE 8 ANNUAL NET FISCAL IMPACT FROM PLANNED DEVELOPMENT AND DEVELOPMENT POTENTIAL UNDER CURRENT GENERAL PLAN IN MENLO PARK, 2014

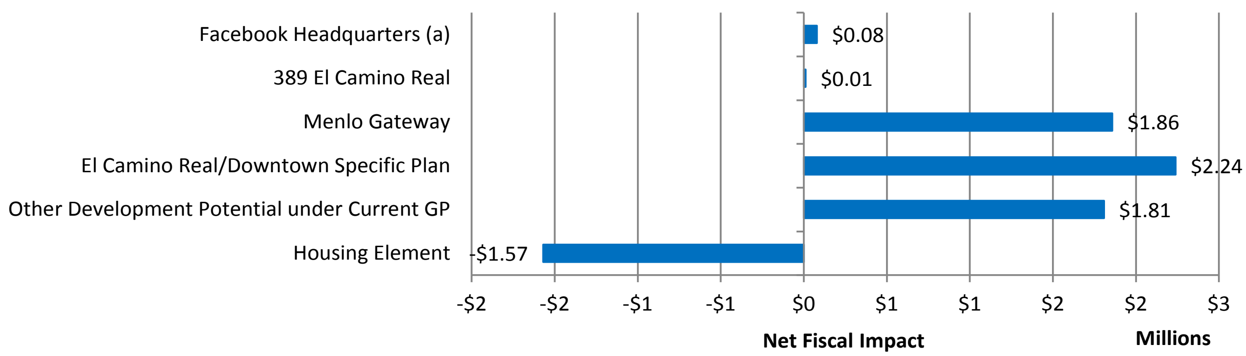


Chart shows annual net fiscal impact to the City's General Fund based on recent fiscal analyses for development in Menlo Park. All figures are inflated to 2014 dollars.
(a) Does not include payments pursuant to City's Development Agreement with Facebook.
Source: BAE, 2014.

ONGOING FISCAL IMPACTS FOR SCHOOL DISTRICTS

The fiscal impact that new development has on a particular school district depends largely on whether the district is a Revenue Limit district or a Basic Aid district. Most school districts in California are Revenue Limit districts, which means that local property taxes are not sufficient to provide the minimum per-student funding that is guaranteed by the State, and are therefore supplemented by State funding to make up for the shortfall. In Revenue Limit districts, new development does not have an impact on district revenues, because the amount of State aid that the district receives is adjusted to account for any change in the gap between the State-mandated minimum spending per-pupil and property tax revenues.

In Basic Aid districts, property tax revenues are sufficient to exceed the minimum per-student funding that is guaranteed by the State, and the district is able to retain and utilize all property tax revenue that it receives. As a result, any change in property taxes to the district represents a change in district revenue.

While this can support higher levels of student spending in districts with a strong property tax base, it also means that property taxes from new development are the primary source of funds for additional annual operating costs caused by students from new residential development. In general, Basic Aid districts will experience a positive net fiscal impact from commercial development because it generates additional property taxes, but no additional students. The fiscal impacts from residential development are mixed and depend on the type of housing, the resulting number of students, and the value of the new housing and the resulting new property tax revenues.

The Ravenswood and Redwood City School Districts, which serve elementary and middle school students in the M-2 Area, Belle Haven, and areas outside of Menlo Park, are Revenue Limit districts and therefore do not experience a fiscal impact related to operating costs from new development. Although these are the elementary and middle school districts that are most likely to experience an increase in students and property tax revenues due to development pursuant to the City's General Plan Update, changes in State aid will ensure consistent levels of per-student funding. Throughout the ConnectMenlo community engagement process, Belle Haven residents have expressed concern to City staff about school quality in the Ravenswood School District, which has lower Academic Performance Index Scores and lower per-pupil spending than the Menlo Park City and Las Lomitas School Districts. However, concerns related to school quality are generally outside of the scope of a General Plan Update.

The Menlo Park City School District and Las Lomitas School District, which serve elementary and middle school students elsewhere in Menlo Park and in some adjacent areas, but not in the M-2 Area and Belle Haven, are Basic Aid districts, and therefore potentially experience fiscal impacts to operating costs from new development. A fiscal impact analysis conducted for the City's Housing Element Update, which included an analysis of all approved, planned, and anticipated residential and commercial projects in Menlo Park, estimated that these projects would have a minimal negative fiscal impact on the Menlo Park City School District amounting to $244,700 annually (0.6 percent of the district budget) and a minimal negative fiscal impact on the Las Lomitas School District amounting to $32,000 annually (0.1 percent of the district budget), in 2014 dollars. Since any land use changes under the General Plan Update will primarily be focused on the M-2 Area, the Menlo Park City School District and Las Lomitas School District are not expected to experience significant changes in property tax revenues or student generation due to development pursuant to the General Plan Update.

Sequoia Union High School District, the high school district that serves all of Menlo Park along with some adjacent communities, is also a Basic Aid district. A fiscal impact analysis conducted for the City on all approved, planned, and anticipated projects in Menlo Park estimated that these projects would have a positive net fiscal impact on the Sequoia Union High School District amounting to $1.15 million annually (in 2014 dollars), or approximately 1.5 percent of the District's annual budget. Because the Sequoia Union High School District covers the M-2 Area and Belle Haven along with other areas in Menlo Park, increases in property tax revenues and district enrollment resulting from development pursuant to the General Plan Update may result in fiscal impacts to the District related to operating costs.

ONGOING FISCAL IMPACTS FOR THE MENLO PARK FIRE PROTECTION DISTRICT

The fiscal impact of new development on the Menlo Park Fire Protection District varies based on factors specific to each project. While fiscal impact analyses for previous projects have shown a neutral or slight positive ongoing fiscal impact on the District, in one case a negative fiscal impact was identified. The fiscal impact analysis for the planned Menlo Gateway project identified a negative net fiscal impact to the District of $62,000 per year because building heights in the project exceeded current building heights in the area, potentially requiring the District to procure a ladder truck for the station closest to the project. The new truck would generate a need for additional personnel and maintenance, resulting in additional ongoing operating expenses for the District. The fiscal impact analysis conducted later in the General Plan Update process will include discussions with the Menlo Park Fire Protection District, as well as analysis of property tax revenues and service costs. These analyses will estimate ongoing fiscal impacts to the District resulting from the General Plan Update in order to ensure that new fire safety service needs can be adequately addressed by the District.

ONE-TIME CAPITAL EXPENDITURES

In addition to the ongoing fiscal impacts discussed above, local governments and special districts can incur one-time capital costs if new development generates a need for new facilities, equipment, or infrastructure. In most cases, capital costs directly associated with new development are fully funded by developers through some combination of impact fees, direct pass-through charges to developers, or developer contributions pursuant to Development Agreements. School district capital improvements are funded by State-controlled school impact fees and bond programs for new construction. The fiscal impact analysis for the General Plan Update process will address potential capital costs that the City and special districts may incur as a result of development pursuant to the General Plan Update.

REAL ESTATE MARKET OVERVIEW

The Silicon Valley real estate market, including Menlo Park, is currently the strongest market in the US, with substantial development of new multi-family residential and office, as well as corporate campuses. This reflects the current boom in the Valley economy, which has had repeated boom and bust cycles over the past several decades. Menlo Park, along with Palo Alto and Mountain View, remain the most desirable locations in Silicon Valley for high-tech companies, although the lack of available space and sites has pushed demand to other parts of Santa Clara and San Mateo County. Based on current levels of market demand for office/R&D space, there is greater demand than there are available sites in Menlo Park, even if the City were to allow more development than is envisioned in the current General Plan.

The active office/R&D market in Silicon Valley has created considerable demand for new residential development in communities throughout Silicon Valley as developers seek to build housing adjacent to employment centers. Many cities near Menlo Park, including Mountain View, Palo Alto, and Redwood City, have experienced significant recent multi-family construction activity as a result, suggesting strong potential for additional multi-family residential development in Menlo Park.

The M-2 Area is the primary location in Menlo Park with the potential to accommodate a significant amount of new development. As a result, future development in the M-2 Area is expected to be vital to the City's future fiscal stability and its ability to attract and retain growing companies. The M-2 Area also offers significant potential to provide amenities and benefits to workers in the area and Belle Haven residents.

According to CoStar, there is total of approximately 8.7 million square feet of built space in the M-2 Area, much of which consists of older and obsolete industrial properties. Some properties have recently been redeveloped or are planned for redevelopment, and many other obsolete properties provide additional opportunities for redevelopment. Strong real estate market demand in Menlo Park and Silicon Valley overall suggests that non-market factors will constitute the primary constraints to future development in the M-2 Area.

Within the 640-acre M-2 Area, 50 percent of the land is owned and/or controlled by four entities: Facebook (137 acres), Bohannon Companies (83 acres), Prologis (61 acres), and Tarlton Properties, Inc (36 acres).[18] Facebook employment has been expanding rapidly in recent years and is anticipated to continue to grow at a rapid pace, and the company may therefore occupy a larger share of space in the M-2 Area in the future. In addition to the company's existing campus, Facebook has a new campus under construction and recently purchased a significant amount of adjacent property from the former TE Connectivity site. Bohannon Companies has secured approvals for a new mixed-use project in the M-2 Area that will include office, retail, and a hotel, and owns additional M-2 Area properties that are poised for redevelopment. Prologis owns a number of office and industrial (life science) properties in the M-2 Area and is considering opportunities to redevelop some of these properties to incorporate a mix of uses. Tarlton Properties, Inc. owns several properties that are leased to life sciences and other companies, and works with new and existing companies to assist in meeting needs for space in Menlo Park.

[18] Together, these four property owners own more than half of the buildable acreage in the M-2 Area. Calculation cited includes Southern Pacific right of way and marshland in the total acreage of the M-2 Area.

RESIDENTIAL MARKET TRENDS

Menlo Park has seen extremely low levels of new unit construction since 2000, with permits issued for a total of only 219 units from January 2000 through July 2014,[19] all of which were for single-family homes (both detached and attached units). During the same period, Palo Alto and Mountain View saw considerably more housing construction: Palo Alto permitted 2,304 units and Mountain View permitted 3,219 units (Figure 9).[20] These cities also experienced considerable new multi-family residential development, with multi-family accounting for 38 percent of the units in Palo Alto and 57 percent of the units in Mountain View built during that time. In San Mateo and Santa Clara Counties overall, 63 percent of all units permitted were multi-family during this period (Figure 10),[21] reflecting a strong shift toward building more multi-family housing construction in the region due to the strong job growth. This trend is now just affecting Menlo Park. Of the 735 new multi-family units approved or under construction, 540 will be located in two adjacent projects on Haven Avenue in the M-2 Area and 195 units are located along the Bayside edge of Belle Haven on Hamilton Avenue.[22]

Menlo Park lies within one of the most expensive housing markets in the US, and home prices in the city are even higher than average for this high-cost region. As of July 2014, the median home sale price reported in Menlo Park was $1.5 million (see Figure 11). The Menlo Park median home sale price is lower than the median in Palo Alto ($2.02 million in July 2014), but higher than the median in Mountain View ($970,000 in July 2014). The desirability of all three of these communities is shown by median sale prices that are higher than the median for the region; the July 2014 median was $790,000 for San Mateo County and $725,000 for Santa Clara County.[23]

Homes in Menlo Park also held their value better than homes in many communities in the region during the recent recession. Menlo Park, along with Palo Alto and Mountain View, showed smaller declines during the recession than the two counties, and Menlo Park and Palo Alto have shown particularly strong gains over the long run, with the July 2014 median sale price for Menlo Park at 171 percent of the 2005 figure, and Palo Alto at 217 percent of the 2005 figure (Figure 11).[24]

[19] US Census Bureau, 2000-2014. The permits for the new multi-family project under construction occurred after the time period covered by this data source.

[20] US Census Bureau, 2000-2014.

[21] US Census Bureau, 2000-2014.

[22] City of Menlo Park, 2014.

[23] DataQuick, 2014.

[24] DataQuick, 2014.

PUBLIC REVIEW DRAFT EXISTING ECONOMIC CONDITIONS REPORT

FIGURE 9 MULTI-FAMILY UNITS PERMITTED, 2000-2013

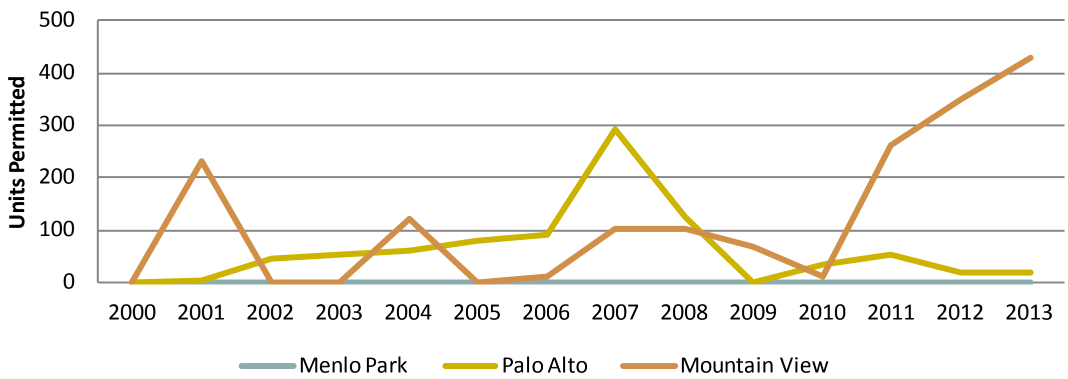


FIGURE 10 RESIDENTIAL UNITS PERMITTED IN SAN MATEO AND SANTA CLARA COUNTIES, 2000-2013

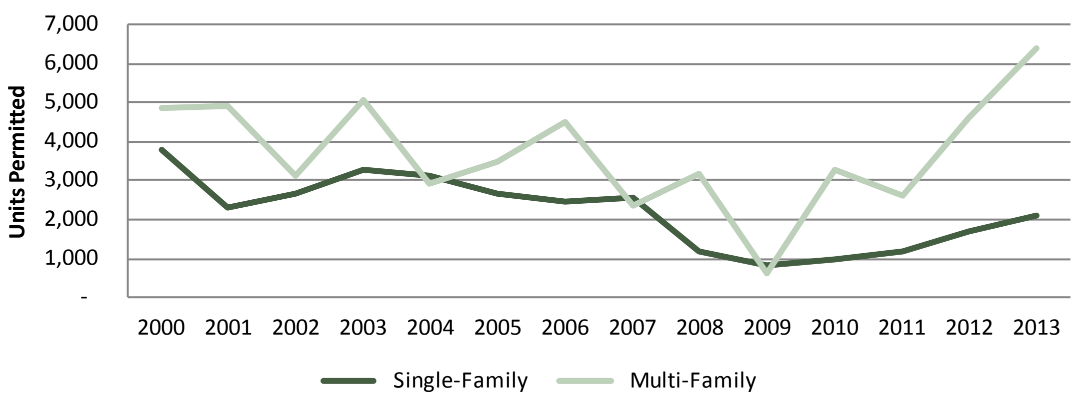
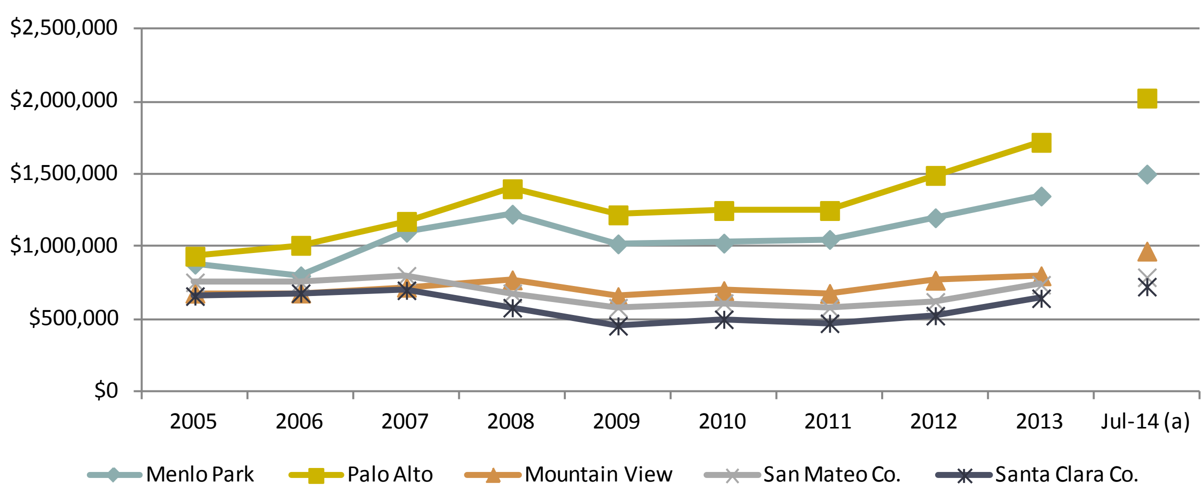


FIGURE 11 MEDIAN HOME SALE PRICE, 2005-2013



Similarly, the Menlo Park rental market is characterized by high rental rates; according to ACS data for the 2010 through 2012 period, the median gross rent in Menlo Park was approximately 12 percent higher than the median in the Combined Counties and 25 percent above the median in the Bay Area overall. Moreover, because there has been a lack of multi-family rental development in Menlo Park during recent years, current rental rates in Menlo Park reflect rents for older properties and are therefore significantly lower than the expected market-rate rent for new rental units in the area.

Rental rates for new units in Menlo Park can be expected to be higher than current averages for Menlo Park, comparable to rents for new units in Redwood City or Mountain View. Rents for newly-constructed units in Redwood City average $2,950 for a one-bedroom unit and $3,400 for a two-bedroom unit. Units in recently-completed multi-family rental properties in Mountain View are even more costly, averaging $3,200 to $4,200 per month for a one-bedroom unit and over $5,000 per month for a two-bedroom unit.[25] In order to be feasible based on current land values, new multi-family residential development is typically three- to five-story buildings, potentially above ground-floor retail, configured either as a wrap building around parking, or a podium-style building with residential above ground-level parking and other uses.

While these high home sale prices and rental rates indicate strong demand for housing in the city, they also contribute to a shortfall in housing affordable to workers at all but the highest income levels. High housing costs in Menlo Park and nearby communities therefore contribute to the high levels of in-commuting from lower-cost communities (including in the East Bay and beyond), and resulting traffic congestion.

OFFICE AND RESEARCH AND DEVELOPMENT MARKET TRENDS

Traditionally, there has been a distinction in the real estate market between office and R&D space, with R&D space typically in single-story rectangular or square-shaped structures with modest exterior features and detailing. However, over time there has been an increasing convergence of real estate product types across the Bay Area as production facilities have moved elsewhere, often to other countries, and research and product development activities that once required large or specialized lab space are more often completed using computer simulations. Future real estate demand in Menlo Park, Silicon Valley, and the Bay Area is expected to reflect a diminished distinction between office and R&D space requirements, with office space used to conduct tasks that have formerly required larger floor plates.[26]

Menlo Park has a strong office market consisting of approximately 6.1 million square feet of office space, 42 percent of which is located in the M-2 Area (Figure 12). The City's inventory of office space has shown

[25] RealFacts, 2014.
[26] Bioscience uses still typically require more square footage per employee than do other high-tech uses.

steady growth over recent decades, increasing by 17 percent between 1997 (the earliest year for which data are available) and 2014 (Figure 13). However, the pace of growth in the city's office inventory during this period was considerably slower than office growth in Silicon Valley[27] overall, which experienced a 41 percent increase in office square footage between 1997 and 2014.[28]

FIGURE 12 OFFICE SPACE BY LOCATION (SQ. FT.) IN MENLO PARK, SECOND QUARTER 2014

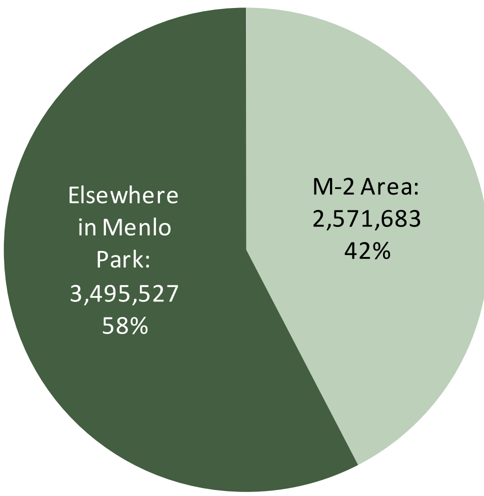
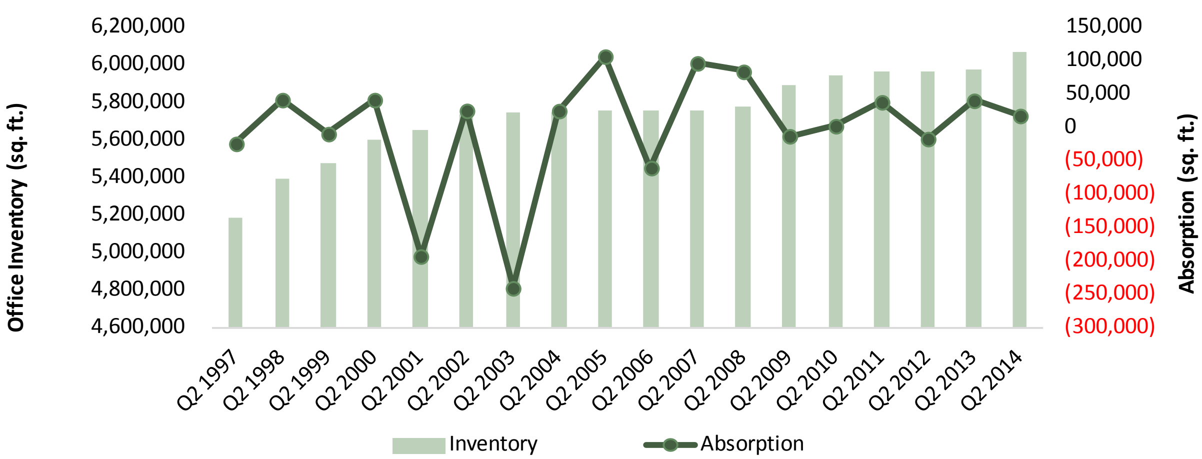


FIGURE 13 OFFICE INVENTORY AND ABSORPTION IN MENLO PARK, Q2 1997-2014



[27] Silicon Valley is defined here as Santa Clara County, Menlo Park, and Fremont. Definition of Silicon Valley is based on source data provided by CoStar, and may vary from definitions used elsewhere in this report to reflect variations in real estate market areas.

[28] CoStar, 2014.

As of the second quarter of 2014, Menlo Park office rental rates were almost twice as high as office rents in Silicon Valley overall, at $5.16 per square foot per month on a full-service basis. Together with Menlo Park's modest office vacancy rate (6.5 percent as of the second quarter of 2014),[29] the city's high office rents within the growing Silicon Valley office market signify that there is significant potential for additional future growth in the Menlo Park office market.

INDUSTRIAL MARKET TRENDS

Menlo Park has an estimated 2.75 million square feet of industrial space, 98 percent of which is located in the M-2 Area. The city's inventory of industrial space has declined slightly in recent years, as shown in Figure 14, which is indicative of the redevelopment of industrial properties to build offices and other property types that provide a higher value to the property owner. The difference in value between office and industrial space is considerable: as of the second quarter of 2014, industrial rents in Menlo Park averaged $0.66 per square foot per month on a triple net basis,[30] on par with industrial rents in Silicon Valley overall but significantly less than the average rent for office space in Menlo Park (more than $5 per square foot). The city experienced a gradual reduction in industrial space beginning in 2007, with a slightly more significant decrease in 2013. These citywide trends are consistent with trends throughout Silicon Valley,[31] which experienced an increase in industrial space through 2002 followed by a steady decrease in subsequent years as properties have redeveloped.[32]

However, while the industrial inventory has declined in Menlo Park and Silicon Valley overall, absorption of industrial space has fluctuated between years, with positive absorption[33] in Menlo Park in 2013 and 2014[34] while the industrial inventory was declining. This pattern suggests that, while there is growing demand for office/R&D space in the region, there is also continuing demand for industrial space from some businesses in the city and region, including from start-ups seeking older, inexpensive industrial buildings. These trends demonstrate a possible mismatch between the continuing demand for space and real estate market trends that motivate redevelopment of older industrial properties into newer, higher-value office and R&D uses.

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[29] CoStar, 2014.

[30] Average industrial rents are quoted on a triple net basis, which means that tenants are responsible for all costs related to the leased property, including real estate taxes, building insurance, and common area maintenance, in addition to the monthly lease amount. As a result, full monthly occupancy costs for industrial tenants would likely be two to three dollars per square foot higher on a full service basis.

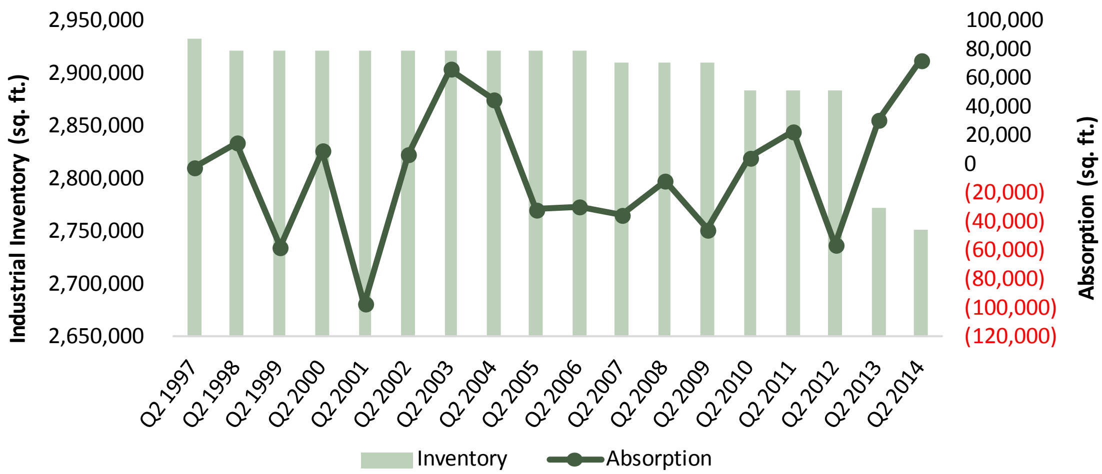
[31] Silicon Valley is defined here as Santa Clara County, Menlo Park, and Fremont.

[32] CoStar, 2014.

[33] Absorption is a measure of the square footage of space that is newly leased, less the square footage that is vacated. In this case, positive absorption means that the amount of industrial space leased in Menlo Park in 2013 and 2014 exceeded the amount of space that was vacated in 2013 and 2014.

[34] CoStar, 2014.

FIGURE 14 INDUSTRIAL INVENTORY AND ABSORPTION IN MENLO PARK, Q2 1997-2014



As noted in the earlier discussion under Economic Development, the General Plan Update will include policies regarding the extent and locations where M-2 Area industrial buildings can be redeveloped to other uses. Even for M-2 Area properties that are rezoned, those where retail and service uses are allowed will have a lower value than those rezoned for office and multi-family residential. One way of distributing the benefit from any rezoning would be to create specific incentives for property owners to provide these uses that contribute to the live-work-play environments sought by many businesses.

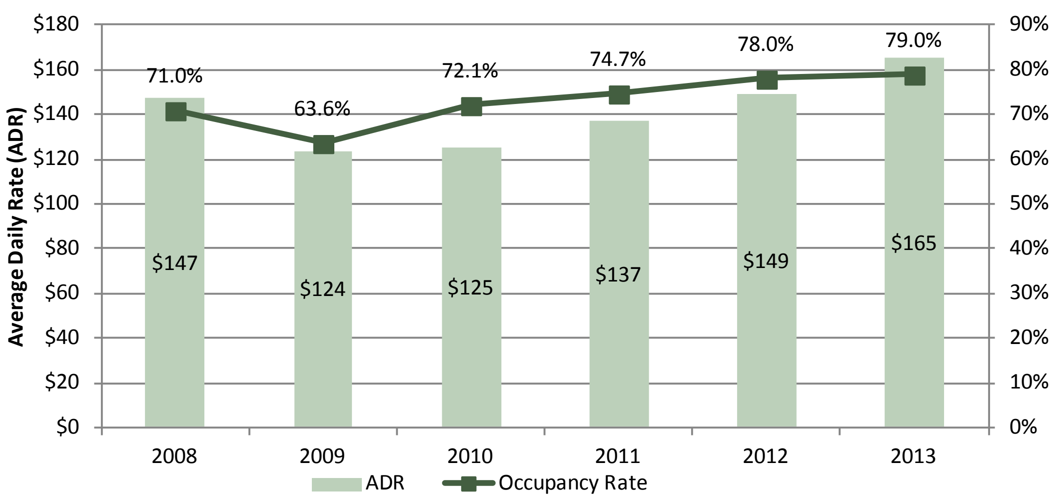
HOTEL INDUSTRY TRENDS

There are currently seven hotels operating in Menlo Park, with a total of slightly more than 400 rooms. These hotels cover a broad range from small economy independents such as the Mermaid Inn to upscale hotels such as the Stanford Park Hotel and the Rosewood Sand Hill. Compared to Palo Alto and Mountain View, Menlo Park has a modest hotel room inventory; Palo Alto has approximately 1,800 hotel rooms and Mountain View has approximately 1,600 rooms, based on data from Smith Travel Research (STR), which tracks lodging industry trends. However, Menlo Park has approved two additional hotels – the conversion of an existing building to a Marriott Residence Inn Hotel in the Downtown area (now under construction) and a hotel in the approved Menlo Gateway project in the M-2 Area – that will add 373 new hotel rooms in the city and provide additional mid- to upper-range lodging options. The City has also approved an expansion of the existing Mermaid Inn, which will add eight additional rooms.[35]

[35] City of Menlo Park, 2014.

Silicon Valley[36] has a strong hotel market that primarily serves business travelers and out-of-town friends and relatives visiting area residents, with a more limited focus on tourism. As shown in Figure 15, the higher-end hotels in the region that cater to business travelers have shown steady growth in occupancy and room rates following a slight decline during the recession in 2009. In 2013, the average occupancy among Silicon Valley business hotels was 79 percent,[37] well above the 70 percent occupancy levels needed to break-even. Strong existing regional hotel demand and future office development in Menlo Park and adjacent communities may provide opportunities for additional hotel development in Menlo Park, particularly in locations that provide easy access to businesses located in the M-2 Area.

FIGURE 15 BUSINESS HOTEL REVENUE AND OCCUPANCY TRENDS IN SILICON VALLEY, 2008-2013



PLANNED AND PROPOSED PROJECTS

Menlo Park has a significant number of projects that are pending, approved, or under construction. The city's development pipeline includes 1,347 residential units, approximately 1.9 million square feet of office space, approximately 113,000 square feet of retail, and 373 hotel rooms. Of this total, a significant share is located in the M-2 Area, including 540 residential units,[38] 1.3 million square feet of office space, approximately 94,000 square feet of retail, and 235 hotel rooms (with most of the remaining development that is pending, approved, or under construction in or near the El Camino Real / Downtown area). More

[36] Silicon Valley is defined here as Santa Clara County and southern San Mateo County.

[37] STR, 2014.

[38] An additional 195 residential units have been approved on Hamilton Avenue in Belle Haven.

PUBLIC REVIEW DRAFT EXISTING ECONOMIC CONDITIONS REPORT

TABLE 8 PLANNED AND PROPOSED DEVELOPMENT IN MENLO PARK, DECEMBER 2014

Project Location Developer	Site Size (Acres)	Development Program[a]		Comments
Under Construction				
Facebook Campus Project 312/313 Constitution Drive (West) Facebook, Inc.	22	433,656 127,246	sq. ft. new office sq. ft. office demo	Two project sites for East and West Campus of Facebook, but only West Campus undergoing new construction.
3639 Haven Avenue St. Anton	9.69	394	new residential units	Multi-family units consisting of studios and 1-, 2-, and 3- bedroom units. 37 units affordable to low- or very low-income households.
1460 El Camino Real B/t Glenwood and Encinal Ave Hunter Properties	1.55	26,800 16 12,000	sq. ft. new office new residential units sq. ft. retail demo	Redevelopment of four parcels into two-story office building and 16 attached townhouse units. Commercial portion built but not occupied.
555 Glenwood Avenue Sand Hill Property Company	2.26	138 8,419	new hotel rooms sq. ft. new commons	Conversion of assisted living facility to Residence Inn by Marriot.
777 Hamilton Avenue Greenheart Land Company	6.5	195	new residential units	Multi-family units consisting of 1-, 2-, and 3-bedroom units.
Approved (Construction Not Yet Commenced)				
Menlo Gateway Project 100-190 Independence Dr; 101-155 Constitution Dr Bohannon Development Company	15.9	694,726 93,787 235	sq. ft. new office sq. ft. new commercial new hotel rooms	Mixed-use development with three office and R&D buildings, 235 hotel rooms, a health club, café/restaurant, and neighborhood serving retail.
3645 Haven Avenue Greystar	4.89	146	new residential units	Multifamily units consisting of 1- and 2-bedroom units.
Core/VA 605 Willow Road The Core Companies	1.9	60	new residential units	Studio and 1-bedroom units affordable to extremely low- and very low-income households on the VA campus.
Commonwealth Corporate Center 151 Commonwealth Dr; 164 Jefferson Dr The Sobrato Organization	13.3	259,920 237,858	sq. ft. new office sq. ft. industrial demo	Redevelop properties and construct 2 four-story office/R&D buildings.
Pending Approval				
500 El Camino Real 300-550 El Camino Real Stanford University	8.43	199,500 170 10,000	sq. ft. new office new residential units sq. ft. new retail	Redevelop six properties into a mixed use development containing office, multi-family residential, and retail space.
SRI Campus Modernization Project Ravenswood Ave b/t Laurel St & Middlefield Road SRI International	63.2	1,212,886 1,212,886	sq. ft. office sq. ft. office demo	Reconstruction of campus in multiple phases. No net new square footage.
1300 El Camino Real El Camino Real & Oak Grove Ave Greenheart Land Company	6.4	220 210,000 7,000	new residential units sq. ft. new office sq. ft. new retail	Redevelop 6.4 acre site with commercial and residential uses. Encompasses prior 1300 El Camino Real and Derry development proposals.
133 Encinal Avenue Hunter Properties	1.74	26	new residential units	Demolition of existing garden nursery buildings and construction of 26 new residential units.

TABLE 8 PLANNED AND PROPOSED DEVELOPMENT IN MENLO PARK, DECEMBER 2014

Project Location Developer	Site Size (Acres)	Development Program[a]		Comments
1295 El Camino Real Pinnacle Group	0.63	15 1,906	new residential units sq. ft. commercial	Demolition of two commercial buildings and construction of a new mixed-use residential and commercial development
650 Live Oak Avenue The Minkoff Group	0.69	15 16,811	new residential units sq. ft. office	Demolition of commercial building and construction of new office-residential development
1020 Alma Street Lane Partners	0.66	25,156	sq. ft. office	Demolition of existing commercial buildings and construction of new office development
1221 Willow Road MidPen Housing	2.27	90 48	new residential units residential units demo	Demolition of existing residential buildings and construction of new senior housing development
Summary				
Gross New Residential Planned and Proposed (units)		1,347		
Gross New Office Planned and Proposed (sq. ft.)[b]		1,866,569		
Gross New Retail/Com. Planned and Proposed (sq. ft.)		112,693		
Gross New Lodging Planned and Proposed (# of Rooms)		373		

Projects listed here do not include projects totaling less than 10,000 square feet or five residential units.
a. Square footage of existing buildings to be demolished is not included for all projects.
b. This does not include the SRI Campus Modernization project as it has no net new square footage.
Source: City Menlo Park, 2014; BAE, 2014.

than half of the M-2 Area approved office space and all of the hotel rooms are located in the Menlo Gateway project.[39]

SUMMARY OF KEY FINDINGS

- **Current Market.** Menlo Park is one of the most desirable locations of Silicon Valley, currently the strongest and most active real estate market in the US. This is reflected in a current median house price in Menlo Park of $1.5 million, office rents that exceed $5 per square foot per month, and rental rates for new, multi-family residences are expected to be as much as $4,200 per month for 1-bedroom units and $5,000 per month for 2-bedroom units. The strength of the market means there is more potential demand for multi-family residential citywide and office and R&D uses in the M-2 Area than there are viable development sites.
- **Local Economy.** The M-2 Area is central to the local economy, with 48 percent of all jobs in Menlo Park located there. It houses significant clusters of leading-edge, high-tech firms in information sciences

[39] City of Menlo Park, 2014.

and social media, life sciences, and medical device manufacturing. It also houses a variety of firms that support these clusters, as well as more traditional industrial uses that offer a broader range of medium- and lower-skilled jobs.

- **M-2 Area.** Older industrial/R&D spaces can help support start-up firms that seek lower cost space until they begin to expand, as well as non-high-tech uses. A number of sites, especially larger parcels in the M-2 Area, are currently being redeveloped or are being targeted for redevelopment by current or prospective owners and tenants. Property owners note that they are already starting to experience challenges in attracting new firms to the M-2 Area because it does not offer the mix of retail, entertainment, lodging, residential, and other uses that companies desire in addition to available office and R&D space. Existing firms in the M-2 Area, including those with on-site food service, report that their employees desire a greater choice of off-site locations for dining, services, and other activities.
- **Retail Potential.** The Belle Haven neighborhood is underserved for retail, relative to the size of its population. Based on household spending trends, there is potentially support for a new specialty grocery store in the 15,000-20,000 square foot range, as well as other retail uses. Additional commercial locations that serve both Belle Haven residents and M-2 Area workers, as well as pass-through traffic, would be expected to enhance the potential to attract a wider range of other retail choices to the area.
- **Development Types.** Based on current trends, office and R&D development in the current M-2 market can be expected to consist of Class A buildings that range from four to eight stories, with feasibility affected by the cost of acquiring land for development and local development controls. New multi-family residential development is typically five- to six-story buildings, either in a wrap configuration around parking or atop podium parking with residences above nonresidential ground floor uses. There also is potential for other mixed-use development configurations in the M-2 Area.
- **Fiscal.** Economic development, and the ability of the M-2 Area to attract new firms and retain existing ones, is central to a sustainable fiscal future for the City and its ability to continue providing a high level of services to residents. Previously planned, approved, and anticipated projects have the potential to generate more than $4 million in net new annual fiscal revenues for the City, which is expected to help offset the long-term trend of existing tax revenues growing at a much slower rate than the cost of providing services.

COMMUNITY CHARACTER

REPORT

PUBLIC REVIEW DRAFT

JANUARY 2015

CONNECTMENLO

menlo park land use & mobility update

INTRODUCTION

Menlo Park has an abundance of distinct streetscape features and architectural styles that characterize and distinguish its many neighborhoods (see Figure 1: Community Features). This Community Character Report describes the physical form and characteristics that make each Menlo Park neighborhood and the M-2 Area unique, and provides an overview of when each area developed and the architectural styles that shaped it. City, regional, and State archives were assessed to gather historical information and understand the aesthetic and cultural themes throughout the city.

DOCUMENT PURPOSE AND CONTENT

This report was prepared as part of the ConnectMenlo General Plan (Land Use and Circulation Elements) and M-2 Area Zoning Update.

PURPOSE

Information in this report is available to inform Land Use Element policies intended to preserve the character of Menlo Park's residential neighborhoods, and to define desired types of potential change in non-residential areas. The descriptions in this report may be useful in crafting goals, policies, and implementation programs related to urban design and neighborhood preservation. In addition, this report may also assist in the preparation of design standards for the M-2 Area Zoning Update.

CONTENT

The report describes the general characteristics and development of each of the city's residential neighborhoods and the M-2 Area, including descriptions of subareas that comprise neighborhoods, where appropriate.

URBAN FORM ANALYSIS

This section describes the character of each neighborhood or subarea block structure and typical site design, and provides visual examples of the built form. The industrial districts in the M-2 Area and the city's residential neighborhoods are identified in Figure 2, Neighborhood Key Map, and include:

- M-2 Area, including seven distinct subareas
  - Haven Avenue
  - Bohannon Drive
  - Marsh to Chilco
  - Chilco to Willow
  - Hamilton Court
  - Adams Court
  - O'Brien Drive
- Belle Haven
- Lorelei Manor
- Suburban Park
- Flood Triangle
- The Willows, including four distinct subareas
  - North Laurel
  - South Laurel
  - O'Connor
  - South of Gilbert
- South of Seminary/Vintage Oaks
- Linfield Oaks
- Central Menlo
- Felton Gables
- Park Forest
- Spruce
- San Antonio
- Downtown
- Allied Arts/Stanford Park
- West Menlo
- Stanford Hills
- Sharon Heights

DEVELOPMENT HISTORY

This section includes a brief history of each area's development, provides examples of early construction that make the area unique, and describes the characteristics of these selected early buildings. The early buildings cited in this report include selected structures that have been officially designated and listed in a historical register through a process involving research, documentation, and significance analysis using established criteria. For each neighborhood, the report highlights representative early buildings, including many, but not all of the properties that have been designated.

Menlo Park's designated properties fall under four categories of designation and are as follows:

National Register of Historic Places:[1]

- Church of the Nativity, 210 Oak Grove Avenue
- Menlo Park Railroad Station, 1120 Merrill Street
- Baron-Latham-Hopkins Gate Lodge, 555 Ravenswood Avenue

California Historical Landmarks:

- Portola's Journey's End, Intersection of East Creek Drive and Alma Street
- Menlo Park Railroad Station, 1120 Merrill Street
- Capidro, 262 Princeton Road

California Points of Historical Interest:

- Church of the Nativity, 210 Oak Grove Avenue
- Flood Park, 215 Bay Road
- James Valentine Coleman Home, 920 Peninsula Way[2]
- Baron-Latham-Hopkins Gate Lodge, 555 Ravenswood Avenue

Menlo Park H-Zoning:

- Russian Orthodox Church, 1220 Crane Street
- Bright Eagle Mansion, 1040 Noel Drive

1 Properties listed in the National Register of Historic Places are automatically also listed in the California Register of Historical Resources.
2 This property is not in Menlo Park, but it is within the General Plan's Sphere of Influence.

UNDERSTANDING THIS DOCUMENT

Each section on urban form includes a map (where 1 inch equals 1000 feet) denoting an area's typical block structure, including major defining features such as parks, tree cover, railroads, or creeks. This map is not meant to encompass the entire neighborhood, but rather shows the reader typical parcel sizes and block configurations.

In addition to block structure, each neighborhood's typical site design is conveyed with an aerial photo at 1 inch equals 600 feet to show site features such as building footprints and their position on parcels, yards, or parking lots. The size of neighborhood differs, but the maps and aerial photos are consistently scaled so the reader may make comparisons between the neighborhoods. A sampling of buildings within each neighborhood are shown in photos and their characteristics are described.

Each section on development history provides the reader with a general overview of the neighborhood's early growth, including the general age of homes constructed and architectural styles used.[3] This overview is followed by a list and map locating selected early buildings in the neighborhood to show the reader where they are, with one or two pictured and described in detail to offer a snapshot of early development in the neighborhood.

The Development History section concludes with examples of architectural character, which are typically buildings constructed during the busiest period of growth for the neighborhood. These examples are not offered as a definitive list of early construction, but rather as illustrations of the established character of each neighborhood.

3 The data contained in the neighborhood summaries was compiled from information contained in the neighborhood files in the History Room of the Menlo Park Historical Association (Menlo Park Public Library) and the graphs entitled "Year House Built" on city-data.com.The construction dates in the following sections are those listed on the San Mateo County GIS Map or in the City of Menlo Park Historic Building Survey of 1990.

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FIGURE 1 **COMMUNITY FEATURES**

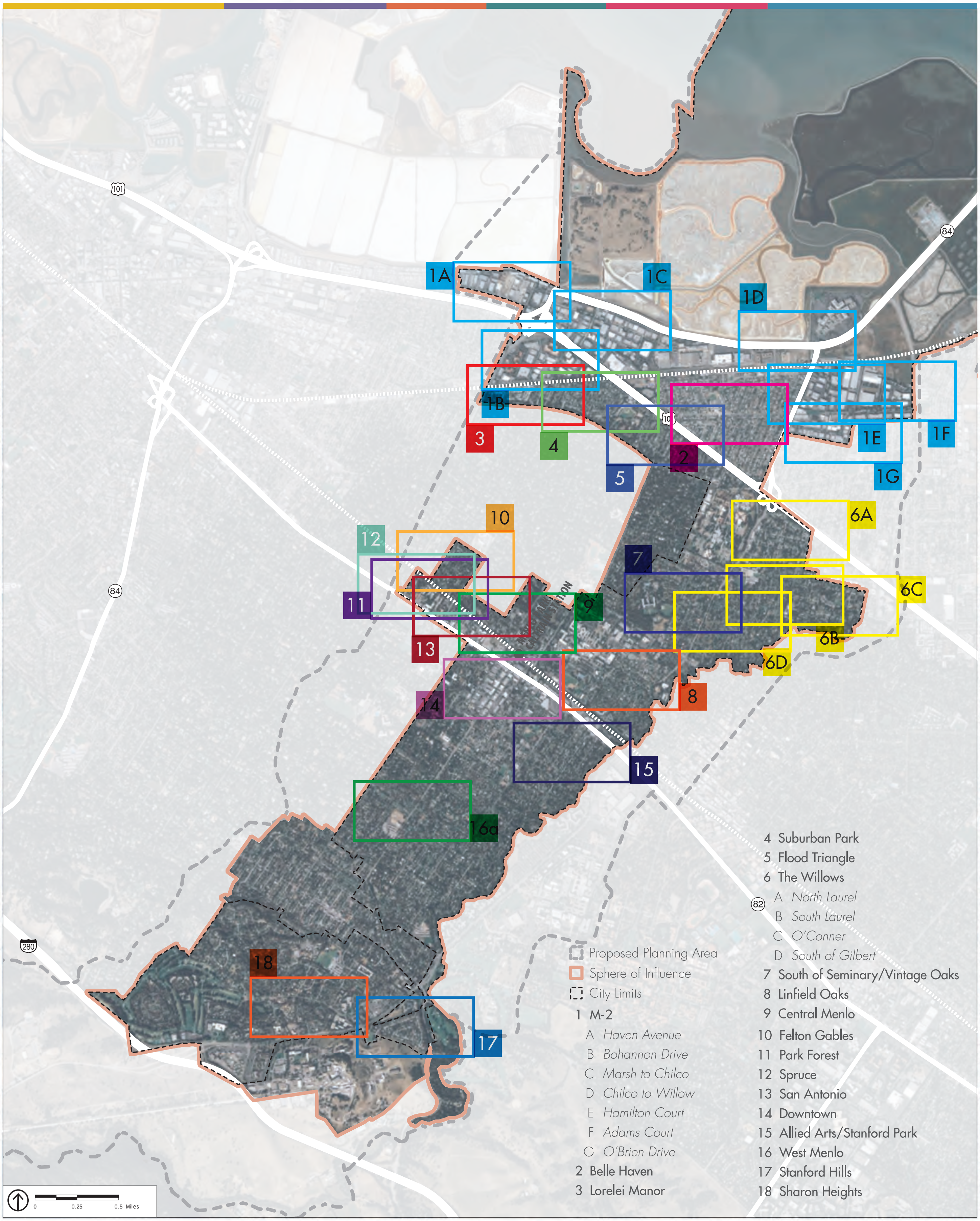

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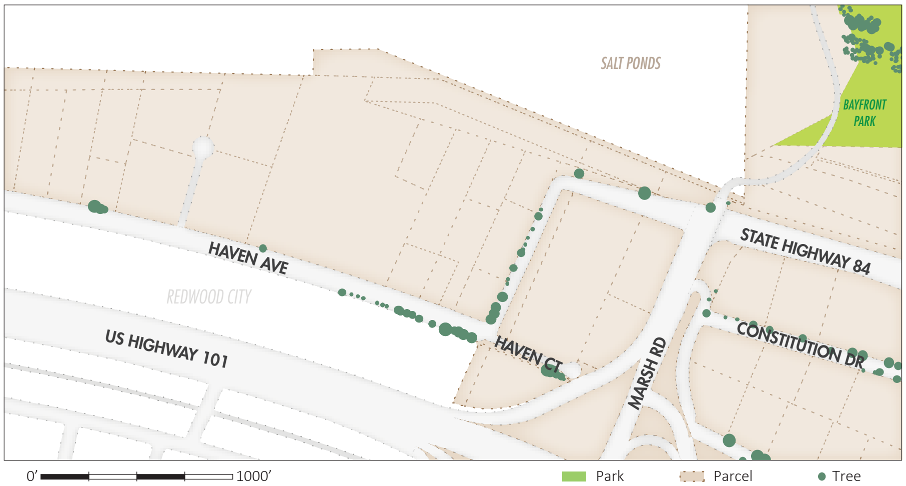
FIGURE 2 **NEIGHBORHOOD KEY MAP**

M-2 (HAVEN AVENUE)

URBAN FORM

Haven Avenue is a subarea of the M-2 district, historically defined by light industrial/office use but with multi-family housing now under construction. The subarea is concentrated along Haven Avenue, between Marsh Road and Redwood City. Marsh Road serves as a view corridor toward the Salt Ponds, Bedwell Bayfront Park, and the Bay beyond.

BLOCK STRUCTURE

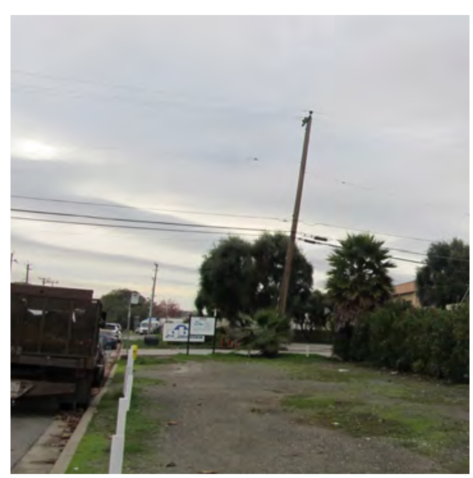


- Long rectilinear blocks.
- Bounded by Salt Ponds and Haven Avenue.
- Small creek is adjacent to a portion of Haven Avenue.
- Block dimensions range from 500 to 2,200 feet.
- Limited access and connectivity to the rest of Menlo Park.
- Inconsistent pedestrian amenities, with gaps in facilities.

TYPICAL SITE DESIGN

- Large parcel sizes.
- Generally, tilt-up light industrial and office buildings typified by utilitarian architecture, minimal fenestration, and large ground-floor plates on expansive parcels (bottom left).
- Buildings are set back from the street by a landscaped buffer, and parking is typically located on the side of the parcel.
- Some parcels are more industrial in character, including industrial use buildings, storage, and machinery (bottom middle).
- Overhead utilities are visually-dominant streetscape components (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

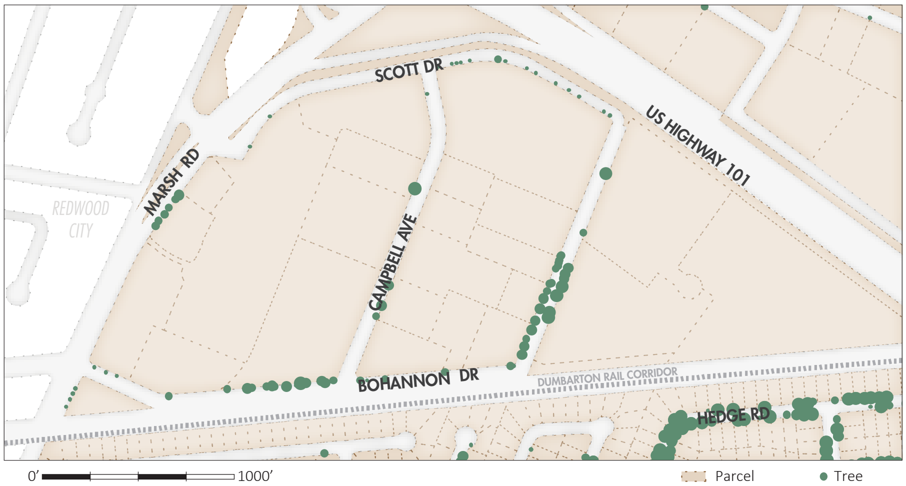


M-2 (BOHANNON DRIVE)

URBAN FORM

Bohannon Drive is a subarea of the M-2 district bounded by Marsh Road, Bohannon Drive, Scott Drive, and Highway 101. The area consists of a combination of tilt-up office buildings and corporate offices in campus settings.

BLOCK STRUCTURE

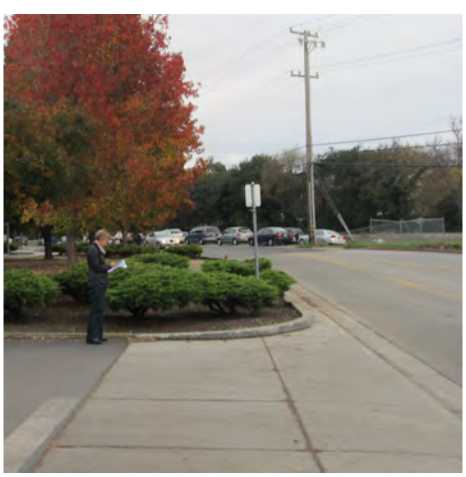


- Large blocks of different shapes in a semi-curvilinear pattern.
- Block dimensions range from 700 to 1,400 feet.
- Limited formal neighborhood connectivity and walkability due to large block sizes and poor pedestrian facilities; however, an informal sub-system of parking lot connections on separate parcels provide additional connections.
- Aside from Marsh Road, generally poor pedestrian amenities and walkability, such as an absence of sidewalks (bottom left).
- Mature trees planted in perimeter landscaping strips adjacent to streets.

TYPICAL SITE DESIGN

- Generally large parcels; combination of large office campuses and smaller individual lots.
- A range of building styles and ages, but all generally follow the same site design, including large front, side, and rear setbacks dominated by landscaping or parking areas (bottom middle).
- Older buildings are tilt-up, utilitarian, and horizontally-oriented office buildings.
- Newer buildings display added architectural features typical of contemporary office development, including sloped or varied roofs, large windows, and multiple, high-quality materials (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

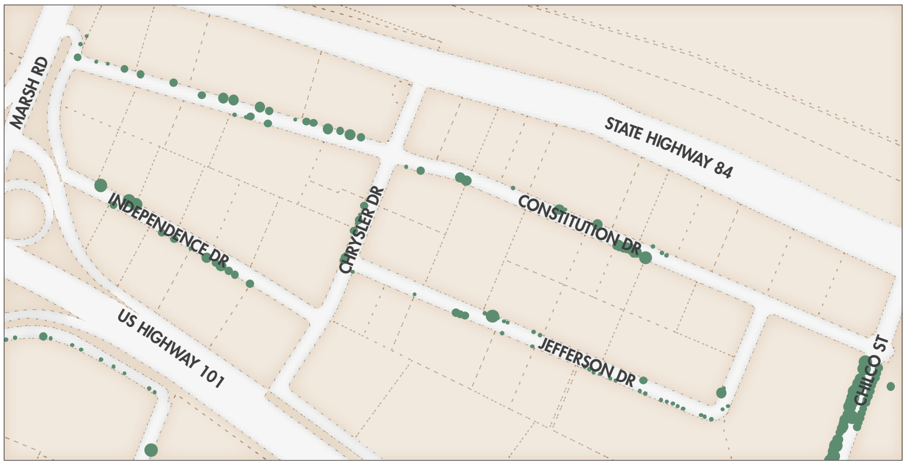


M-2 (MARSH TO CHILCO)

URBAN FORM

The Marsh to Chilco subarea of M-2 consists of a number of businesses in a suburban office park setting, bounded by Highway 101, Highway 84, Marsh Road, and Chilco Street. Substantial new development in the form of a new hotel, three office buildings, a health club, neighborhood-serving retail, and structured parking, referred to as the Menlo Gateway Project, has been approved for construction on Independence Drive and Constitution Drive.

BLOCK STRUCTURE



- Characterized by large blocks primarily of rectangular shape.
- Block lengths vary between 400 and 2,200 feet.
- Generally poor pedestrian amenities, including a lack of sidewalks, connections, and circuitous routes.
- Limited neighborhood mobility and connectivity to other parts of the city, due to long block lengths, lack of street connections, and physical barriers (especially Highway 101).

TYPICAL SITE DESIGN

- Large parcel sizes.
- Generally one- to two-story tilt-up buildings typified by utilitarian architecture, minimal fenestration, and large ground-floor plates on expansive parcels (bottom left).
- Buildings are generally located in the center of the parcel, surrounded by surface parking.
- Parcels with street frontage include scattered landscaping and abut other parcels with parking rows or landscaping strips, which usually lack sidewalks (bottom middle).
- Newer development is typically two- to three-stories with mirrored or transparent glass upper floors (bottom right).

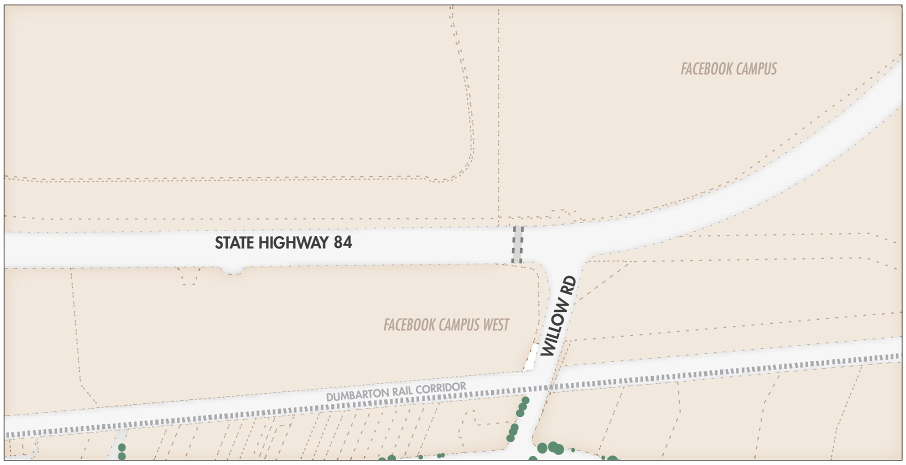
REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

M-2 (CHILCO TO WILLOW)

URBAN FORM

The Chilco to Willow subarea of M-2 is comprised of two large properties south of Highway 84 (Bayfront Expressway) from Chilco Street to Willow Road now owned by Facebook, and the Facebook Campus on the Bayside of Highway 84, enclosed by Hacker Way. The area is distinct from the rest of M-2 by its exceptionally large parcel patterns, blocks, and buildings.

BLOCK STRUCTURE

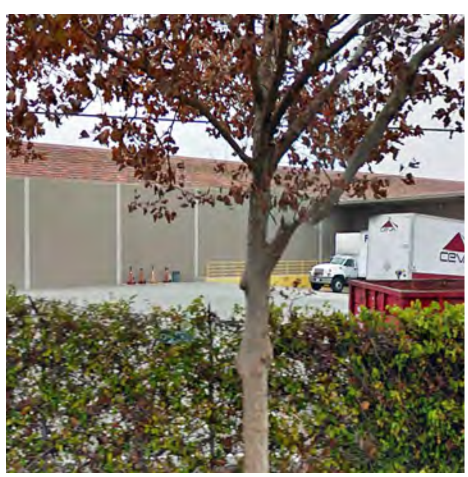


- Exceptionally large blocks, defined by Highway 84, Salt Ponds, and the Dumbarton Rail Corridor.
- Block dimensions range from 500 to 5,000 feet.
- Office campus environment with little to no pedestrian facilities.
- Disjointed subarea with limited neighborhood mobility and connectivity to other parts of the city, due to long block lengths, a lack of street connections, and physical barriers, especially the Dumbarton Rail Corridor (bottom left).
- A bike/ped underpass connects either side of Highway 84 (Bayfront Expressway) at Willow Road.

TYPICAL SITE DESIGN

- Exceptionally large parcel sizes, with dimensions bigger than most city blocks.
- Large footprint two-story light industrial/office buildings are surrounded by surface parking.
- Along Constitution Drive on the western edge of the subarea, light-industrial buildings are characterized by minimal articulation and fenestration. (bottom middle).
- The Facebook Campus is a prototypical corporate campus, characterized by contemporary office buildings and internal pedestrian walkways surrounded by large parking areas (bottom right).
- The southwest corner of Willow Road and Highway 84 is currently under construction for Facebook's West Campus. It is raised on pillars to accomodate parking underneath, and exemplifies environmentally sensitive architectural features.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

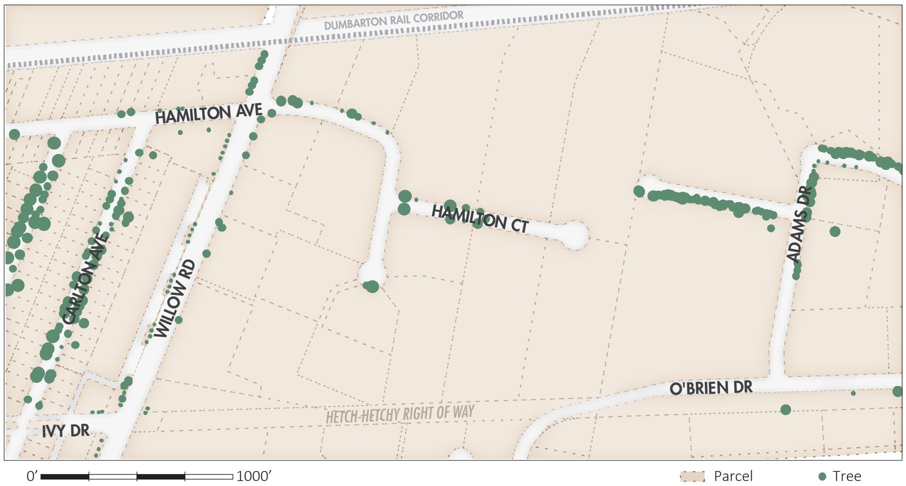


M-2 (HAMILTON COURT)

URBAN FORM

Hamilton Court is the western half of a business area between Willow Road and University Avenue, bounded by Dumbarton Rail Corridor and the Hetch-Hetchy right-of-way. Accessed by a single road, and characterized by large parcels, the suburban office park's accessibility is relatively isolated.

BLOCK STRUCTURE

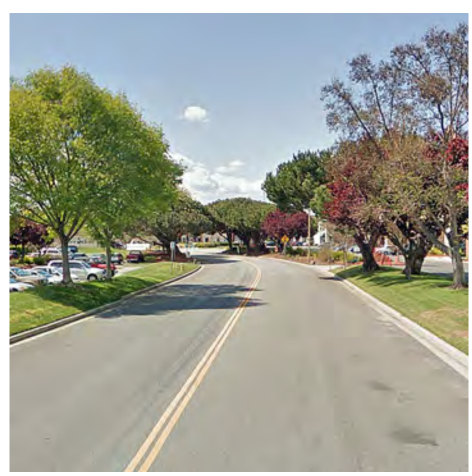


- Technically, the area is one large block bisected by Hamilton Court, which dead-ends.
- Sidewalks exist on Willow Road; however, the majority of the area is car-oriented with a lack of pedestrian amenities (bottom right).
- Connections to other neighborhoods and the rest of the city is limited to Willow Road; no roads go through the area.
- Access and connectivity to buildings is through an informal network of parking lot driveways.

TYPICAL SITE DESIGN

- Large square and rectangular parcels.
- Generally one- to two-story tilt-up buildings typified by utilitarian architecture, minimal fenestration, and large ground-floor plates on expansive parcels (bottom left).
- Buildings are generally located in the center of the parcel, surrounded by surface parking.
- Consistent landscaped setbacks planted with mature trees for parcels fronting Hamilton Avenue and Hamilton Court (bottom right).
- Newer buildings show more articulation and include mirrored or colored fenestration on the ground floor (bottom middle).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

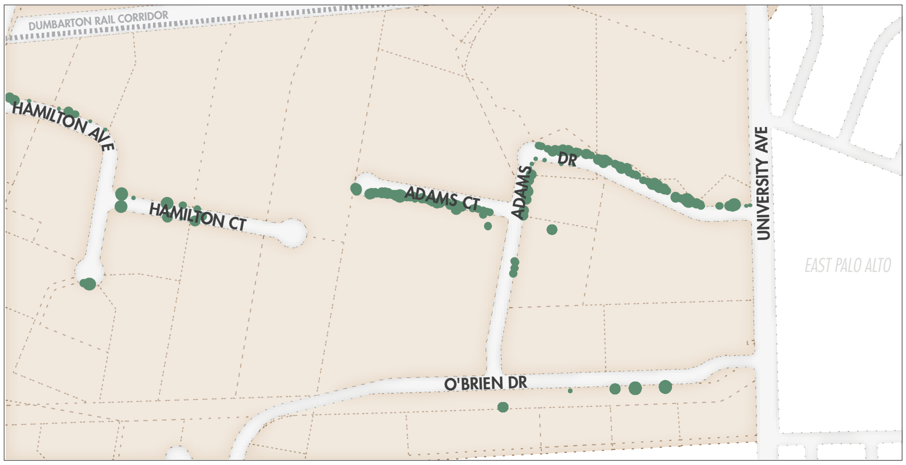


M-2 (ADAMS COURT)

URBAN FORM

Adams Court is the business area between the end of Hamilton Court and University Avenue, bounded by Dumbarton Rail and O'Brien Drive. Like Hamilton Court, it is isolated from surrounding areas and characterized by large office park development.

BLOCK STRUCTURE



0' 1000'   Parcel   Tree

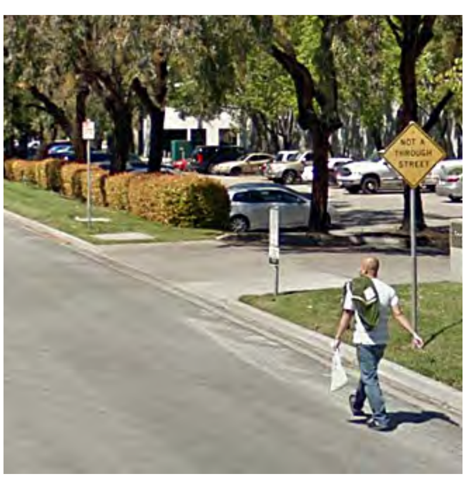
- Medium and large curvilinear blocks.
- Block dimensions range from 500 to 900 feet.
- Connectivity to other neighborhoods and the city is limited to O'Brien Drive and University Avenue.
- Car-oriented development patterns lead to a lack of pedestrian amenities (bottom left).
- Access and connectivity to buildings is through a informal network of parking lot driveways.
- Mature trees are planted in landscaped setbacks along Adams Court.

TYPICAL SITE DESIGN

0 600'

- Large parcel sizes.
- Generally one- to two-story tilt-up buildings typified by utilitarian architecture, minimal fenestration, and large ground-floor plates on expansive parcels (bottom right).
- Buildings are generally located in the center of the parcel, surrounded by surface parking.
- Consistent landscaped setbacks for parcels fronting Adams Court (bottom left).
- Newer buildings show more articulation and include mirrored or colored fenestration on the ground floor (bottom middle).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

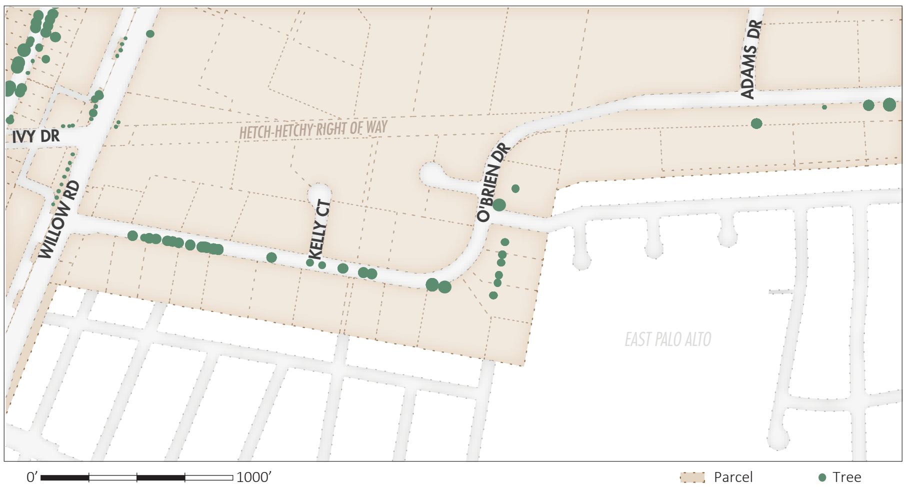


M-2 (O'BRIEN DRIVE)

URBAN FORM

The parcels and buildings fronting O'Brien Drive are relatively small compared to the rest of the commercial lots in M-2, making it a unique subarea of the district.

BLOCK STRUCTURE

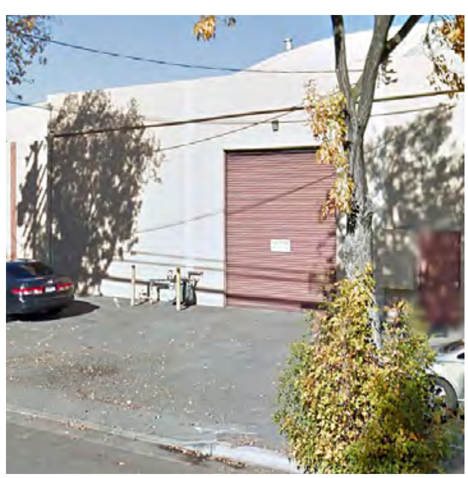


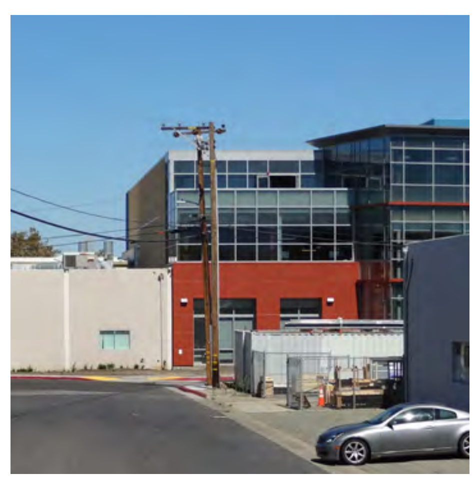
- Winding block pattern defined by O'Brien Drive, connecting Willow Road and University Avenue.
- Moderate neighborhood connectivity and walkability due to large block sizes and limited street connections, due to dead-ends and cul-de-sacs.
- Limited pedestrian amenities, due to a lack of consistent sidewalks (bottom left).
- Mature trees consistently planted adjacent to O'Brien Drive.

TYPICAL SITE DESIGN

- Medium-sized commercial parcels, compared to the rest of the M-2 area.
- Generally one-story tilt-up buildings typified by utilitarian architecture, and mimimal fenestration; smaller than development of similar type in M-2 (bottom middle).
- Small parking area in front setback and limited side and rear setbacks.
- Newer buildings show more articulation and include mirrored or colored fenestration on the ground and upper floors (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER





DEVELOPMENT HISTORY IN THE M-2 AREA

Originally part of the Spanish Land Grant Rancho de las Pulgas, the M-2 Area was included in a 1,773-acre tract platted in 1863. A 1948 aerial map indicates that the only building in the area at the time was what appears to be a hangar for Hiller Helicopters just northeast of Willow Road, and a landing strip nearby was the only non-agricultural land development. Subdivision maps show the M-2 Area divided into smaller parcels in the 1950s and 1960s. Aerial maps show Hiller remained the only large industrial development into the 1960s, when smaller buildings began to be built at the west end.

Although Hiller, along with Raychem (which does not appear in Menlo Park directories until 1970), each employed hundred of people, the M-2 Area also had many smaller firms. Hiller was acquired by Fairchild and Raychem (later called TE Connectivity) by Tyco, and both their campuses were later redeveloped. By the 1980s, much of the current development in the M-2 area was complete, although the Sun Microsystems headquarters campus was not built until the early 1990s. Facebook is currently developing its West Campus on a 22-acre former TE Connectivity parcel across Highway 84 from the former Sun campus that is its current headquarters.

Unlike a historic district, which typically would have attained at least 50 years ago a physical form deemed significant—and retained it with little change—the M-2 Area is physically characterized by ongoing change driven by technical innovations and business dynamics such as acquisitions and bankruptcies.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

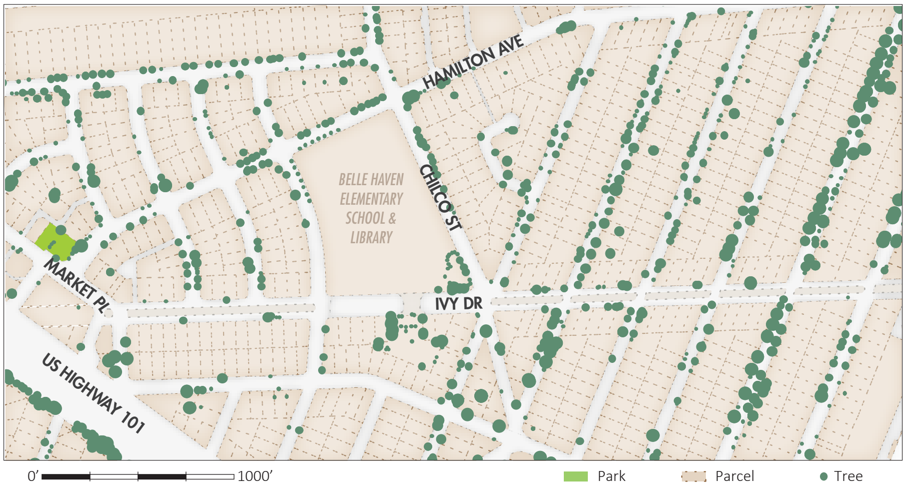
- The M-2 Area is different from other Menlo Park residential and commercial districts in street patterns, building placement and lot coverage, building types, and landscaping.
- The M-2 Area is subdivided by four regional infrastructure corridors: Highway 101, Highway 84, the Dumbarton Rail Corridor, and the Hetch Hetchy pipeline, and is bounded by the marshlands of San Francisco Bay and former salt ponds owned by the Leslie Salt Co.
- The road network includes the Highway 101 freeway, divided arterial roads (Willow Road, Bayfront Expressway, Marsh Road) and local streets which vary in width (many without sidewalks). The local streets are laid out in an ad-hoc pattern to serve groups of parcels and do not appear as a single, coherent network.
- Building placement and landscaping vary, but buildings are usually surrounded by parking or other pavement on all sides, and siting and landscaping do not fit a consistent pattern. Almost all buildings have flat roofs, many are rectangular in form, and most have metal or cementitious exterior wall materials.

BELLE HAVEN

URBAN FORM

Belle Haven is a residential neighborhood bounded by Highway 101, Willow Road, and the Dumbarton Rail Corridor. The neighborhood has many public facilities, including parks, community centers, and public safety services. Belle Haven is a transforming neighborhood, as its small and relatively affordable homes are increasingly desirable compared to more established and expensive neighborhoods within the city.

BLOCK STRUCTURE

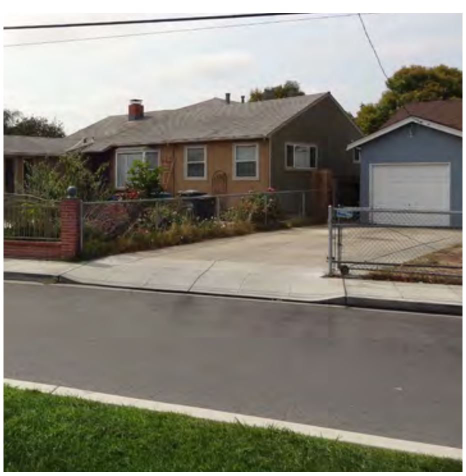


- Generally rectilinear grid system, defined by Willow Road, Highway 101, or the railroad tracks, with some curvilinear exceptions.
- Mixture of long and walkable block lengths, ranging from 300 to 1,200 feet.
- The Menlo Park Library, Senior Center, and Onetta Harris Community Center are central community destinations.
- Ivy Drive, characterized by its wide, landscaped median on the Hetch Hetchy right-of-way, acts as the neighborhood's spine and connects to the Belle Haven Library and Elementary School.
- Adequate sidewalk and crosswalk widths and conditions, generally, yet some streets lack consistent tree canopies. Pierce Street and Chilco Street lack consistent sidewalks.

TYPICAL SITE DESIGN

- Compact parcelization patterns create a relatively dense residential character. Most homes are one-story, single-family constructed close together with small front yards (bottom left). The new Hamilton Park development and multi-family housing on the perimeter streets (Pierce Street and Willow Road) are the only examples of higher density housing (bottom right).
- Homes are of varying architecture styles and levels of maintenance; many homes have front lawn fencing, emphasizing privacy and safety (bottom middle).
- Many front yards feature landscaping and mature trees planted within private property; some are completely paved (bottom left and middle).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

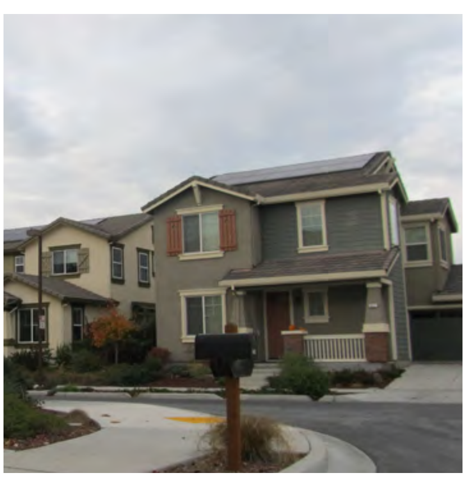


DEVELOPMENT HISTORY

The peak decade of residential construction in the Belle Haven Neighborhood was 1950-1959, with 421 houses built during this period by comparison to 292 built before 1939 and 115 during the 1940s. Housing construction dropped sharply during the 1960s, although small spikes occurred during the 1970s and 1990s. The predominant house type is the ranch house, which in these early examples exhibits features of the Streamlined Moderne style.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- Small, modest, one-story houses built during the 1940s-1960s, including ranch houses (far left) exemplifying late Moderne features from the 1940s.
- Much stucco and wood siding and many hip, gable and flat roofs.
- Bigger single-family homes and multi-family buildings along Hamilton Avenue (bottom left) and Willow Road (bottom middle).

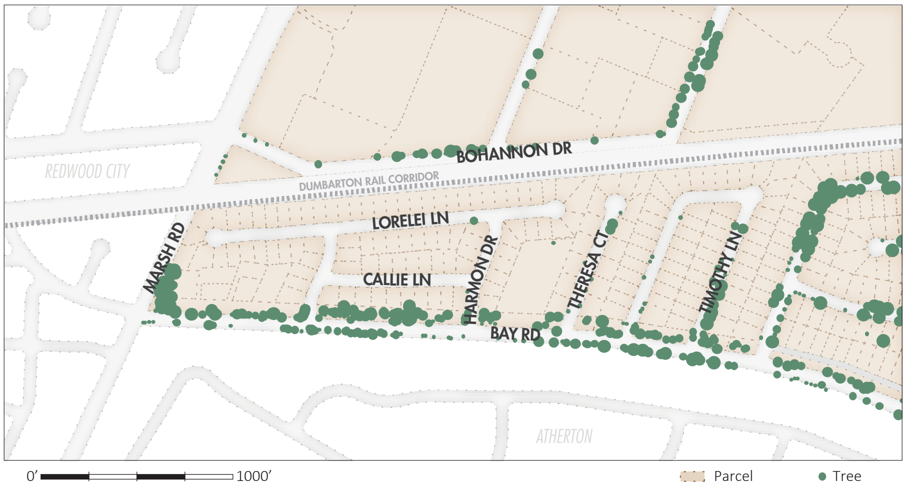


LORELEI MANOR

URBAN FORM

Lorelei Manor is a small enclave of homes west of the Suburban Park neighborhood, generally bounded by Marsh Road, Bay Road, Theresa Court, and the Dumbarton Rail Corridor. Lorelei Manor contains some of the city's more contemporary single-family residences, consistent sidewalks, and curbs. The neighborhood has its own zoning district.

BLOCK STRUCTURE

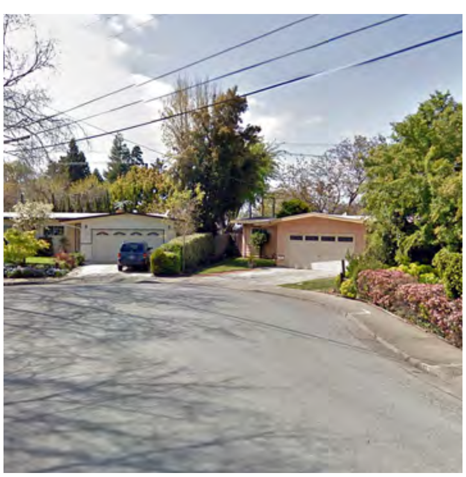
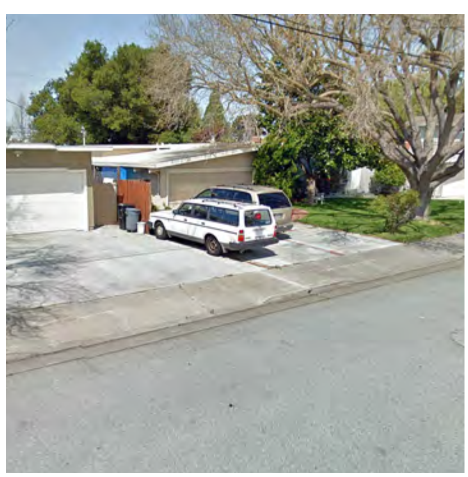


- Small- and medium-sized blocks oriented in small, rectangular loops around cul-de-sacs.
- Block dimensions range between 150 and 1,300 feet.
- Limited connectivity to areas to the north and east; Bay Road provides the only major connection.
- Generally good pedestrian amenities, such as consistent sidewalk and curbs; however, the small enclave does not have consistent connections to major streets due to cul-de-sacs and dead ends (bottom left).

TYPICAL SITE DESIGN

- Medium-sized lots with front lawns and driveways aligned with side property lines often leading to attached garages.
- Homes set back from the front of the lot create spacious front yards; narrow side setbacks leads to residences close to one another (bottom).
- Front area landscaping is typically a lawn with few bushes and a large mature tree adjacent to paved driveway. (bottom middle and right).
- Mostly one-story, well maintained contemporary residences with flat roofs, large picture windows, and minimal ornamentation.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER


SUBURBAN PARK

URBAN FORM

The Suburban Park neigborhood is bounded by Bay Road, Highway 101, Theresa Court, and Flood Park. It has a pleasant, tree-lined character, well-maintained residences snugly built together, and proximity to Flood Park.

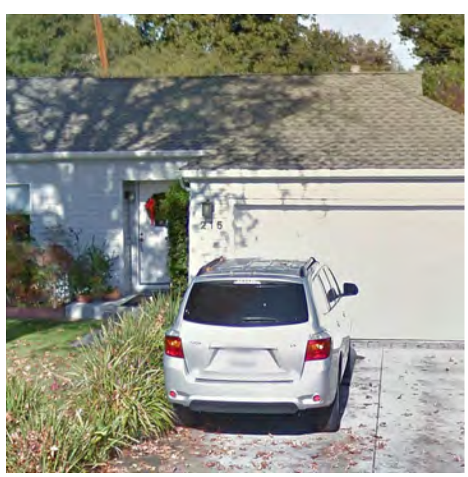
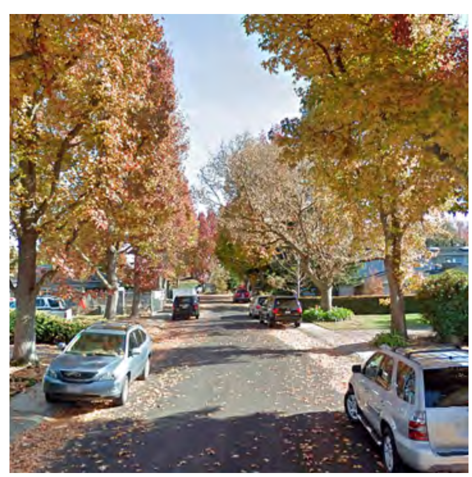
BLOCK STRUCTURE

- Winding blocks with cul-de-sac style patterns.
- Block dimensions range between 300 and 600 feet.
- Connectivity is limited to Bay Road.
- Generally consistent sidewalks and street trees; cars are sometimes parked on rolled-curb sidewalks (bottom left).
- Flood Park is a 21-acre community recreation area and focal point.

TYPICAL SITE DESIGN

- Medium-sized lots with front yards, driveways aligned with side property lines often leading to attached garages (bottom middle).
- Homes set back from the front of the lot create spacious front yards; narrow side setbacks result in residences close to one another.
- Streets and front yards are often planted with mature trees, providing a pleasant and natural character (bottom right).
- Front area landscaping is typically a lawn with few bushes and a large mature tree; some front areas are paved.
- Combination of one- and two-story, well maintained contemporary residences.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

FLOOD TRIANGLE

URBAN FORM

Flood Triangle is a tree-lined neighborhood, adjacent to a large neighborhood gathering area, Flood Park. The triangular-shaped area is bounded by Highway 101, Bay Road, and Flood Park.

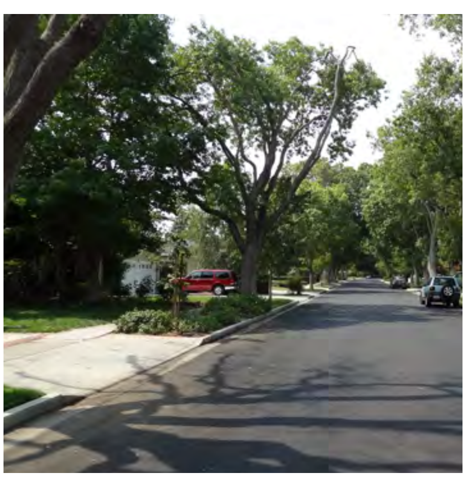
BLOCK STRUCTURE

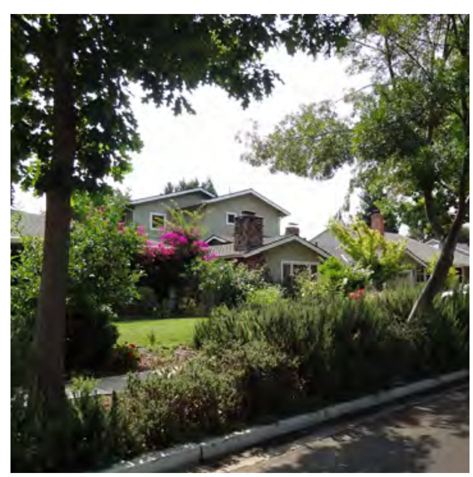
- Long, rectilinear grid blocks shaped by curvilinear avenues, with dimensions averaging from 300 to 800 feet.
- Separated from the Suburban Park neighborhood by Flood Park; accessible only from Bay Road and Van Buren Road.
- Quality pedestrian environment, including tree-lined sidewalks, landscaped buffers, and crosswalks (bottom left); however, Bay Road lacks consistent sidewalks.
- Bike/ped connectivity to other areas in the city is limited to one bike/ped overpass over Highway 101, and Ringwood Avenue to Middlefield Road.
- Highway 101 is a major enlosing feature with sound walls.

TYPICAL SITE DESIGN

- Small lot patterns create a compact and urban one- to two-story, single-family residential character; homes are close together with small front yards.
- Homes in the neighborhood are generally consistently maintained and landscaped (bottom middle).
- In addition to tree-lined, narrow streets, many residential lots include plentiful landscaping and trees (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

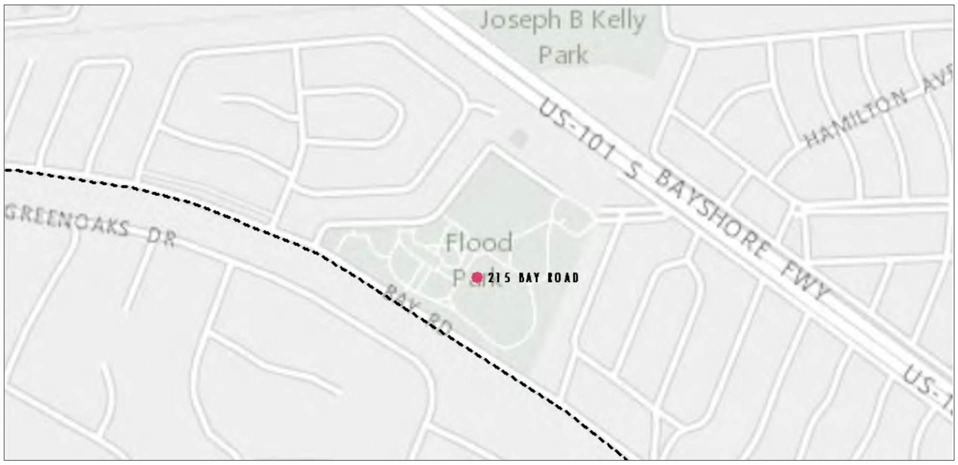




DEVELOPMENT HISTORY LORELEI MANOR, SUBURBAN PARK, AND FLOOD TRIANGLE

Suburban Park and Flood Triangle developed largely during the late 1940s. Before 1940, 59 houses had been built in these neighborhoods and, by 1950, 451 houses had been built, largely in Suburban Park and Flood Triangle. During the 1950s, 417 houses were built or renovated in the neighborhood. Many of the new houses built during this decade were built in Lorelei Manor. The neighborhoods possess visual cohesiveness due to the predominance of small 1940s and 1950s ranch houses, lacking in architectural ornamentation.

EARLY BUILDINGS



- Flood Park, 215 Bay Road (Colonial Revival stlyle)

EXAMPLES OF EARLY BUILDINGS

- Flood Park is a 21-acre county park established on a portion of the old James C. Flood estate by the Works Project Administration after 1936. The Headquarters (in addition to wall at Bay Road) was built of stabilized adobe.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- Predominantly small, single-family ranch houses, one story in height dating to the 1940s and 1950s.
- The 1940s dwellings are often clad in stucco and many have sparce classical details. The 1950s ranch houses are clad in a variety of materials and are largely Mid-Century Modern in style, featuring long, low profiles, and informal, minimal architectural details.

THE WILLOWS (NORTH LAUREL)

URBAN FORM

North Laurel is the northern section of The Willows neighborhood, bounded by Willow Road, O'Keefe Street, Highway 101, and the City of East Palo Alto. The area is unified by consistent parcel size, housing stock, and streetscape.

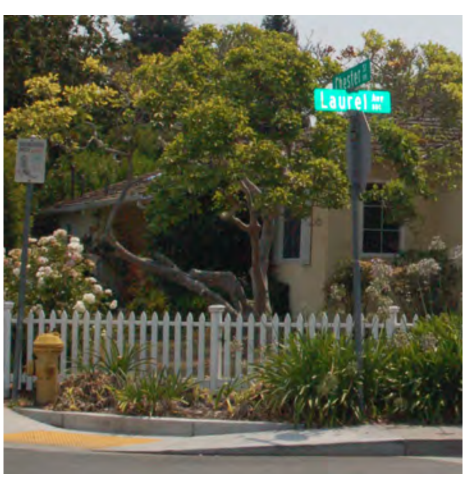
BLOCK STRUCTURE

- Small to medium rectilinear blocks in a grid system, with some blocks shaped by Highway 101 and Willow Road.
- Block dimensions range from 300 to 800 feet.
- Neighborhood connectivity supported by small block lengths.
- Consistent sidewalks and curbs promote walkability (bottom left).
- Larger commercial parcels front Willow Road.

TYPICAL SITE DESIGN

- Consistent residential parcel sizes and shapes, generally long, and narrow.
- One- to two-story single-family units of various architectural styles and conditions of maintenance.
- Post-War housing is distinguished by attached garages.
- Homes have front yards, deep backyards, and narrow side yards (bottom middle).
- Front yard landscaping and fence treatment is varied ranging from formal to organic.
- Not many street trees; most mature trees are planted in yards (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER



THE WILLOWS (SOUTH LAUREL)

URBAN FORM

South Laurel is a small area in the central part of The Willows neighborhood, concentrated around Walnut Street and Menalto Avenue. The area is unified by consistent parcel size, housing stock, and streetscape, and has distinct mature street trees.

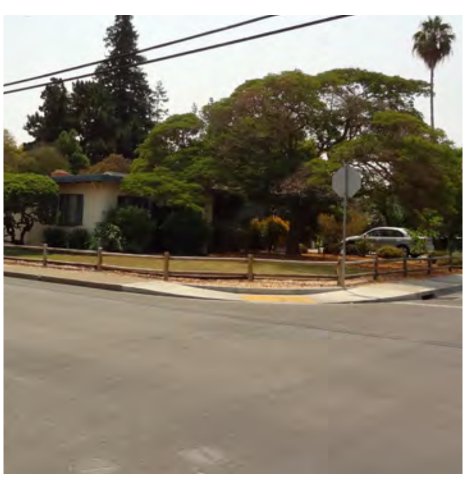
BLOCK STRUCTURE

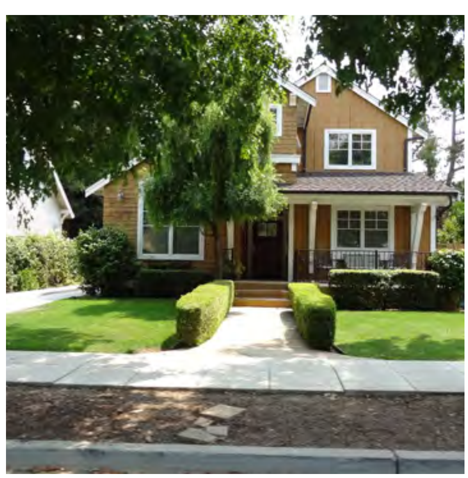
- Combination of small to medium rectilinear and curvilinear blocks in semi-grid system; streets curve as they approach San Francisquito Creek.
- Blocks range from 300 to 800 feet and are divided by a consistent alleyway network running parallel to Menalto Avenue.
- Neighborhood connectivity and walkability is supported by small block sizes and street connections; however, connection to Willow Road is limited to Gilbert Avenue.
- Excellent pedestrian amenities, including consistent sidewalks and curbs and consistent street trees (bottom right).

TYPICAL SITE DESIGN

- In general, consistent residential parcel sizes and shapes, generally long, and narrow; parcels are unique in shape and size in the southern portion, defined by winding roads and the creek.
- One- to two-story single-family units of various architectural styles and generally good condition with attached garages (bottom middle).
- Large front yards, deep back yards, and narrow side yards.
- Front yard landscaping and fence treatment is varied ranging from formal to rustic (bottom left).
- Combination of street trees and on-site trees and landscaping provide a lush, green character (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER





THE WILLOWS (O'CONNOR)

URBAN FORM

O'Connor is a subarea of The Willows, generally bounded by O'Connor Street, Menalto Avenue, Woodland Avenue, and Euclid Avenue, bordering the Cities of East Palo Alto and Palo Alto. It is one of the more eclectic residential areas in the city, with a varied and diverse development pattern varying from parcel to parcel.

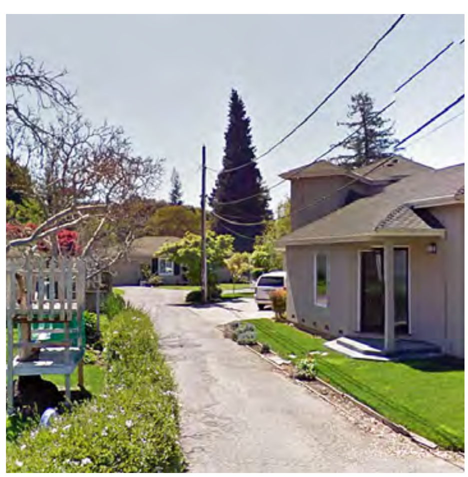
BLOCK STRUCTURE

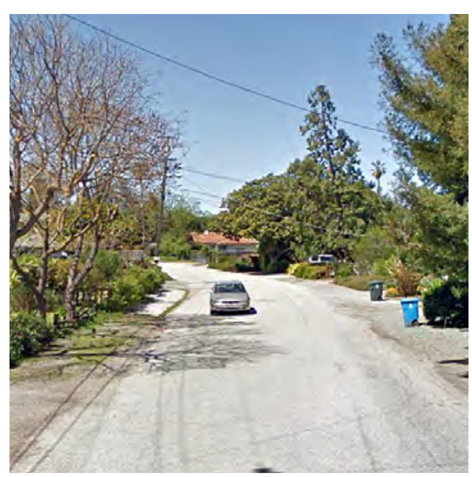
- Large blocks bounded by slighlty winding roads, which follow the natural contours of San Francisquito Creek.
- Block dimensions vary greatly and range from 500 to 2,100 feet.
- Moderate neighborhood connectivity and walkability due to large block sizes and limited street connections, resulting from dead-ends and cul-de-sacs.
- Limited consistent sidewalks and curbs (bottom left).
- Oak Court and Woodland Avenue break the traditional grid pattern and are slightly curvilinear.

TYPICAL SITE DESIGN

- Greatly varied parcel shapes, sizes, and orientation.
- Larger parcels subdivided into smaller ones are common, with some parcels in the interior of blocks requiring private driveways for access to the street network (bottom middle).
- Mix of one- to two-story single-family architectural styles and front and side yard landscaping treatment.
- Absence of sidewalk, curb, or gutter in many areas contribute to a rural visual style (bottom right).
- Mature street trees are located primarily on private properties in front setback areas and not in street right-of-ways.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER





THE WILLOWS (SOUTH OF GILBERT)

URBAN FORM

South of Gilbert is a subarea of The Willows, concentrated around Gilbert Avenue, Willow Road, and San Francisquito Creek. South of Gilbert contains some older homes on smaller lots than the rest of The Willows, characteristic of neighborhoods closer to the city center. Although architecture varies, landscaping, streetscape, and building size commonalities contribute to a cohesive character.

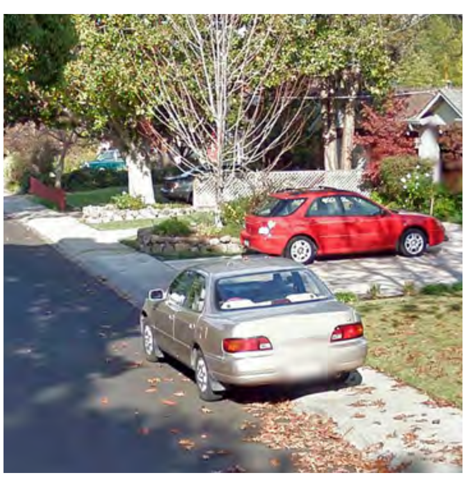
BLOCK STRUCTURE

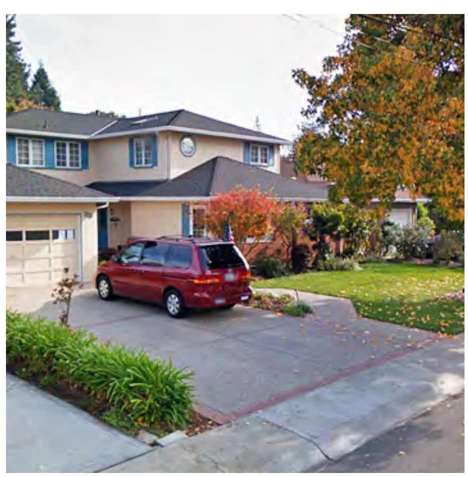
- Medium and large curvilinear blocks.
- Block dimensions range greatly from 300 to 1,600 feet.
- Moderate neighborhood connectivity and walkability due to large block sizes and winding and discontinuous streets.
- Generally consistent sidewalks and street trees; cars sometime parked in rolled-curb areas (bottom left).
- Good amount of mature trees on most streets and front setback areas.

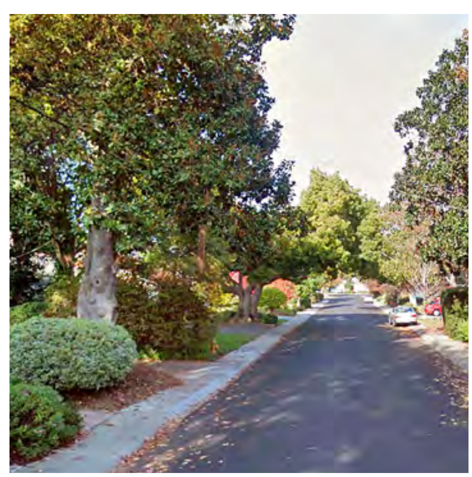
TYPICAL SITE DESIGN

- In general, consistent rectangular residential parcels with depths slightly longer than widths, generally smaller than those in the rest of The Willows neighborhood; parcels become more unique in shape and size in the southern portion, defined by winding roads, and along the creek.
- One- to two-story single-family units of various architectural styles and good condition.
- Post-War housing is distinguished by attached garages.
- Large front yards, smaller back yards, and narrow side yards (bottom middle).
- Rolled curbs, abundant mature street and front yard trees, and earthy landscaping contribute to a woodsy visual character (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER







DEVELOPMENT HISTORY

Like many Menlo Park neighborhoods, The Willows took shape largely after World War II with the construction of ranch houses; however, portions of the neighborhood that were subdivided earlier possess a pre-war enclave appearance. The earliest remaining house in The Willows is the McKendry House of 1902 at 244 Robin Way. During the next decade, at least 13 other houses were built in The Willows on Pope Street, O'Connor Street, Central Avenue, Woodland Avenue and Laurel Avenue. The peak of construction activity in The Willows occurred during

(continues, next page)

EARLY BUILDINGS

City Limits

- 244 Robin Way (Colonial Revival style)
- 315 Central Avenue (Prairie style)
- 1956 Menalto Avenue (Craftsman style)
- 102, 117, 125, 202 Pope Street (Craftsman styles)
- 302 Pope Street (Bungalow style)
- 318 Laurel Avenue (Ranch style)
- 369 O'Connor Street (Bungalow style)

EXAMPLES OF EARLY BUILDINGS

Source: Zillow ©

- 202 Pope Street (left) is a 1908 house, which exhibits several important traits typical of Craftsman design, while also conveying the individuality that characterizes many, if not all, houses of this movement. In keeping with the bungalow subset of the Craftsman style, the large, cross-gable roof over the first floor has a prominent second floor dormer and deep overhangs with exposed rafter tails. The first floor window boxes are supported on prominent brackets with knee braces. The upper sashes of the large windows have small, square divided lights. While a front porch is nearly mandatory for bungalows, this one introduces a twist on the convention, covering only part of the front facade and having a second floor.

- 302 Pope Street (left) is a two-story, bungalow style house from the Arts and Crafts era, which was popular between 1880-1910. It exhibits characteristic shallow sloped roof planes, deep eaves supported by wood brackets and multi-light doors and sash.

the 1940s and 1950s, with 565 and 538 houses built during these decades, respectively, as compared to 345 built before 1940, and 294 and 368 built during the 1960s and 1970s, respectively. Construction in the neighborhood increased during the 1990s, after a decline during the 1980s, and has continued with the construction of two-story homes and second story additions today.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- Primarily medium-sized lots. Some large lots with deep front yards, sometimes with parkways, and generous side setbacks. Earlier houses typically do not have driveways and were commonly accessed by the alleys behind the properties.
- Predominantly single-family dwellings, one- or two-stories in height, that reflect architectural styles from the first half of the 20th century.
- As typical of other Menlo Park neighborhoods, the residential styles vary from historic styles common between World War I and II (left and bottom left) and ranch houses lacking in historical details.

SOUTH OF SEMINARY/VINTAGE OAKS

URBAN FORM

South of Seminary/Vintage Oaks is a neighborhood centered around St. Patrick's Seminary. The winding, walled-in development of the west end is functionally and aesthetically bisected by Santa Monica Avenue from the grid pattern to the east.

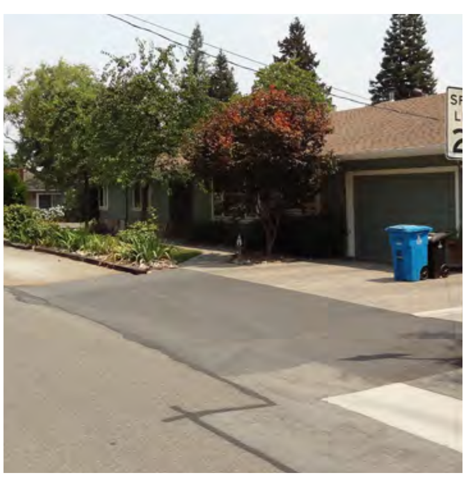
BLOCK STRUCTURE

- Winding, curvilinear blocks (west of Santa Monica Avenue) juxtapose the rectilinear grid east of Santa Monica Avenue; the development pattern is defined by irregular shape of St. Patrick's Seminary and bounding roadways.
- Generally long block lengths with some shorter, more walkable blocks east of Santa Monica Avenue.
- Seminary Oaks park and playground area is central to the neighborhood.
- Aside from Willow Road and Coleman Avenue, connectivity is limited; sidewalks are not present on most streets as rural, valley gutters are typical (bottom left).
- Many interior streets end in cul-de-sacs.

TYPICAL SITE DESIGN

- Parcelization patterns are distinct on both sides of Santa Monica Avenue; the west side exhibits larger, curved lots (bottom middle) while the east side includes more rectangular, smaller plots (bottom right).
- Generally, bigger and deeper parcels than surrounding areas, accommodating bigger yards and two-story homes.
- Rolled-curbs and un-paved walking areas create a rural-suburban character (bottom left).
- Privacy walls and heavy landscaping west of Santa Monica Avenue emphasize a feeling of privacy.
- Contemporary architecture styles west of Santa Monica Avenue, while architecture styles vary by style and decade on the east side.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER



DEVELOPMENT HISTORY

A few dwellings were built in the neighborhood through the 1930s. The post-war era saw the greatest growth in the South of Seminary/Vintage Oaks Neighborhood, with the construction of 234 and 201 dwellings during the 1940s and 1950s, respectively. Construction tapered off during the three subsequent decades, to peak again during the 1990s when the 145-unit Vintage Oaks development was built.

EARLY BUILDINGS

- 114 Santa Margarita Avenue {Colonial Revival style}
- 300 Middlefield Road (Vernacular)
- 320 Middlefield Road (Second Empire style)

EXAMPLES OF EARLY BUILDINGS

- 114 Santa Margarita Avenue (far left), now an office building, was built as a single-family classically-detailed house. Characteristic of its Classical or Colonial Revival style, is its boxy form with lapped siding, pilasters at the front corners and hipped roof (lowered when the building was moved).
- 300 Middlefield Road (left) is an old fire station that is a simple wood-frame vernacular building, characterized by its simple-gable roofed form and bell tower. It was moved from ts original location and is scheduled to be relocated to downtown Menlo Park.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

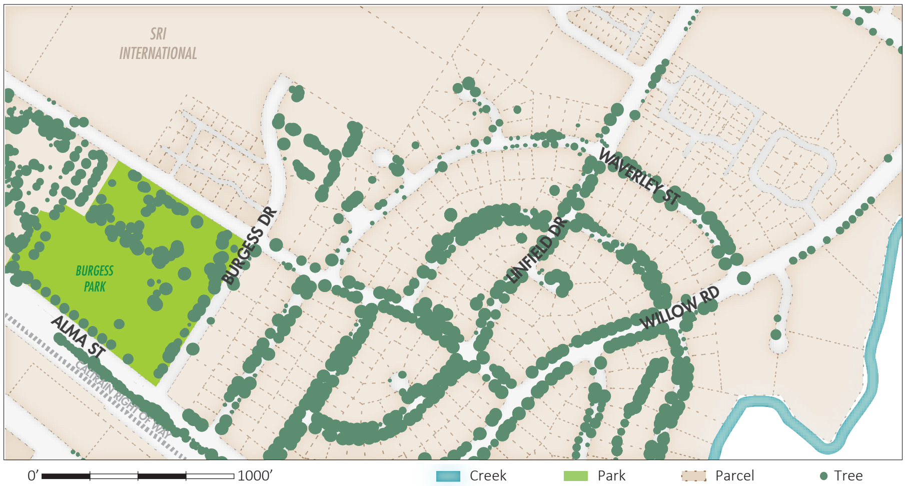
- Single-family, one-story Moderne and ranch dwellings predominate, giving the area a visually cohesive appearance.
- The older houses in the neighborhood are typically small dwellings originally built on modest budgets. Where historic details were used in the original construction, these details are spare; examples of these spare details include 4x4 wood porch posts with small capitals.

LINFIELD OAKS

URBAN FORM

The Linfield Oaks neighborhood is concentrated around Linfield Drive and Laurel Streets. The majority of the neighborhood consists of commercial, office, research, and recreational uses; residential development is concentrated around Willow Road. The SRI campus comprises 62 acres of the area northeast of Burgess Park. The neighborhood is known for its mature street trees, spacious lot sizes, and nearby amenities.

BLOCK STRUCTURE

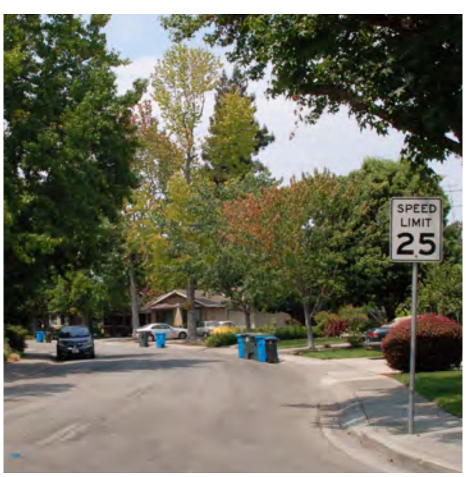


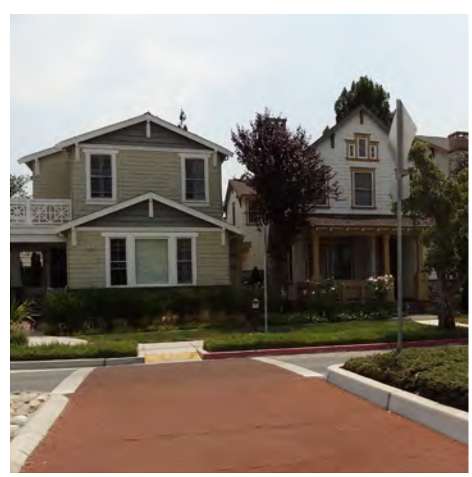
- Large commercial blocks along Middlefield Road and Ravenswood Avenue buffer winding, curvilinear residential blocks near Willow Road.
- Walkable residential blocks average 200 to 800 feet in length and connect residents to Burgess Park, one of the city's recreation centers.
- The residential block pattern is oriented around curving Willow Road; commercial and office blocks line Middlefield Road and Linfield Drive.
- Pedestrian amenities include continuous sidewalks of various widths, consistent and mature sidewalk trees, and street connectivity (bottom left).
- Connectivity to West Menlo is limited to Ravenswood Avenue to the northwest. The neighborhood is connected to Caltrain and Palo Alto via Alma Street.

TYPICAL SITE DESIGN

- Unique parcel shapes are defined by winding roads; large residential lot sizes allow for bigger one- to two-story homes and spacious front yard areas (bottom middle).
- Most homes depict post-war era and ranch style characteristics, and are well-maintained, openly landscaped, and exhibit an overall feel of uniformity.
- Blocks have a mixture of rolled curbs on interior streets and curb and gutter on major streets, all lined with consistent mature street and front yard trees.
- Linfield Oaks contains a small, new urbanist-style, compact development built on smaller parcels than the rest of the neighborhood and features walkable streets (bottom right).
- Two-story, multi-family residential buildings with minimal architectural details are prevalent along Willow Road, Waverley Street and Alma Street.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER





DEVELOPMENT HISTORY

Most of residential areas of Linfield Oaks were subdivided and re-subdivided during the 1950s. Residential construction peaked during the 1950s with 644 dwellings built during that decade by comparison to 116 in the 1930s to 1940s and 188 in the 1960s. Construction, which appears to include remodeling, experienced a small spike during the 1970s.

EARLY BUILDINGS

- Building 2, USGS, 345 Middlefield Road (Miesian style)
- Barron-Latham-Hopkins Gate Lodge at 555 Ravenswood Avenue (Second Empire style)
- California Historical Marker at Landmark Site #2, the site of the end of Portolá's 1769 journey near the intersection of East Creek Drive and Alma Street in Menlo Park, California

EXAMPLES OF EARLY BUILDINGS

- Building 2, USGS, 345 Middlefield Road (far left) was designed with perimeter concrete columns supporting concrete floor and roof slabs and glass walls bridging the horizontal slabs—a characteristically Miesian design. The building's exterior is characterized by the repetition of curtain wall window bays with windows (now replaced) over solid masonite panels. (Exterior steel trusses were added in 1977.)
- The Baron-Latham-Hopkins Gate Lodge (left) is Second Empire gatehouse of wood construction with lapped siding and bell-cast Mansard roof. The roof is clad with patterned wood shingles and punctuated with dormer windows. Classical details ornament the dormers. The building is a rare example of this style in Bay Area and is listed on the National Registry of Historic Places.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

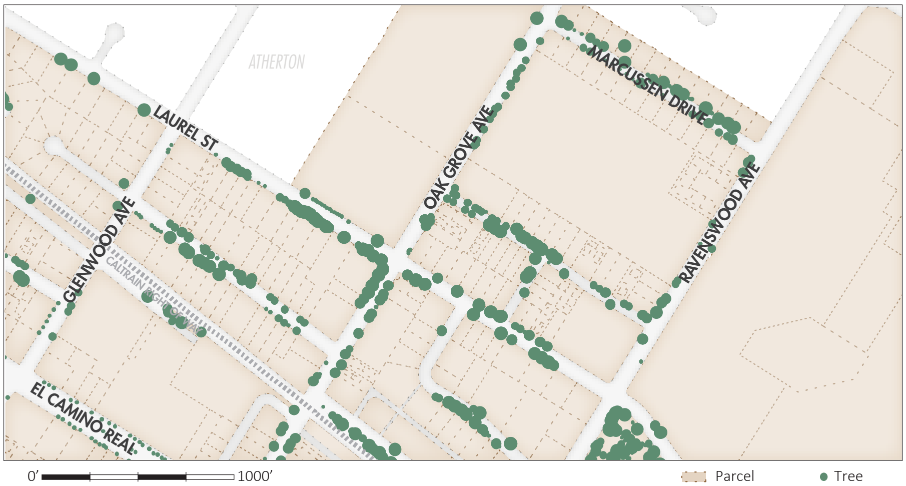
- A mix of single- and multi-family dwellings that are consistent in size and date than many neighborhoods (1950s) give the neighborhood a cohesive appearance.
- Ranch-style (far left) and Mid-Century Modern (left) are the prevailing architectural styles.

CENTRAL MENLO

URBAN FORM

Central Menlo is a residential neighborhood generally bounded by Ravenswood Avenue, Glenwood Avenue, Marcussen Drive, and the Caltrain tracks. As one of the city's older neighborhoods with examples of buildings built at the turn of the century, Central Menlo exhibits traditional development patterns and urban forms, consisting of compact, urban lots filled with dense single-family and multi-family buildings, and benefits from its proximity to Caltrain, parks, and other amenities.

BLOCK STRUCTURE

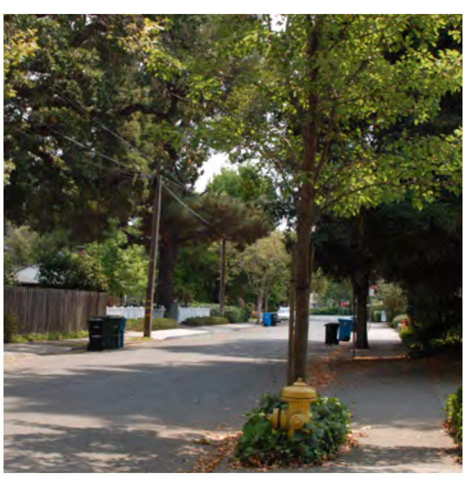


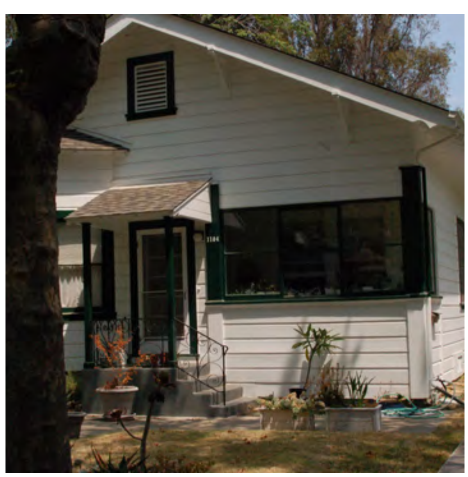
- Mid- to large-sized blocks developed in a rectilinear pattern; some blocks are defined by the Caltrain tracks which disrupt the grid at an angle.
- Walkable blocks dimensions range widely between 200 to 1,000 feet.
- Overall good connectivity,
- Good pedestrian amenities including ample sidewalks, curbs, street trees, and clear pedestrian crossings over railroad tracks (bottom left).

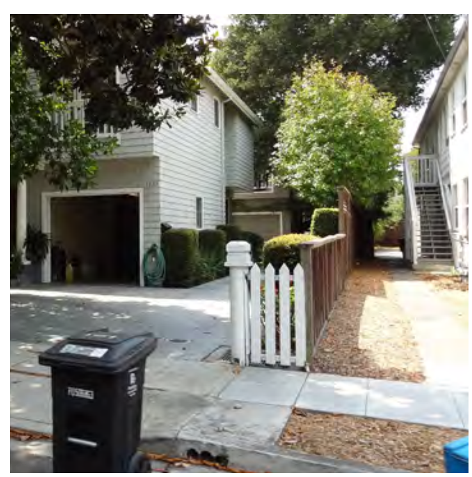
TYPICAL SITE DESIGN

- Mixture of medium-sized lots, compact single-family residential and multi-family buildings (bottom middle).
- Long and narrow parcelization patterns result in adjacent residences close together, leaving small side and front yard areas (bottom right).
- Like some of the city's other older neighborhoods, the buildings in Central Menlo vary considerably in type, size, and character.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER



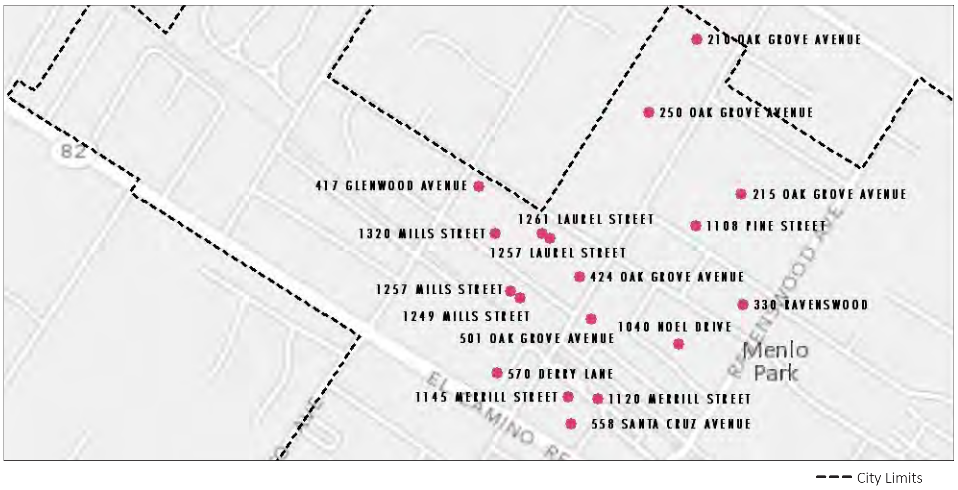




DEVELOPMENT HISTORY

There was a steady increase of homes built to the1950s with 231 units built and a similar steady decline in housing construction to 1990. The most active decade for construction in Central Menlo was the 1990s, with more than 250 units built or remodeled. Central Menlo is one of the most visually eclectic neighborhoods, characterized by juxtapositions of single- and multi-family dwellings of varied size, date, and style.

EARLY BUILDINGS



- Caltrain Station, 1120 Merrill St (Victorian Style)
- 558 Santa Cruz Ave, 570 Derry Ln (commercial buildings)
- 417 Glenwood Avenue (Stick style)
- 1249 Mills Street (Vernacular-Craftsman style)
- 424 Oak Grove Ave, 1320 Mills St (Folk Victorian style)
- 210, 215 Oak Grove Ave (Late Gothic Revival)
- 250 Oak Grove Ave (Classical Revival style)
- 501 Oak Grove Ave (Italianate style)
- 1040 Noel Dr (Italianate style), Edgar Mills Estate/Bright Eagle, eligible for National Register
- 1261 Laurel Street (Craftsman Bungalow style)
- 1257 Mills St, 1145 Merrill St, 1257 Laurel St, 1108 Pine St (Colonial Revival styles)
- 330 Ravenswood (undetermined style)

EXAMPLES OF EARLY BUILDINGS

- 1108 Pine Street (far left) and 1257 Laurel Street (left) are one-story wood-frame examples of the Colonial Revival style. Both date to 1907 and share, asymmetrical elevations with inset porches balanced by bay windows, classical details and hip roofs with central dormers. They vary somewhat in size and scale.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- The majority of dwellings are single- and multi-family that vary widely in size and style, giving the neighborhood an eclectic character.
- The styles of construction vary from historic styles of the early 20th century (far left) to Mid-Century Modern (left).

FELTON GABLES

URBAN FORM

Felton Gables is a small, enclosed neighborhood, bounded by Encinal Avenue, the Caltrain tracks, and the Town of Atherton. The unique neighborhood consists of well-maintained homes on relatively large lots and has its own zoning district. Although secluded, Felton Gables benefits from its proximity to schools, El Camino Real, and Caltrain.

BLOCK STRUCTURE

- Enclave of slightly winding blocks oriented in a rectilinear pattern.
- Block dimensions range between 250 and 1,100 feet.
- Connectivity within the neighborhood is good, however, connectivity to surrounding neighborhoods and Atherton is limited to Encinal Avenue.
- Limited pedestrian amenities due to a lack of consistent sidewalks and curbs; most streets have valley gutters adjacent to front lawns or parking areas (bottom left).

TYPICAL SITE DESIGN

- Generally larger one- to two-story residential buildings set back from the street (bottom middle).
- Larger parcels than the city's other neighborhoods provide large yard areas in the front and sides.
- Well-maintained residences of various ages and architectural styles.
- Winding roads and valley gutters add to a rural-suburban ambience.
- Front yard landscaping varies by property, ranging from manicured to naturalistic (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

DEVELOPMENT HISTORY

Felton Gables developed over many decades. Nine houses were built before 1939, 15 in the 1940s, 27 in the 1950s, 36 in the 1960s, 26 in the 1970s, and 20 in the 1980s. Construction activity in the neighborhood peaked again during the 1990s, tapered off significantly during the first half of the 2000s and rose again after 2005. Large-scale additions or remodels account for much of the construction activity from the 1960s on.

EARLY BUILDINGS

- 207 Felton Drive (Ranch style)
- 239 Felton Drive (Ranch style)
- 300 Felton Drive (Monterey Revival style)
- 466 Felton Drive (Ranch style)
- 204, 217 Lennox Avenue (Monterey Revival style
- 300 Lennox Avenue (Tudor Revival style)

EXAMPLES OF EARLY BUILDINGS

- 300 Felton Drive (far left), illustrates the Monterey Revival style, characterized by gently sloped gable roofs, wood-frame construction, wrap-around veranda and multi-light window sash.
- 300 Lennox Avenue (left) is a Tudor Revival dwelling that occupies one of the larger lots in the neighborhood. It is characterized by gable-roofed forms with pronounced chimneys, a central tower, half-timbering, and multi-light sash.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- Period revival styles, including Tudor, Mediterranean, Monterey, Colonial, and ranch (far left).
- Single-family dwellings that are more consistent in size and date than other Menlo Park neighborhoods (1930s-1950s), give the neighborhood a cohesive visual appearance
- The houses are typically large, rambling, one-story dwellings, designed in period revival styles of the 1930s and 1940s to mid-century modern (left).

PARK FOREST

URBAN FORM

Park Forest is a small cluster of townhomes bounded by Stone Pine Lane, Forest Lane, and Buckthorn Way. This unique area is distinct from the rest of the city due to its urban residential scale and building typology.

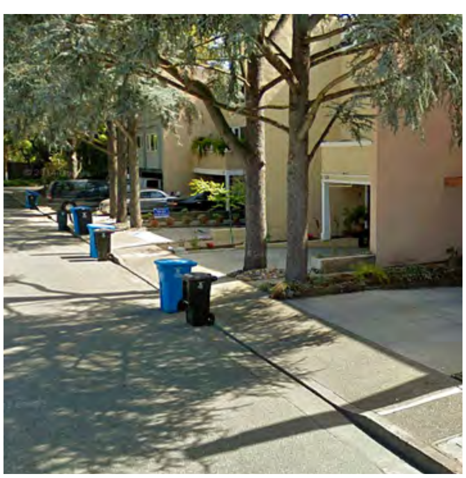
BLOCK STRUCTURE

- Small, walkable, rectilinear blocks.
- Block dimensions average between 300 and 500 feet.
- Excellent pedestrian environment, including tree-lined sidewalks and street connections (bottom left).
- Connectivity to other parts of Menlo Park and other cities is limited to El Camino Real; Caltrain tracks inhibit connections to the northeast.

TYPICAL SITE DESIGN

- Compact and urban parcelization with long, narrow dimensions.
- Two- to three-story townhome style units at the front parcel line with no side yards and attached units (bottom middle).
- Tuck-under garages on the first floor are featured prominently and front the street on many lots, with two stories of residential space on top (bottom right).
- Vertical-oriented building components and rhythm.
- Well-kept buildings with modern, contemporary architectural styles.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER



SPRUCE

URBAN FORM

Spruce is a small single-family neighborhood, roughly consisting of parcels between Spruce Avenue and Buckthorn Way.

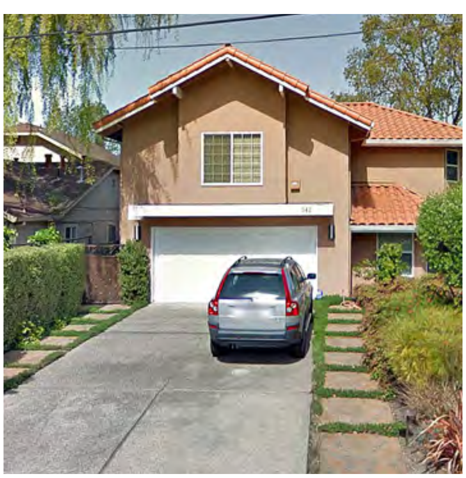
BLOCK STRUCTURE

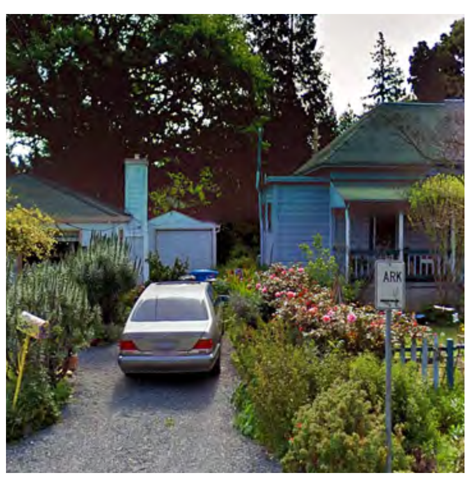
- Small, rectilinear blocks.
- Block dimensions average between 300 and 800 feet.
- Lack of sidewalks or curbs.
- Connectivity to other parts of Menlo Park and other cities is limited to El Camino Real; Caltrain tracks inhibit connections to the northeast.

TYPICAL SITE DESIGN

- Medium-sized, consistently rectangular, and long and narrow parcels.
- One- to two-story, single-family residences with ample front and back yards, and narrow side yards (bottom left).
- Homes exhibit a variety of architectural styles and degrees of maintenance.
- Absence of sidewalks and curbs, combined with unpaved, dirt and gravel on-street parking areas contribute to a rural/suburban visual character (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER





SAN ANTONIO

URBAN FORM

San Antonio is a small block of apartment complexes, bounded by Encinal Avenue, Garwood Way, San Antonio Street, and Glenwood Avenue. New townhomes have recently been constructed in the neighborhood.

BLOCK STRUCTURE

0' 1000' Parcel Tree

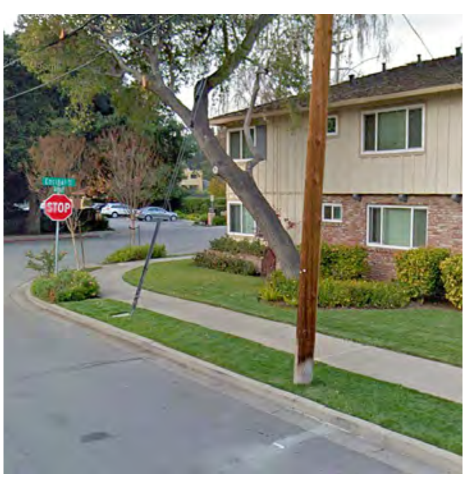
- Small, walkable rectangular block.
- Block measures 300 by 1,100 feet.
- Well-connected to surrounding streets.
- Pedestrian amenities include consistent sidewalks and curbs (bottom left).

TYPICAL SITE DESIGN

0 600'

- Long and narrow parcels, with some parcels spanning the entire block width.
- Typical siting is a two- to three-story apartment building set back from the street, accessed by a paved driveway for vehicles on the ground floor (bottom middle).
- Tuck-under garages and carports on the first floor are featured prominently and front the street on many lots, with two stories of residential space above.
- Buildings generally typify 1960s and 1970s style apartment design, with side entrances, private and blank frontages, and bulky, unrefined massing that emphasizes horizontality rather than verticality (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER



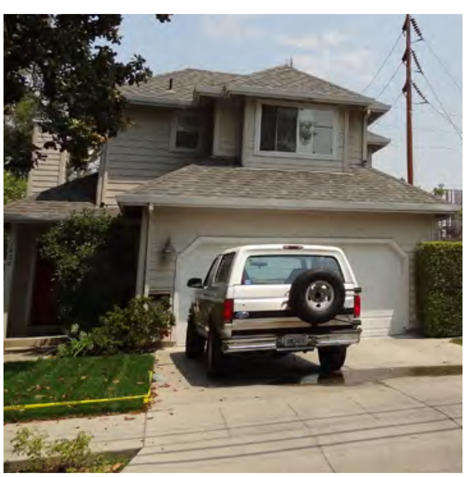
DEVELOPMENT HISTORY PARK FOREST, SPRUCE, AND SAN ANTONIO

Residential development rose steadily in these neighborhoods and peaked in the 1960s with the construction of 38 dwellings. Approximately 24 dwellings were built or remodeled annually during the three subsequent decades.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- Two dwelling types predominate: small single-family dwellings of vernacular architecture (left), sometimes with driveways, and single-family townhouses with two floors of living space over garages and vestibules.

- Park Forest's modern townhouses have a uniform appearance, unique in Menlo Park.

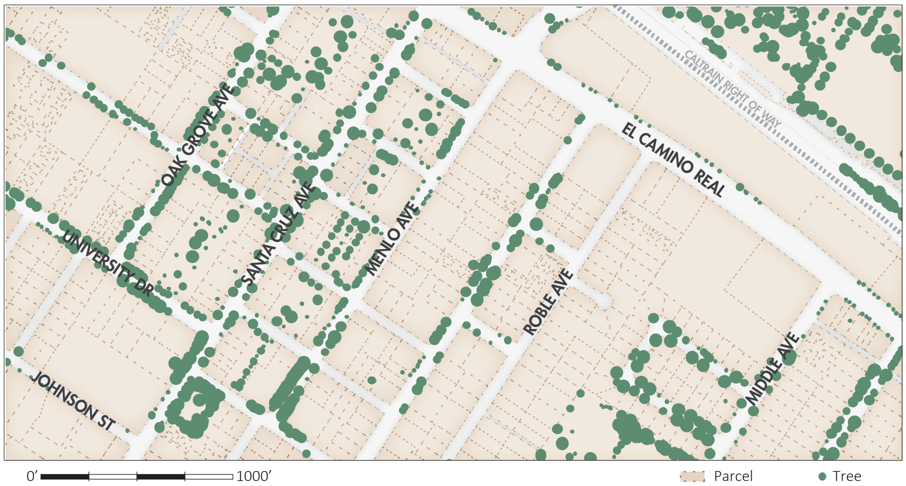


DOWNTOWN

URBAN FORM

Downtown is a walkable neighborhood of businesses, small lots, and densely-built homes and apartments, south of El Camino Real. One of the city's oldest neighborhoods, it is characterized by streets lined with mature trees, organized in a grid with numerous street connections. Downtown is conveniently located near El Camino Real and the Caltrain station.

BLOCK STRUCTURE



- Blocks of various sizes on a rectilinear grid system, oriented to El Camino Real and Santa Cruz Avenue.
- Block dimensions range widely between 250 and 1,000 feet.
- Neighborhood walkability and interconnectivity is excellent; however, connectivity to Menlo Park on the Bayside of El Camino Real is limited to Oak Grove Avenue, Menlo Avenue, and Valparaiso Avenue.
- Pedestrian amenities include consistent sidewalks and curbs, crosswalks, and mature street trees.
- Santa Cruz Avenue, Downtown's main retail street, is pedestrian-oriented and a citywide destination (bottom left).

TYPICAL SITE DESIGN

- A variety of parcel sizes generally rectangularly shaped; larger commercial parcels are in the Downtown core, while some smaller, narrow parcels can be found in the residential areas.
- Commercial and residential development have little to no front setback; residential units have shallow front yards and narrow side yards.
- A mixture of small, single-family dwellings and larger blocky multi-family units.
- Varied building frontages range from ground-floor porches of single-family homes, to side entrances to apartments, to carports and tuck-under parking areas facing the street.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

DEVELOPMENT HISTORY

Downtown experienced a steady increase in construction before 1959; 173 homes were built before 1939, 240 between 1940 and 1949, and 364 between 1950 to 1959. Construction tapered off to 213 homes during the 1960s, 276 during the 1970s, and fewer in the later decades. There are a number of ranch houses and other dwelling types with Moderne and Colonial Revival influences and a scattering of period revival dwellings built before 1940.

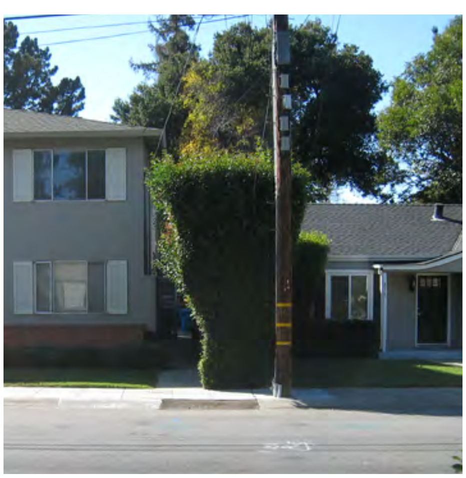
EARLY BUILDINGS

- 957 University Drive (Mediterranean Revival style)
- The Nativity of the Holy Virgin Church at 1220 Crane Street (Gothic Revival style)

EXAMPLES OF EARLY BUILDINGS

- The Nativity of the Holy Virgin Church (Holy Trinity Episcopal Church/Russian Orthodox Church, far left) was moved from its original location to 1220 Crane Street in 1957. It is a one-story, wood-frame Gothic Revival church with a steeply pitched mass containing the nave and projecting bay containing a vestibule. It is eligible for the National Registry. The rustic siding and shingles, stickwork eave details, stained glass windows and cross at the ridge characterize the style and nature of the building.
- 957 University Avenue (left) exhibits stucco, red clay roof tiles and large, arched window opening below a central gable, an example of Spanish colonial or Mediterranean Revival style.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER



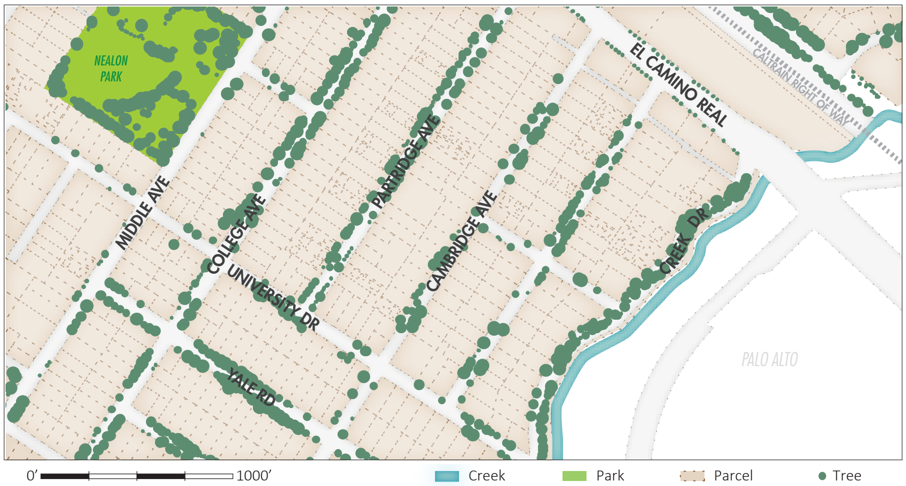
- Variety of single- and multi-family dwellings that differ widely in scale and design—a characteristic of the second quarter of the 20th century.
- Building mass varies from small dwellings with porches or projecting wings, to large blocky buildings containing multiple dwelling units.
- Styles of the buildings vary from historic styles of the 1930s to mid-century modern.

ALLIED ARTS/STANFORD PARK

URBAN FORM

Allied Arts/Stanford Park is one of Menlo Park's older neighborhoods, characterized by a grid of blocks, streets lined with mature trees, and small, older residences. It is generally bounded by El Camino Real, Middle Avenue, and Creek Drive, and is close to San Francisquito Creek, which lends a natural aesthetic to the neighborhood.

BLOCK STRUCTURE

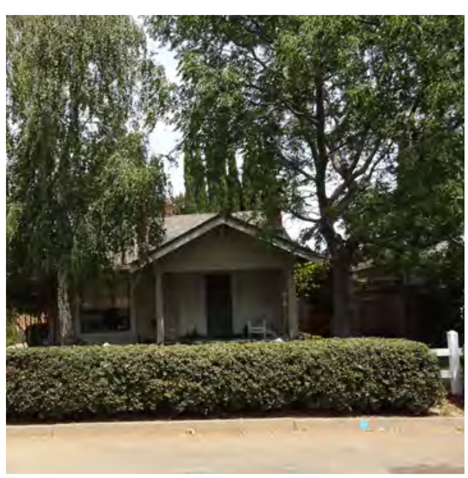


- Medium and large blocks on a rectilinear grid system, with some unique block shapes defined by San Francisquito Creek.
- Block dimensions range between 300 and 1,600 feet.
- Neighborhood walkability and interconnectivity is excellent; however, connectivity to Menlo Park on the Bayside of El Camino Real is limited to crossings at Middle Avenue and Cambridge Street.
- Generally good pedestrian amenities, including consistent sidewalks and curbs on most streets, crosswalks, and mature street trees with patches of amenity gaps (bottom right).
- Home to the Allied Arts Guild, which is a citywide and regional destination and venue (bottom left).

TYPICAL SITE DESIGN

- Consistent long and narrow parcels, generally medium-sized.
- Primarily one- to two-story, single-family buildings with front yards and narrow side yards, generally small residences, with some larger two-story buildings (bottom middle).
- Densely landscaped and tree-lined streets and front yards, usually in a naturalilstic and unmanicured style (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER



DEVELOPMENT HISTORY

The character of the Allied Arts/Stanford Park Neighborhood derives in large part from similarities in the character of the houses built between 1926 and 1940, the peak years of construction of this neighborhood. These similarities result from commonalities in scale, massing, materials, and details that characterize the period revival styles of the 1920s and 1930s, including Colonial, Tudor and Mediterranean Revival Styles.

EARLY BUILDINGS

- 649 Harvard Avenue (Bungalow style)
- 700 Harvard Avenue (Colonial Revival-Prairie style)
- 727 Harvard Avenue (Western Stick style)
- 80 Yale Road (Tudor Revival style)
- Allied Arts Guild, 75 Arbor Road (Spanish Colonial Revival style)
- Allied Arts Guild, Creek and Arbor Roads (utilitarian outbuilding)
- California Historical Landmark, Capidro, 262 Princeton Road

EXAMPLES OF EARLY BUILDINGS

- 75 Arbor Road (far left) , the Allied Arts Guild, is a Spanish Colonial Revival site, characterized by Mission-inspired massing consisting of a main, two-story wing, one-story wings surrounding a courtyard, stucco cladding and red clay tile roofs. The 1990 Historic Building Survey identifies the Allied Arts Guild as a significant structure in the building type, "Art and Art-Related Properties, 1850-1940."
- 727 Harvard Avenue (left), a Western Stick style house, is characterized by its asymmetrical boxy form, visible stickwork brackets supporting deep eaves, a bay window, and a recessed, arched porch on the second floor.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- Predominantly single-family dwellings that are largely small in scale and one- or two-stories.
- The predominant styles of construction vary from period revival styles popular through the 1930s to combinations of Moderne, Colonial Revival styles and ranch house (left) forms, popular during the late 1930s and after.

WEST MENLO

URBAN FORM

West Menlo is bounded by Valparaiso Avenue, Arbor Road, Vine Street, and San Francisquito Creek. Due to its large area and history of development, West Menlo contains a variety of residential sizes, styles, and scales. Generally, West Menlo is tree-lined with rural sidewalk treatments.

BLOCK STRUCTURE

0' 1000'   Parcel   Tree

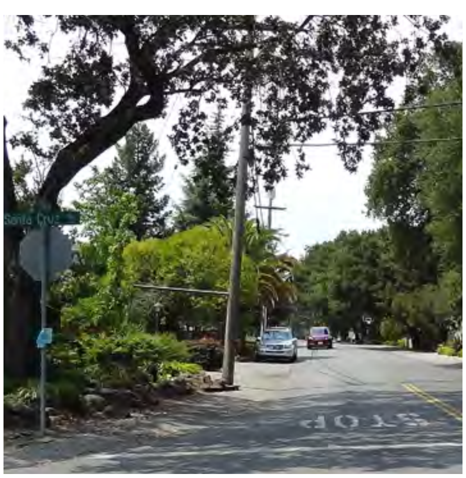
- Blocks are a variety of shapes and sizes due to the neighborhood's large area and numerous historical subdivisions; generally a grid-system with pockets of interior curvilinear streets and cul-de-sacs.
- A wide range of block dimensions.
- Generally, West Menlo is auto-oriented; pedestrian walkability and connectivity is affected by cul-de-sac patterns, proximity of street connections, and inconsistent sidewalks.
- Pedestrian amenities include inconsistent sidewalks and curbs; some sidewalks are built within property edges (below left).

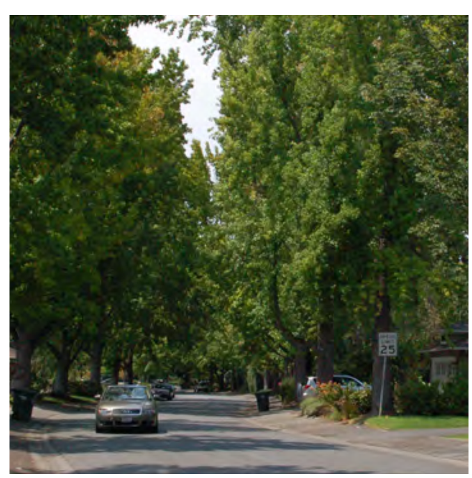
TYPICAL SITE DESIGN

0 600'

- A variety of parcel sizes generally rectangularly shaped, depending on location and subdivision.
- Blocks along San Mateo Drive, Robert S. Drive, Corinne Lane, and within The Hermosa Tract, centered around Hermosa Way, contains Menlo Park's larger residential parcels, where larger stately homes are set back from streets without sidewalks (below middle).
- In general, West Menlo contains some of the city's bigger residential parcels, although residences range from small to large.
- Parcels and home design follow the curving nature of San Francisquito Creek along tree-lined Bay Laurel Drive (below right).
- Due to the large area, architectural styles vary greatly.

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER





DEVELOPMENT HISTORY

West Menlo developed largely prior to 1960, with a steadily increasing number of dwellings built by then. 205 before 1939, 360 during the 1940s, and 833 during the 1950s. Construction dropped after 1959, with only 50 to 130 dwellings built per decade from 1960 to 2000. Mid-Century Modern dwellings predominate among the older housing stock in West Menlo, with a significant number of Period Revival style dwellings in evidence.

EARLY BUILDINGS

- 1241 Arbor Road (Mediterranean Revival style)
- 10 Maywood Lane (Stick style)
- 1060 Santa Cruz Avenue (Bungalow style)
- 1812 Santa Cruz Avenue (Tudor Revival style)
- 925 Valparaiso Avenue (Bungalow style)
- 1109 Valparaiso Avenue (Shingle-Craftsmant style)

EXAMPLES OF EARLY BUILDINGS


- 1060 Santa Cruz (far left) and 925 Valparaiso (left) are bungalow building types. Common to the two examples are their characteristic low-pitched roofs that emphasize the horizontality of the buildings' boxy masses, deep eaves, projecting porches with battered pillars, and multi-light over single-light window sashes.
- 925 Valparaiso Avenue (left) exhibits strong horizontal bands used as linear surface ornamentation and exhibits Secessionist or Prairie School influences.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER


Source: Estately.com.

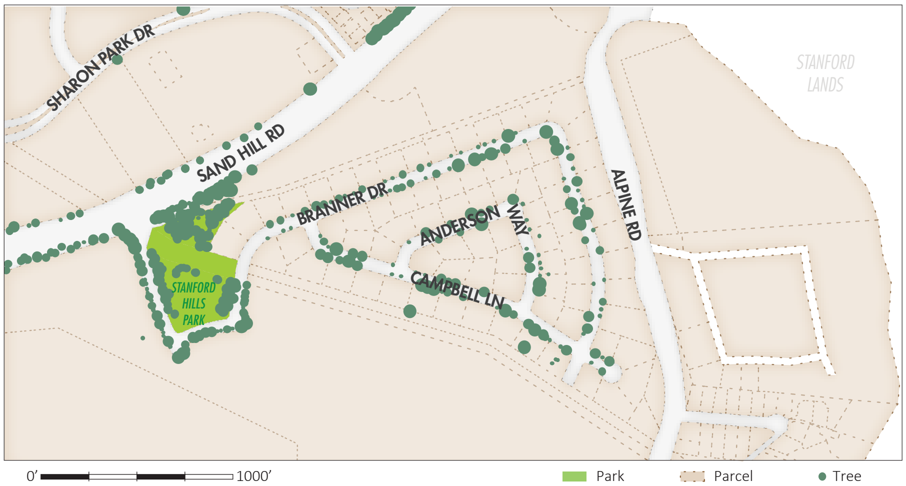
- Dwellings are typically single-family houses, one-and two-stories in height.
- Many houses are designed in Period Revival styles of the 1920s -1940s or as ranch houses of the 1940s-1950s (left).

STANFORD HILLS

URBAN FORM

Stanford Hills is a small enclave of homes near the southern tip of the city, bounded by Sand Hill Road, Alpine Road, and Campbell Lane. As with other neighborhoods near Highway 280 and away from the city center, Stanford Hills is a relatively recent neighborhood in Menlo Park, and as such, exhibits larger than usual parcels and residences.

BLOCK STRUCTURE

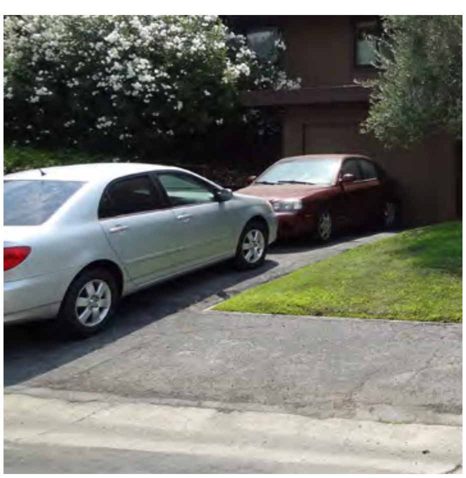


- Medium-sized blocks oriented in a triangular loop.
- Block dimensions range between 300 and 2,000 feet.
- Poor connectivity to other parts of Menlo Park; access is limited to one connection at Sand Hill Road.
- Limited pedestrian amenities, such as inconsistent sidewalk and curbs, crosswalks, gaps in facilities; some areas have valley gutters.
- Adjacent to Stanford Hills Park, a neighborhood amenity.

TYPICAL SITE DESIGN

- Large parcels with deep frontages compared to other Menlo Park neighborhoods (bottom middle).
- Larger, single-story homes with long front yards, narrow side setbacks and driveways leading to attached garages.
- Less tree and landscaping coverage compared to other parts of Menlo Park; front lawn landscaping generally more manicured and many are partially paved (bottom right).
- Many lots have long, paved driveways (bottom left).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER



DEVELOPMENT HISTORY

Records indicate few buildings were built in the neighborhood before 1950, with nine built before 1939 and four during the 1940s. In the three decades leading up to 1980, 11, 32 and 45 houses were built, respectively. Construction activity during the next three decades dropped to 1940s levels.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- The neighborhood is composed of single-family ranch houses that are more consistent in size and date than most neighborhoods (1960s-1970s), giving the area a cohesive appearance.

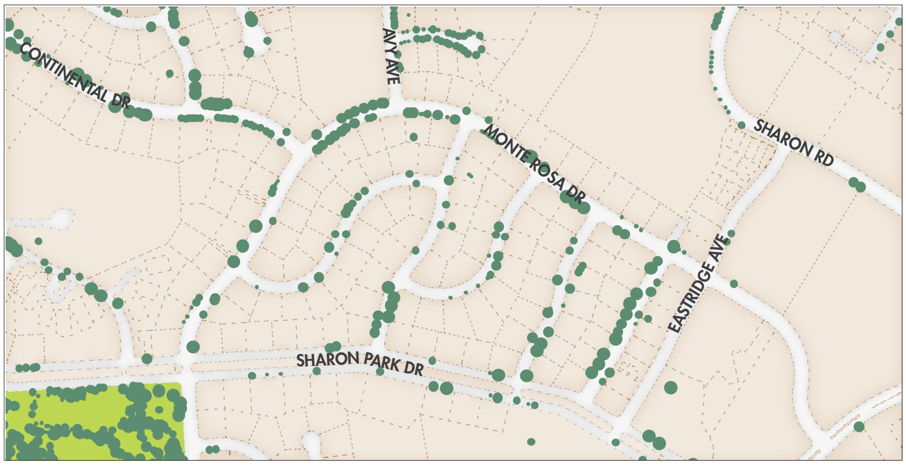
- The houses are typically long, narrow and rambling with integral garages. Their overall character is achieved by massing that is broken up into advancing and receding planes for effect under dominant, horizontally-oriented roofs.

SHARON HEIGHTS

URBAN FORM

Sharon Heights is one of Menlo Park's younger neighborhoods, which is typical of neighborhoods distant from the city center. It is foucsed around Sharon Park Drive. The large area consists of a variety of development types, including strip commercial, apartments and condos, and single-family residences. It is in close proximity to neighborhood parks and schools.

BLOCK STRUCTURE



0' 1000'

Park Parcel Tree

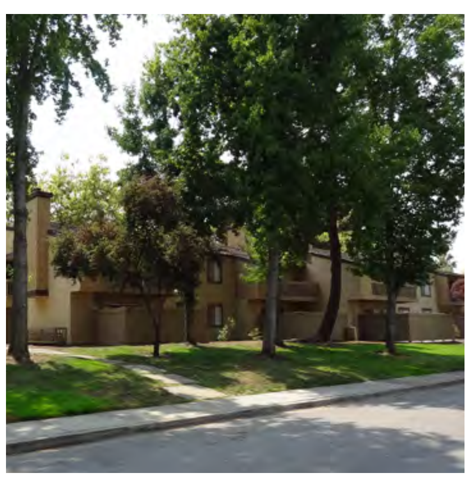
- Large and winding curvilinear blocks of a variety of shapes respond to the hilly topography.
- Block dimensions range between 300 and 1,500 feet.
- Auto-oriented circulation emphasis and limited pedestrian amenities, such as a lack of consistent sidewalks, curbs, and street connectivity; cul-de-sacs further prevent connectivity.
- Sharon Heights Golf and Country Club defines the block pattern and landscaping style of the southwest end of Sharon Heights.

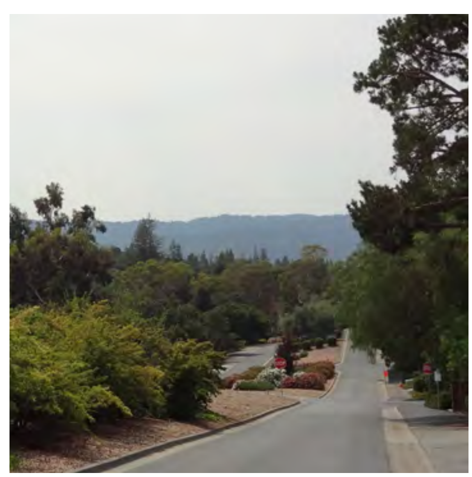
TYPICAL SITE DESIGN

0 600'

- Large parcels with deep and wide dimensions compared to other Menlo Park neighborhoods.
- Pockets of hilly terrain.
- Residences have deep front yards, narrow side setbacks, and driveways leading to garages that are integral to the residential construction (bottom left).
- Primarily one- to two-story single-family units with pockets of planned developments, multi-family buildings, and condos closer to Sand Hill Road (bottom middle).
- Mature trees and landscaping are usually present, most often within front yards and setbacks.
- Sharon Park Drive offers scenic views to hills to the southwest (bottom right).

REPRESENTATIVE EXAMPLES OF BUILT FORM AND CHARACTER

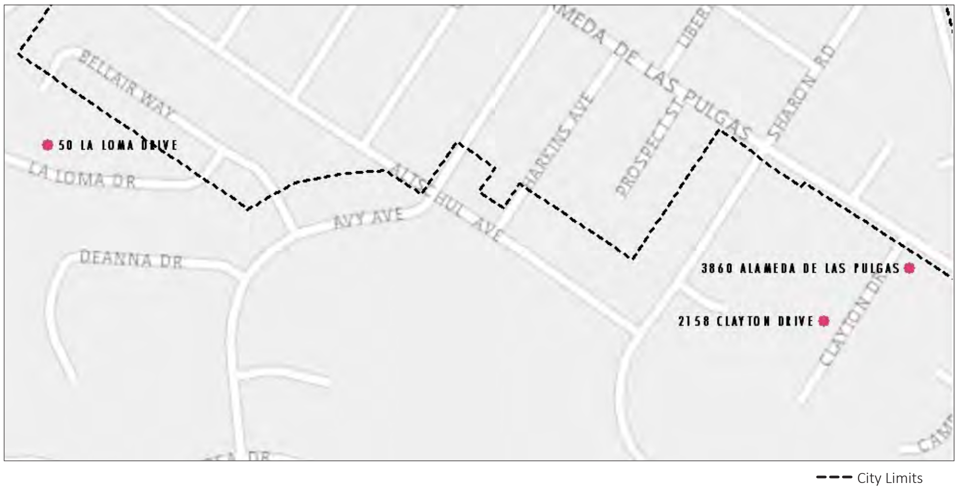




DEVELOPMENT HISTORY

In contrast to the rest of Menlo Park, which experienced a steady increase in dwelling units peaking during the 1950s, Sharon Heights experienced later growth. Few dwelling units were built in Sharon Heights before 1950. Like other neighborhoods distant from the city's center, Sharon Heights developed during the post-war era, with the construction of 342, 488, and 644 dwellings during the 1950s, 1960s, and 1970s, respectively.

EARLY BUILDINGS



- 3860 Alameda de la Pulgas (Tudor Revival style)
- 2158 Clayton Drive (Tudor Revival style)
- 50 La Loma Drive (Streamlined Moderne style)

EXAMPLES OF EARLY BUILDINGS

- 50 La Loma Drive (far left) is a rambling 6,000 square foot, two-story, single-family house, sited on a rise above the street. It exhibits spare details characteristic of the Streamlined Moderne style.

REPRESENTATIVE EXAMPLES OF ARCHITECTURAL CHARACTER

- The neighborhood is composed of single-family ranch houses with attached garages (1960s) that are more consistent in size and date than most neighborhoods, giving the area a cohesive appearance.
- The houses are typically long, narrow and rambling with massing broken up into advancing and receding planes for effect. Architectural details depicting architectural historic styles were rarely used in the original construction, but have been introduced in recent alterations.

APPENDIX A

LOS METHODOLOGY

APPENDIX A
LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in Transportation Research Board, Highway Capacity Manual 2000. Highway Capacity Manual 2000 represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service is a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with level-of-service A representing the best operating conditions and level-of-service F the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels.

A general description of service levels for various types of facilities is shown in Table A-I

Table A-I: Level of Service Description

	Uninterrupted Flow	**Interrupted Flow**
Facility Type	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections Two-way Stop Control All-way Stop Control
LOS		
A	Free-flow	Very low delay.
B	Stable flow. Presence of other users noticeable.	Low delay.
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay.
D	High density stable flow.	Tolerable delay.
E	Unstable flow.	Limit of acceptable delay.
F	Forced or breakdown flow.	Unacceptable delay

Source: Highway Capacity Manual 2000

Urban Streets

The term "urban streets" refers to urban arterials and collectors, including those in downtown areas.

Arterial streets are roads that primarily serve longer through trips. However, providing access to abutting commercial and residential land uses is also an important function of arterials.
Collector streets provide both land access and traffic circulation within residential, commercial and industrial areas. Their access function is more important than that of arterials, and unlike arterials their operation is not always dominated by traffic signals.
Downtown streets are signalized facilities that often resemble arterials. They not only move through traffic but also provide access to local businesses for passenger cars, transit buses, and trucks. Pedestrian conflicts and lane obstructions created by stopping or standing buses, trucks and parking vehicles that cause turbulence in the traffic flow are typical of downtown streets.

The speed of vehicles on urban streets is influenced by three main factors, street environment, interaction among vehicles and traffic control. As a result, these factors also affect quality of service.

The street environment includes the geometric characteristics of the facility, the character of roadside activity and adjacent land uses. Thus, the environment reflects the number and width of lanes, type of median, driveway density, spacing between signalized intersections, existence of parking, level of pedestrian activity and speed limit.

The interaction among vehicles is determined by traffic density, the proportion of trucks and buses, and turning movements. This interaction affects the operation of vehicles at intersections and, to a lesser extent, between signals.

Traffic control (including signals and signs) forces a portion of all vehicles to slow or stop. The delays and speed changes caused by traffic control devices reduce vehicle speeds, however, such controls are needed to establish right-of-way.

The average travel speed for through vehicles along an urban street is the determinant of the operating level of service. The travel speed along a segment, section or entire length of an urban street is dependent on the running speed between signalized intersections and the amount of control delay incurred at signalized intersections.

Level-of-service A describes primarily free-flow operations. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at signalized intersections is minimal.

Level-of-service B describes reasonably unimpeded operations. The ability to maneuver within the traffic stream is only slightly restricted, and control delays at signalized intersections are not significant.

Level-of-service C describes stable operations, however, ability to maneuver and change lanes in midblock location may be more restricted than at level-of-service B. Longer queues, adverse signal coordination, or both may contribute to lower travel speeds.

Level-of-service D borders on a range in which in which small increases in flow may cause substantial increases in delay and decreases in travel speed. Level-of-service D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors.

Level-of-service E is characterized by significant delays and lower travel speeds. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and inappropriate signal timing.

Level-of-service F is characterized by urban street flow at extremely low speeds. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.

The methodology to determine level of service stratifies urban streets into four classifications. The classifications are complex, and are related to functional and design categories. Table A-II describes the functional and design categories, while Table A-III relates these to the urban street classification.

Once classified, the urban street is divided into segments for analysis. An urban street segment is a one-way section of street encompassing a series of blocks or links terminating at a signalized intersection. Adjacent segments of urban streets may be combined to form larger street sections, provided that the segments have similar demand flows and characteristics.

Levels of service are related to the average travel speed of vehicles along the urban street segment or section.

Travel times for existing conditions are obtained by field measurements. The maximum-car technique is used. The vehicle is driven at the posted speed limit unless impeded by actual traffic conditions. In the maximum-car technique, a safe level of vehicular operation is maintained by observing proper following distances and by changing speeds at reasonable rates of acceleration and deceleration. The maximum-car technique provides the best base for measuring traffic performance.

An observer records the travel time and locations and duration of delay. The beginning and ending points are the centers of intersections. Delays include times waiting in queues at signalized intersections. The travel speed is determined by dividing the length of the segment by the travel time. Once the travel speed on the arterial is determined, the level of service is found by comparing the speed to the criteria in Table A-IV. Level-of-service criteria vary for the different classifications of urban street, reflecting differences in driver expectations.

Table A-II: Functional and Design Categories for Urban Streets

Criterion	Functional Category			
	Principal Arterial		Minor Arterial	
Mobility function	Very important		Important	
Access function	Very minor		Substantial	
Points connected	Freeways, important activity centers, major traffic generators		Principal arterials	
Predominant trips served	Relatively long trips between major points and through trips entering, leaving, and passing through city		Trips of moderate length within relatively small geographical areas	
Criterion	**Design Category**			
	High-Speed	**Suburban**	**Intermediate**	**Urban**
Driveway access density	Very low density	Low density	Moderate density	High density
Arterial type	Multilane divided; undivided or two-lane with shoulders	Multilane divided: undivided or two-lane with shoulders	Multilane divided or undivided; one way, two lane	Undivided one way; two way, two or more lanes
Parking	No	No	Some	Usually
Separate left-turn lanes	Yes	Yes	Usually	Some
Signals per mile	0.5 to 2	1 to 5	4 to 10	6 to 12
Speed limits	45 to 55 mph	40 to 45 mph	30 to 40 mph	25 to 35 mph
Pedestrian activity	Very little	Little	Some	Usually
Roadside development	Low density	Low to medium density	Medium to moderate density	High density

Source: Highway Capacity Manual 2000

Table A-III: Urban Street Class based on Function and Design Categories

	Functional Category	
Design Category	**Principal Arterial**	**Minor Arterial**
High-Speed	I	Not applicable
Suburban	II	II
Intermediate	II	III or IV
Urban	III or IV	IV

Source: Highway Capacity Manual 2000

Table A-IV: Urban Street Levels of Service by Class

Urban Street Class	I	II	III	IV
Range of Free Flow Speeds (mph)	45 to 55	35 to 45	30 to 35	25 to 35
Typical Free Flow Speed (mph)	50	40	33	30
Level of Service	**Average Travel Speed (mph)**			
A	>42	>35	>30	>25
B	>34	>28	>24	>19
C	>27	>22	>18	>13
D	>21	>17	>14	>9
E	>16	>13	>10	>7
F	≤16	≤13	≤10	≤7

Source: Highway Capacity Manual 2000

Interrupted Flow

One of the more important elements limiting, and often interrupting the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation such as traffic signals, stop and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Specifically, level of service criteria for traffic signals are stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. A description of levels of service for signalized intersections can be found in Table A-V

Table A-V: Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Progression is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase doe not serve queued vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestions becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: Highway Capacity Manual 2000

The use of control delay, which may also be referred to as signal delay, was introduced in the 1997 update to the *Highway Capacity Manual*, and represents a departure from previous updates. In the third edition, published in 1985 and the 1994 update to the third edition, delay only included stopped delay. Thus, the level of service criteria listed in Table A-V differs from earlier criteria.

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the *Highway Capacity Manual* and represent a revision of the methodology published in the 1994 update to the 1985 *Highway Capacity Manual*. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions, *i. e.,* in the absence of traffic control, geometric delay, any incidents, and any other vehicles. Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay are determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through a stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in Table A-VI.

Table A-VI: Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of tolerable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

Source: Highway Capacity Manual 2000

Appendix B

LOS Calculation Sheets

Menlo Park GP Circulation Update

Vistro File: J:\...\Menlo Park AM_update.vistro | Scenario 1: Existing AM

Report File: J:\...\Menlo Park_AM Results.pdf | 1/9/2015

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM2000	SWBT	1.021	53.4	D
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM2000	SWBT	0.704	95.4	F
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM2000	NBL	0.739	67.2	E
4	Marsh Rd/Bay Rd	Signalized	HCM2000	SBL	0.585	32.2	C
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM2000	NEBL	0.647	35.5	D
10	Middlefield Rd/Ringswood Ave	Signalized	HCM2000	NWBL	0.429	33.7	C
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM2000	NWBL	0.957	22.1	C
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM2000	SBR	0.814	33.7	C
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM2000	SBL	0.557	27.6	C
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM2000	NBL	0.543	19.0	B
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM2000	SBL	0.547	14.5	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM2000	SBL	0.785	40.6	D
21	Willow Rd/Bay Rd	Signalized	HCM2000	NEBL	0.675	20.7	C
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM2000	WBL	0.761	14.3	B
23	Willow Rd/Coleman Ave	Signalized	HCM2000	EBL	0.954	33.8	C
24	Willow Rd/Gilbert Ave	Signalized	HCM2000	WBT	0.683	18.3	B
25	Middlefield Rd-Willow Rd	Signalized	HCM2000	NEBT	0.623	48.7	D
26	Ravenswood Ave/Laurel St	Signalized	HCM2000	SEBT	0.958	20.4	C
28	Oak Grove Ave/Laurel St	Signalized	HCM2000	SEBT	0.751	15.6	B
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM2000	NWBL	0.646	18.1	B
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM2000	NWBL	0.823	35.4	D

	Ave						
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM2000	NEBL	0.728	30.6	C
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM2000	NEBR	0.658	11.3	B
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM2000	NWBL	0.824	37.8	D
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM2000	SEBL	0.569	8.7	A
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM2000	NWBL	0.685	16.8	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM2000	NEBL	0.591	4.3	A
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM2000	SWBL	0.601	16.9	B
39	Santa Cruz Ave/Sand Hill Rd	Signalized	HCM2000	SEBL	0.782	52.6	D
58	University Avenue and Adams Drive	Two-way stop	HCM2000	EBL	0.196	146.8	F
74	University Ave/O'Brien Dr	Signalized	HCM2000	EBR	0.569	3.7	A
88	Valparaiso Ave/ University Dr	Signalized	HCM2000	NWBT	0.675	19.8	B
103	Addison Wesley/Sand Hill Rd	Signalized	HCM2000	EBT	0.668	155.5	F
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM2000	WBR	0.784	46.4	D
110	Marsh Road and US 101 NB Ramps	Signalized	HCM2000	NWBL	0.681	17.1	B
132	Oak Ave/Sand Hill Rd	Signalized	HCM2000	SEBR	0.789	18.2	B
156	Saga Ln/Sand Hill Rd	Signalized	HCM2000	EBT	0.605	54.3	D
157	Branner Dr/Sand Hill Rd	Signalized	HCM2000	EBT	0.575	44.3	D
162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM2000	SWBL	0.650	29.4	C
163	Bayfront Expy/Marsh Rd	Signalized	HCM2000	WBL	1.173	140.9	F
181	Santa Cruz Ave/Elder Ave	Signalized	HCM2000	NEBL	0.545	15.4	B
195	Bayfront Expy/Chilco St	Signalized	HCM2000	NBL	0.843	18.9	B
196	Bayfront Expy/Chrysler Drive	Signalized	HCM2000	NBL	0.883	15.1	B
207	Chilco St/Constitution Dr	All-way stop	HCM2000	SBT		11.6	B
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM2000	NEBT	0.000	9.6	A
213	Chrysler Dr/Independence Dr	Two-way stop	HCM2000	NWBT	0.016	10.1	B
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM2000	NWBT	0.000	12.2	B

215	Chrysler Dr/Constitution Dr	All-way stop	HCM2000	EBT		8.8	A
233	Sand Hill Road and Sand Hill Circle	Signalized	HCM2000	NBT	0.435	63.7	E
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM2000	EBT	0.731	233.2	F

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
#1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	53.4
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.021

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	no		no		no	

Volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	784	1747	279	953	320
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	3.60	2.15	5.10	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	784	1747	279	953	320
Peak Hour Factor	1.0000	0.9700	0.9700	1.0000	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	202	450	70	246	82
Total Analysis Volume [veh/h]	0	808	1801	279	982	330
Presence of On-Street Parking		no	no		no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	4		0		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	57.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal Group	0	2	6	0	4	1
Auxiliary Signal Groups						1,4
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	36	36	0	36	30
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	46	38	0	34	8
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	16	0	22	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		yes	yes		no	no
Maximum Recall		no	no		no	no
Pedestrian Recall		no	no		no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	44	36	32	40
g / C, Green / Cycle	0.55	0.45	0.40	0.50
(v / s)_i Volume / Saturation Flow Rate	0.20	0.52	0.29	0.21
Total Saturation Flow Adjustment	1.05	0.92	0.88	0.82
s, saturation flow rate [veh/h]	4000	3492	3335	1562
c, Capacity [veh/h]	2200	1571	1334	781
d1, Uniform Delay [s]	10.15	22.00	20.41	12.68
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.47	73.77	3.65	1.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

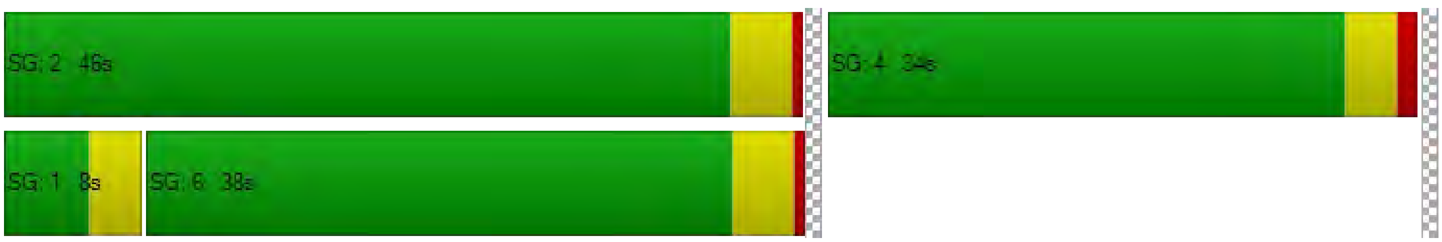
X, volume / capacity	0.37	1.15	0.74	0.42
d, Delay for Lane Group [s/veh]	10.62	95.77	24.06	14.35
Lane Group LOS	B	F	C	B
Critical Lane Group	no	yes	yes	yes
50th-Percentile Queue Length [veh]	5.99	41.42	11.62	5.29
50th-Percentile Queue Length [ft]	149.71	1035.62	290.57	132.22
95th-Percentile Queue Length [veh]	11.39	66.29	19.73	10.30
95th-Percentile Queue Length [ft]	284.74	1657.26	493.33	257.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	10.62	95.77	0.00	24.06	14.35
Movement LOS		B	F		C	B
d_A, Approach Delay [s/veh]	10.62		95.77		21.62	
Approach LOS	B		F		C	
d_I, Intersection Delay [s/veh]	53.41					
Intersection LOS	D					
Intersection V/C	1.021					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	95.4
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Base Volume Input [veh/h]	28	1184	14	439	1422	296	15	4	71	239	12	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	3.00	7.10	3.90	4.00	1.00	0.00	0.00	12.70	1.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	59	0	0	0
Total Hourly Volume [veh/h]	28	1184	14	439	1422	296	15	4	12	239	12	5
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	312	4	116	374	78	4	1	3	63	3	1
Total Analysis Volume [veh/h]	29	1246	15	462	1497	312	16	4	13	252	13	5
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			1			2		
Bicycle Volume [bicycles/h]	2			0			0			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	70.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal Group	5	2	2	1	6	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	0	6	0	4	4	4
Maximum Green [s]	4	16	16	4	16	16	0	30	0	16	16	16
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	8	53	53	29	74	74	0	41	0	37	37	37
Vehicle Extension [s]	2.5	3.5	3.5	2.0	3.5	3.5	0.0	2.5	0.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	0	8	0	8	8	8
Pedestrian Clearance [s]	0	21	21	0	21	21	0	28	0	24	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	yes		no	yes			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	6	51	27	72	39	39	35	35
g / C, Green / Cycle	0.04	0.32	0.17	0.45	0.24	0.24	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.02	0.25	0.14	0.53	0.01	0.01	0.14	0.01
Total Saturation Flow Adjustment	0.92	0.88	0.89	0.89	0.96	0.67	0.93	0.96
s, saturation flow rate [veh/h]	1742	5015	3374	3387	1827	2536	1775	1815
c, Capacity [veh/h]	65	1599	569	1524	445	618	388	397
d1, Uniform Delay [s]	75.37	49.60	64.05	44.00	46.26	45.99	56.91	49.32
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	20.34	4.03	11.93	90.99	0.19	0.06	8.15	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

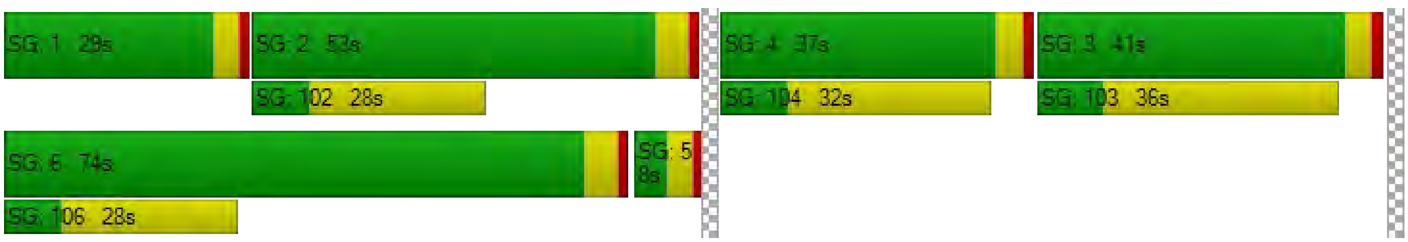
X, volume / capacity	0.44	0.79	0.81	1.19	0.04	0.02	0.65	0.05
d, Delay for Lane Group [s/veh]	95.70	53.63	75.98	134.99	46.45	46.05	65.06	49.53
Lane Group LOS	F	D	E	F	D	D	E	D
Critical Lane Group	yes	no	no	yes	yes	no	yes	no
50th-Percentile Queue Length [veh]	1.46	22.29	12.51	67.73	0.73	0.27	11.70	0.67
50th-Percentile Queue Length [ft]	36.38	557.37	312.84	1693.24	18.13	6.64	292.40	16.84
95th-Percentile Queue Length [veh]	3.42	35.93	21.05	108.37	1.79	0.68	19.84	1.67
95th-Percentile Queue Length [ft]	85.41	898.25	526.16	2709.18	44.69	16.93	496.03	41.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	95.70	53.63	53.63	75.98	134.99	134.99	46.45	46.45	46.05	65.06	49.53	49.53
Movement LOS	F	D	D	E	F	F	D	D	D	E	D	D
d_A, Approach Delay [s/veh]	54.58			122.99			46.29			64.03		
Approach LOS	D			F			D			E		
d_I, Intersection Delay [s/veh]	95.37											
Intersection LOS	F											
Intersection V/C	0.704											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	67.2
Analysis Method:	HCM2000	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.739

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Base Volume Input [veh/h]	99	767	90	27	1068	435	447	47	198	27	16	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	1.60	5.60	7.40	5.10	3.00	6.50	8.50	4.50	25.90	37.50	28.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	15	0	0	0
Total Hourly Volume [veh/h]	99	767	90	27	1068	435	447	47	183	27	16	25
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	202	24	7	281	114	118	12	48	7	4	7
Total Analysis Volume [veh/h]	104	807	95	28	1124	458	471	49	193	28	17	26
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			5			3			3		
Bicycle Volume [bicycles/h]	10			5			2			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	50.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal Group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	30	30	30	30	30	30	30	30	30	0	30	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	12	79	79	8	75	75	37	36	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	19	19	0	16	16	25	25	25	0	25	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	yes		no	yes			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	10	77	6	73	34	34	35	35
g / C, Green / Cycle	0.06	0.48	0.04	0.46	0.21	0.21	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.06	0.26	0.02	0.48	0.16	0.13	0.02	0.03
Total Saturation Flow Adjustment	0.91	0.92	0.88	0.86	0.84	0.80	0.75	0.65
s, saturation flow rate [veh/h]	1736	3500	1681	3283	3190	1514	1434	1243
c, Capacity [veh/h]	108	1684	63	1498	678	322	314	272
d1, Uniform Delay [s]	74.79	29.00	75.37	43.50	59.28	56.86	49.80	50.58
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	75.84	1.22	21.06	39.65	8.12	8.03	0.56	1.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

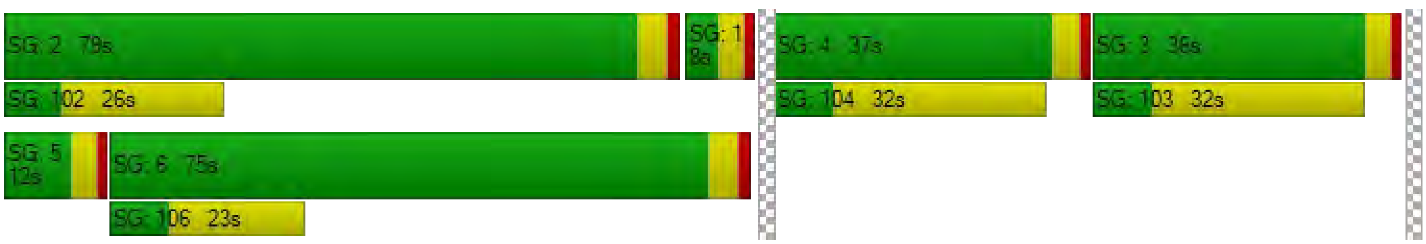
X, volume / capacity	0.96	0.54	0.44	1.06	0.77	0.60	0.09	0.16
d, Delay for Lane Group [s/veh]	150.64	30.23	96.43	83.15	67.40	64.89	50.36	51.82
Lane Group LOS	F	C	F	F	E	E	D	D
Critical Lane Group	yes	no	no	yes	yes	no	no	yes
50th-Percentile Queue Length [veh]	6.51	16.46	1.41	52.24	13.67	8.83	1.07	1.67
50th-Percentile Queue Length [ft]	162.85	411.56	35.18	1306.06	341.65	220.66	26.65	41.87
95th-Percentile Queue Length [veh]	12.19	26.95	3.31	83.59	22.75	15.63	2.57	3.88
95th-Percentile Queue Length [ft]	304.82	673.80	82.84	2089.74	568.86	390.82	64.16	96.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	150.64	30.23	30.23	96.43	83.15	83.15	67.40	67.40	64.89	50.36	51.82	51.82
Movement LOS	F	C	C	F	F	F	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	42.67			83.38			66.72			51.24		
Approach LOS	D			F			E			D		
d_I, Intersection Delay [s/veh]	67.17											
Intersection LOS	E											
Intersection V/C	0.739											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	32.2
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.585

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	1	803	82	268	867	31	114	78	7	45	19	173
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.20	2.40	7.10	6.20	3.20	3.50	2.60	0.00	0.00	5.30	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	803	82	268	867	31	114	78	7	45	19	173
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	211	22	71	228	8	30	21	2	12	5	46
Total Analysis Volume [veh/h]	1	845	86	282	913	33	120	82	7	47	20	182
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			4			0		
Bicycle Volume [bicycles/h]	4			4			6			8		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	30	29	30	30	30	29	19	19	19	0	19	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	48	50	48	19	48	50	32	32	32	0	32	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no		no	no			no			no	
Maximum Recall		yes		no	yes			no			no	
Pedestrian Recall		no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	48	17	46	30	30
g / C, Green / Cycle	0.48	0.17	0.46	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.27	0.17	0.28	0.20	0.17
Total Saturation Flow Adjustment	0.91	0.89	0.89	0.56	0.78
s, saturation flow rate [veh/h]	3449	1685	3387	1068	1479
c, Capacity [veh/h]	1639	284	1543	317	439
d1, Uniform Delay [s]	19.06	41.95	20.78	31.03	30.01
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.44	51.97	1.83	10.28	5.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.57	0.99	0.61	0.66	0.57
d, Delay for Lane Group [s/veh]	20.49	93.92	22.61	41.30	35.23
Lane Group LOS	C	F	C	D	D
Critical Lane Group	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	11.30	12.05	12.16	6.12	6.78
50th-Percentile Queue Length [ft]	282.52	301.24	303.98	153.06	169.60
95th-Percentile Queue Length [veh]	19.26	20.36	20.52	11.60	12.60
95th-Percentile Queue Length [ft]	481.51	509.05	513.08	289.88	315.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.49	20.49	20.49	93.92	22.61	22.61	41.30	41.30	41.30	35.23	35.23	35.23
Movement LOS	C	C	C	F	C	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	20.49			38.99			41.30			35.23		
Approach LOS	C			D			D			D		
d_I, Intersection Delay [s/veh]	32.23											
Intersection LOS	C											
Intersection V/C	0.585											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	35.5
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.647

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	85	522	446	364	420	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	11.80	4.20	3.10	2.50	3.30	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	85	0	446	364	420	75
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	0	124	101	117	21
Total Analysis Volume [veh/h]	94	0	496	404	467	83
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2		21		0	
Bicycle Volume [bicycles/h]	22		39		37	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	10	10	0
Maximum Green [s]	30	26	19	42	26	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	24	71	65	136	71	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	12	12	0	12	12	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no		no	no	no	
Maximum Recall	no		no	yes	yes	
Pedestrian Recall	no		no	no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	6.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	22	22	63	134	69
g / C, Green / Cycle	0.14	0.14	0.39	0.84	0.43
(v / s)_i Volume / Saturation Flow Rate	0.06	0.00	0.28	0.22	0.31
Total Saturation Flow Adjustment	0.85	0.82	0.92	0.98	0.95
s, saturation flow rate [veh/h]	1614	1550	1751	1854	1798
c, Capacity [veh/h]	222	213	689	1552	775
d1, Uniform Delay [s]	63.19	59.51	41.03	2.70	37.28
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.82	0.00	6.38	0.41	5.44
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

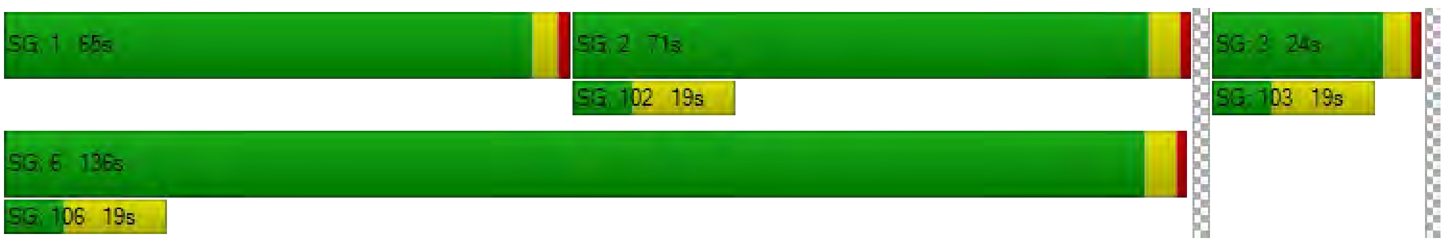
X, volume / capacity	0.42	0.00	0.72	0.26	0.71
d, Delay for Lane Group [s/veh]	69.02	59.51	47.40	3.11	42.73
Lane Group LOS	E	E	D	A	D
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	4.25	0.00	21.65	4.54	23.17
50th-Percentile Queue Length [ft]	106.31	0.00	541.31	113.60	579.27
95th-Percentile Queue Length [veh]	8.62	0.00	34.93	9.10	37.30
95th-Percentile Queue Length [ft]	215.51	0.00	873.21	227.55	932.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.02	59.51	47.40	3.11	42.73	42.73
Movement LOS	E	E	D	A	D	D
d_A, Approach Delay [s/veh]	69.02		27.52		42.73	
Approach LOS	E		C		D	
d_I, Intersection Delay [s/veh]	35.46					
Intersection LOS	D					
Intersection V/C	0.647					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#10: Middlefield Rd/Ringswood Ave

Control Type:	Signalized	Delay (sec / veh):	33.7
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.429

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	5	3	12	136	44	251	55	559	84	216	653	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	8.30	4.40	0.00	4.00	0.00	3.20	0.00	4.60	4.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	222	0	0	96	0	0	0
Total Hourly Volume [veh/h]	5	3	12	136	44	29	55	559	0	216	653	62
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	3	36	12	8	14	147	0	57	172	16
Total Analysis Volume [veh/h]	5	3	13	143	46	31	58	588	0	227	687	65
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			27			5			11		
Bicycle Volume [bicycles/h]	6			23			39			34		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	2	8	2	6	8	6	5	2	8	1	6	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	30	16	30	30	16	30	30	30	16	30	30	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.5	3.6	3.2	3.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	62	49	62	97	49	97	14	62	49	49	97	0
Vehicle Extension [s]	3.6	2.9	3.6	3.0	2.9	3.0	3.0	3.6	2.9	3.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	21	12	12	21	12	0	12	21	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	yes		no	yes	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	47	47	47	47	12	60	60	47	95
g / C, Green / Cycle	0.29	0.29	0.29	0.29	0.08	0.38	0.38	0.29	0.59
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.13	0.02	0.03	0.17	0.00	0.13	0.22
Total Saturation Flow Adjustment	0.47	0.87	0.77	0.80	0.95	0.92	0.85	0.91	0.90
s, saturation flow rate [veh/h]	885	1650	1459	1512	1805	3505	1615	1726	3433
c, Capacity [veh/h]	260	485	428	444	135	1315	606	507	2039
d1, Uniform Delay [s]	40.13	40.29	45.84	40.74	70.72	37.55	31.25	45.95	16.91
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	0.13	3.27	0.30	9.61	1.10	0.00	2.85	0.52
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.03	0.44	0.07	0.43	0.45	0.00	0.45	0.37
d, Delay for Lane Group [s/veh]	40.27	40.42	49.12	41.04	80.33	38.65	31.25	48.79	17.42
Lane Group LOS	D	D	D	D	F	D	C	D	B
Critical Lane Group	no	no	yes	no	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	0.17	0.54	7.54	1.07	2.77	11.35	0.00	9.05	10.17
50th-Percentile Queue Length [ft]	4.27	13.56	188.58	26.65	69.25	283.79	0.00	226.14	254.15
95th-Percentile Queue Length [veh]	0.44	1.35	13.74	2.57	6.02	19.33	0.00	15.95	17.60
95th-Percentile Queue Length [ft]	10.96	33.85	343.44	64.17	150.59	483.37	0.00	398.86	439.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.27	40.42	40.42	49.12	49.12	41.04	80.33	38.65	31.25	48.79	17.42	17.42
Movement LOS	D	D	D	D	D	D	F	D	C	D	B	B
d_A, Approach Delay [s/veh]	40.38			47.98			42.39			24.70		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	33.74											
Intersection LOS	C											
Intersection V/C	0.429											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	22.1
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.957

Intersection Setup

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	873	85	1495	3915	185	359
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	3.50	1.60	3.10	2.20	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	873	85	1495	3915	185	359
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	227	22	389	1020	48	93
Total Analysis Volume [veh/h]	909	89	1557	4078	193	374
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		4		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal Group	2	2	1	6	4	1
Auxiliary Signal Groups						1,4
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	4	4	4	4	4	4
Maximum Green [s]	16	16	4	24	16	4
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	44	44	102	146	14	102
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	0
Pedestrian Clearance [s]	1	1	0	1	1	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no		no	no	no	no
Maximum Recall	no		no	no	no	no
Pedestrian Recall	no		no	no	no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	98	142	10	112
g / C, Green / Cycle	0.25	0.25	0.61	0.89	0.06	0.70
(v / s)_i Volume / Saturation Flow Rate	0.19	0.06	0.45	0.81	0.06	0.09
Total Saturation Flow Adjustment	0.86	0.82	0.91	0.88	0.90	0.73
s, saturation flow rate [veh/h]	4910	1560	3450	5020	3430	4139
c, Capacity [veh/h]	1228	390	2113	4455	214	2897
d1, Uniform Delay [s]	55.22	47.72	21.89	5.40	74.50	7.92
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.04	1.36	2.34	3.96	40.06	0.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.74	0.23	0.74	0.92	0.90	0.13
d, Delay for Lane Group [s/veh]	59.27	49.08	24.23	9.35	114.57	8.01
Lane Group LOS	E	D	C	A	F	A
Critical Lane Group	no	no	no	yes	no	yes
50th-Percentile Queue Length [veh]	16.05	3.41	29.67	54.17	5.94	2.33
50th-Percentile Queue Length [ft]	401.19	85.14	741.79	1354.31	148.47	58.34
95th-Percentile Queue Length [veh]	26.32	7.17	47.55	86.68	11.31	5.20
95th-Percentile Queue Length [ft]	658.10	179.31	1188.82	2166.92	282.82	129.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.27	49.08	24.23	9.35	114.57	8.01
Movement LOS	E	D	C	A	F	A
d_A, Approach Delay [s/veh]	58.36		13.46		44.28	
Approach LOS	E		B		D	
d_I, Intersection Delay [s/veh]	22.11					
Intersection LOS	C					
Intersection V/C	0.957					

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	33.7
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.814

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Base Volume Input [veh/h]	128	380	361	16	59	42	217	713	155	732	2780	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	10.90	4.20	10.20	37.50	30.50	40.50	4.60	6.20	12.30	6.70	3.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	16	0	0	106	0	0	0
Total Hourly Volume [veh/h]	128	380	361	16	59	26	217	713	49	732	2780	24
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	104	99	4	16	7	60	196	13	201	764	7
Total Analysis Volume [veh/h]	141	418	397	18	65	29	238	784	54	804	3055	26
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			2			12			2		
Bicycle Volume [bicycles/h]	17			6			0			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	8	8	1	4	4	4	5	2	2	1	6	6
Auxiliary Signal Groups			1,8									
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	4	16	16	16	4	16	16	4	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	23	23	63	8	8	8	15	36	36	63	84	84
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	1	1	0	1	1	1	0	1	1	0	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no	no		no		no	no		no	no	
Maximum Recall		no	no		no		no	no		no	no	
Pedestrian Recall		no	no		no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	19	19	82	4	4	4	11	32	32	59	80	80
g / C, Green / Cycle	0.15	0.15	0.63	0.03	0.03	0.03	0.08	0.25	0.25	0.45	0.62	0.62
(v / s)_i Volume / Saturation Flow Rate	0.09	0.12	0.12	0.01	0.02	0.03	0.07	0.13	0.04	0.24	0.52	0.02
Total Saturation Flow Adjustment	0.86	0.91	0.88	0.69	0.73	0.60	0.88	1.02	0.76	0.86	1.03	0.85
s, saturation flow rate [veh/h]	1628	3472	3362	1313	2772	1149	3351	5836	1438	3285	5846	1615
c, Capacity [veh/h]	238	507	2121	40	85	35	284	1437	354	1491	3598	994
d1, Uniform Delay [s]	51.88	53.87	10.05	61.91	62.53	62.64	58.63	42.67	38.38	25.67	20.14	9.77
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.42	14.08	0.20	31.78	46.98	102.38	24.71	1.49	0.91	1.40	2.71	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

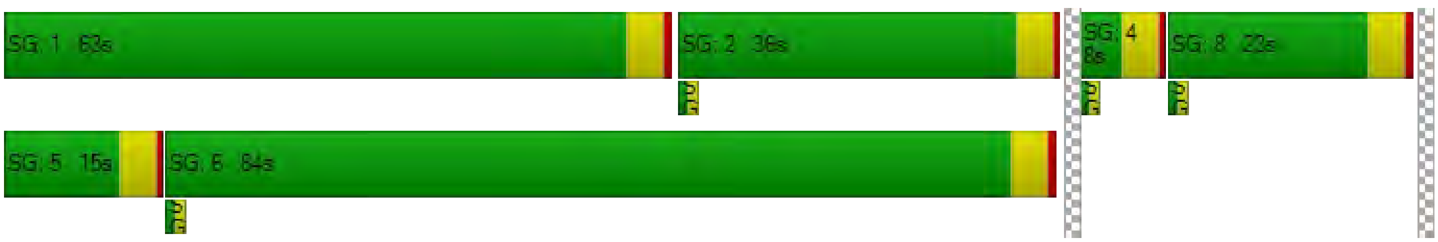
X, volume / capacity	0.59	0.82	0.19	0.45	0.76	0.82	0.84	0.55	0.15	0.54	0.85	0.03
d, Delay for Lane Group [s/veh]	62.30	67.96	10.24	93.69	109.50	165.03	83.34	44.17	39.29	27.07	22.85	9.82
Lane Group LOS	E	E	B	F	F	F	F	D	D	C	C	A
Critical Lane Group	no	yes	no	no	no	yes	yes	no	no	no	yes	no
50th-Percentile Queue Length [veh]	5.50	9.73	3.78	0.76	1.63	1.46	5.73	10.15	1.66	12.20	40.34	0.41
50th-Percentile Queue Length [ft]	137.54	243.22	94.40	18.98	40.87	36.62	143.23	253.63	41.39	305.10	1008.57	10.16
95th-Percentile Queue Length [veh]	10.63	16.96	7.82	1.87	3.79	3.44	10.99	17.57	3.84	20.59	64.56	1.03
95th-Percentile Queue Length [ft]	265.83	423.90	195.40	46.67	94.86	85.90	274.72	439.14	95.94	514.74	1614.03	25.63

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.30	67.96	10.24	93.69	109.50	165.03	83.34	44.17	39.29	27.07	22.85	9.82
Movement LOS	E	E	B	F	F	F	F	D	D	C	C	A
d_A, Approach Delay [s/veh]	43.16			121.34			52.59			23.64		
Approach LOS	D			F			D			C		
d_I, Intersection Delay [s/veh]	33.71											
Intersection LOS	C											
Intersection V/C	0.814											

Sequence

Ring 1	1	2	-	4	-	8	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	27.6
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.557

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	124	807	71	88	795	57	78	22	50	26	24	23
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	6.30	7.00	9.10	8.40	10.50	1.30	4.50	6.00	23.10	12.50	30.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	124	807	71	88	795	57	78	22	50	26	24	23
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	237	21	26	234	17	23	6	15	8	7	7
Total Analysis Volume [veh/h]	146	949	84	104	935	67	92	26	59	31	28	27
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			16			10			7		
Bicycle Volume [bicycles/h]	15			7			8			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	4	16	16	4	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	23	77	77	19	73	73	34	34	34	34	34	34
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	1	1	0	1	1	1	1	1	1	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	no		no	no			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	19	73	15	69	30	30
g / C, Green / Cycle	0.15	0.56	0.12	0.53	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.08	0.31	0.06	0.30	0.13	0.06
Total Saturation Flow Adjustment	0.94	0.88	0.87	0.87	0.70	0.73
s, saturation flow rate [veh/h]	1777	3362	1654	3304	1330	1381
c, Capacity [veh/h]	260	1888	191	1754	307	319
d1, Uniform Delay [s]	51.63	18.04	54.28	20.54	44.36	41.02
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.54	1.15	10.72	1.36	7.68	2.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.56	0.55	0.54	0.57	0.58	0.27
d, Delay for Lane Group [s/veh]	60.17	19.19	65.00	21.90	52.04	43.09
Lane Group LOS	E	B	E	C	D	D
Critical Lane Group	yes	no	no	yes	yes	no
50th-Percentile Queue Length [veh]	5.61	14.12	4.07	14.59	6.51	2.79
50th-Percentile Queue Length [ft]	140.21	353.08	101.85	364.83	162.71	69.77
95th-Percentile Queue Length [veh]	10.80	23.43	8.32	24.14	12.18	6.06
95th-Percentile Queue Length [ft]	270.01	585.87	208.06	603.43	304.60	151.56

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.17	19.19	19.19	65.00	21.90	21.90	52.04	52.04	52.04	43.09	43.09	43.09
Movement LOS	E	B	B	E	C	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	24.26			25.95			52.04			43.09		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	27.56											
Intersection LOS	C											
Intersection V/C	0.557											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	19.0
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.543

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	135.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	129	1141	842	9	17	147
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	5.70	10.30	22.20	0.00	6.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	129	1141	842	9	17	147
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	336	248	3	5	43
Total Analysis Volume [veh/h]	152	1342	991	11	20	173
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14		18		7	
Bicycle Volume [bicycles/h]	16		6		3	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	4	4	4	4	4
Maximum Green [s]	4	24	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	24	99	75	75	31	31
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	1	1	1
Pedestrian Clearance [s]	0	1	1	1	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no	no		no	
Maximum Recall	no	no	no		no	
Pedestrian Recall	no	no	no		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	95	71	27	27
g / C, Green / Cycle	0.15	0.73	0.55	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.09	0.39	0.31	0.01	0.11
Total Saturation Flow Adjustment	0.93	0.90	0.86	0.95	0.80
s, saturation flow rate [veh/h]	1764	3423	3274	1805	1522
c, Capacity [veh/h]	271	2501	1788	375	316
d1, Uniform Delay [s]	50.93	7.75	19.29	41.26	46.04
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.11	0.83	1.27	0.27	6.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.56	0.54	0.56	0.05	0.55
d, Delay for Lane Group [s/veh]	59.03	8.58	20.57	41.53	52.70
Lane Group LOS	E	A	C	D	D
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	5.80	13.29	14.17	0.62	6.35
50th-Percentile Queue Length [ft]	145.06	332.24	354.28	15.51	158.73
95th-Percentile Queue Length [veh]	11.10	22.20	23.51	1.54	11.94
95th-Percentile Queue Length [ft]	277.54	554.88	587.66	38.52	298.55

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.03	8.58	20.57	20.57	41.53	52.70
Movement LOS	E	A	C	C	D	D
d_A, Approach Delay [s/veh]	13.71		20.57		51.54	
Approach LOS	B		C		D	
d_I, Intersection Delay [s/veh]	18.98					
Intersection LOS	B					
Intersection V/C	0.543					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	14.5
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.547

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1201	304	54	969	195	58
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	5.30	7.40	9.70	10.30	8.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1201	304	54	969	195	58
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	330	84	15	266	54	16
Total Analysis Volume [veh/h]	1320	334	59	1065	214	64
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		1		21	
Bicycle Volume [bicycles/h]	27		1		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal Group	2	2	1	6	8	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	4	4	4	4	4	4
Maximum Green [s]	16	16	4	24	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	92	92	13	105	25	25
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	1
Pedestrian Clearance [s]	1	1	0	1	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no		no	no	no	
Maximum Recall	no		no	no	no	
Pedestrian Recall	no		no	no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	88	88	9	101	21
g / C, Green / Cycle	0.68	0.68	0.07	0.78	0.16
(v / s)_i Volume / Saturation Flow Rate	0.38	0.22	0.04	0.32	0.09
Total Saturation Flow Adjustment	0.90	0.81	0.88	0.87	0.81
s, saturation flow rate [veh/h]	3432	1534	1681	3298	3097
c, Capacity [veh/h]	2323	1038	116	2562	500
d1, Uniform Delay [s]	11.02	8.67	58.36	4.78	50.20
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.01	0.82	14.91	0.50	4.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.57	0.32	0.51	0.42	0.56
d, Delay for Lane Group [s/veh]	12.04	9.49	73.27	5.28	54.61
Lane Group LOS	B	A	E	A	D
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	15.31	5.70	2.38	7.93	5.55
50th-Percentile Queue Length [ft]	382.65	142.38	59.45	198.31	138.73
95th-Percentile Queue Length [veh]	25.21	10.94	5.28	14.32	10.71
95th-Percentile Queue Length [ft]	630.16	273.38	132.06	357.88	267.69

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	12.04	9.49	73.27	5.28	54.61	54.61
Movement LOS	B	A	E	A	D	D
d_A, Approach Delay [s/veh]	11.52		8.85		54.61	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	14.46					
Intersection LOS	B					
Intersection V/C	0.547					

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	40.6
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.785

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	151	1407	166	51	1132	10	37	169	281	273	120	42
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	5.70	6.60	2.00	10.00	30.00	10.80	4.10	1.80	2.90	7.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	44	0	0	34
Total Hourly Volume [veh/h]	151	1407	166	51	1132	10	37	169	237	273	120	8
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	378	45	14	304	3	10	45	64	73	32	2
Total Analysis Volume [veh/h]	162	1513	178	55	1217	11	40	182	255	294	129	9
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			39			14			15		
Bicycle Volume [bicycles/h]	11			5			6			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal Group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	4	16	16	4	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	19	72	72	10	63	63	30	30	30	18	18	18
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	1	1	0	1	1	1	1	1	1	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	no		no	no			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	68	6	59	26	26	26	14	14	14
g / C, Green / Cycle	0.12	0.52	0.05	0.45	0.20	0.20	0.20	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.09	0.35	0.03	0.37	0.02	0.10	0.16	0.09	0.07	0.01
Total Saturation Flow Adjustment	0.93	0.85	0.93	0.86	0.86	0.96	0.83	0.90	0.93	0.85
s, saturation flow rate [veh/h]	1770	4819	1770	3284	1629	1825	1586	3407	1767	1615
c, Capacity [veh/h]	204	2521	82	1491	326	365	317	367	190	174
d1, Uniform Delay [s]	55.99	22.78	61.04	30.97	42.65	46.21	49.57	56.64	55.83	52.04
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	26.37	1.44	36.42	5.29	0.77	4.80	19.10	16.68	17.72	0.56
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

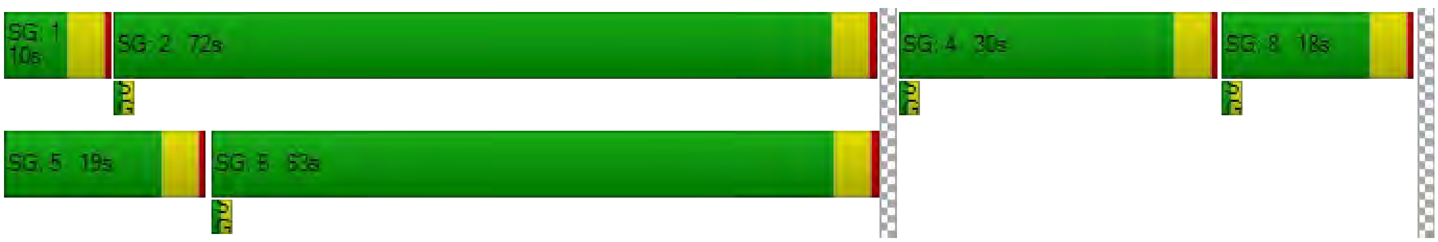
X, volume / capacity	0.79	0.67	0.67	0.82	0.12	0.50	0.80	0.80	0.68	0.05
d, Delay for Lane Group [s/veh]	82.36	24.22	97.45	36.26	43.42	51.01	68.66	73.33	73.55	52.61
Lane Group LOS	F	C	F	D	D	D	E	E	E	D
Critical Lane Group	yes	no	no	yes	no	no	yes	yes	no	no
50th-Percentile Queue Length [veh]	7.16	19.14	2.42	24.91	1.28	6.54	10.90	6.76	5.36	0.32
50th-Percentile Queue Length [ft]	178.94	478.40	60.46	622.81	31.97	163.60	272.62	169.08	133.93	7.88
95th-Percentile Queue Length [veh]	13.16	31.03	5.36	40.03	3.04	12.24	18.68	12.57	10.41	0.80
95th-Percentile Queue Length [ft]	329.06	775.85	134.01	1000.77	75.90	305.96	466.97	314.24	260.17	20.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	82.36	24.22	24.22	97.45	36.26	36.26	43.42	51.01	68.66	73.33	73.55	52.61
Movement LOS	F	C	C	F	D	D	D	D	E	E	E	D
d_A, Approach Delay [s/veh]	29.30			38.88			59.81			72.96		
Approach LOS	C			D			E			E		
d_I, Intersection Delay [s/veh]	40.60											
Intersection LOS	D											
Intersection V/C	0.785											

Sequence

Ring 1	1	2	-	4	-	8	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	20.7
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.675

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	80.00	100.00	100.00	100.00	175.00	100.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	67	1278	1161	445	363	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	2.40	3.00	1.80	3.30	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	299	0	77
Total Hourly Volume [veh/h]	67	1278	1161	146	363	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	329	299	38	94	0
Total Analysis Volume [veh/h]	69	1318	1197	151	374	0
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		2		9	
Bicycle Volume [bicycles/h]	14		6		2	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	4	4	4	4	4
Maximum Green [s]	4	24	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	10	64	54	54	36	36
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	1	1	1
Pedestrian Clearance [s]	0	1	1	1	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no	no		no	
Maximum Recall	no	no	no		no	
Pedestrian Recall	no	no	no		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	60	50	50	32	32
g / C, Green / Cycle	0.06	0.60	0.50	0.50	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.04	0.37	0.34	0.10	0.21	0.00
Total Saturation Flow Adjustment	0.94	0.93	0.92	0.83	0.92	0.84
s, saturation flow rate [veh/h]	1778	3533	3512	1586	1747	1593
c, Capacity [veh/h]	107	2120	1756	793	559	510
d1, Uniform Delay [s]	45.96	12.76	18.96	13.81	29.42	23.12
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	26.47	1.38	2.16	0.53	6.24	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

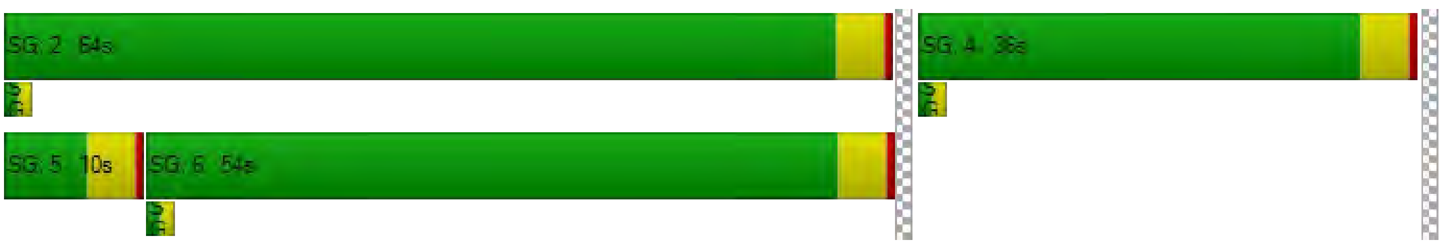
X, volume / capacity	0.65	0.62	0.68	0.19	0.67	0.00
d, Delay for Lane Group [s/veh]	72.43	14.15	21.12	14.35	35.66	23.12
Lane Group LOS	E	B	C	B	D	C
Critical Lane Group	yes	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	2.30	14.36	15.58	2.56	10.54	0.00
50th-Percentile Queue Length [ft]	57.62	359.11	389.61	64.07	263.45	0.00
95th-Percentile Queue Length [veh]	5.14	23.79	25.63	5.64	18.14	0.00
95th-Percentile Queue Length [ft]	128.54	594.87	640.64	140.89	453.54	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.43	14.15	21.12	14.35	35.66	23.12
Movement LOS	E	B	C	B	D	C
d_A, Approach Delay [s/veh]	17.05		20.37		35.66	
Approach LOS	B		C		D	
d_I, Intersection Delay [s/veh]	20.72					
Intersection LOS	C					
Intersection V/C	0.675					

Sequence

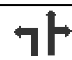
Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	14.3
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.761

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	26	1040	16	36	925	89	40	3	10	48	12	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	6	0	0	0
Total Hourly Volume [veh/h]	26	1040	16	36	925	89	40	3	4	48	12	70
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	274	4	9	243	23	11	1	1	13	3	18
Total Analysis Volume [veh/h]	27	1095	17	38	974	94	42	3	4	51	13	74
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			10			10			20		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	5	4	4	5	4	4	4	4	4	4	4	4
Maximum Green [s]	30	16	16	30	16	16	16	16	16	16	16	16
Amber [s]	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	0.5	0.5	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	9	79	79	9	79	79	12	12	12	12	12	12
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	1	1	0	1	1	1	1	1	1	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	no		no	no			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	75	5	75	8	8	8	8
g / C, Green / Cycle	0.05	0.75	0.05	0.75	0.08	0.08	0.08	0.08
(v / s)_i Volume / Saturation Flow Rate	0.01	0.31	0.02	0.57	0.04	0.00	0.06	0.05
Total Saturation Flow Adjustment	0.95	0.95	0.95	0.99	0.54	0.85	0.49	0.87
s, saturation flow rate [veh/h]	1805	3609	1805	1875	1026	1615	926	1658
c, Capacity [veh/h]	90	2707	90	1406	82	129	74	133
d1, Uniform Delay [s]	45.81	4.52	46.10	7.26	44.26	42.43	44.79	44.66
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.30	0.46	13.78	3.90	23.79	0.44	41.43	22.60
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.30	0.41	0.42	0.76	0.55	0.03	0.69	0.66
d, Delay for Lane Group [s/veh]	54.11	4.98	59.87	11.16	68.05	42.87	86.21	67.26
Lane Group LOS	D	A	E	B	E	D	F	E
Critical Lane Group	yes	no	no	yes	no	no	yes	no
50th-Percentile Queue Length [veh]	0.82	6.95	1.19	21.69	1.45	0.11	1.77	2.87
50th-Percentile Queue Length [ft]	20.49	173.68	29.66	542.31	36.22	2.80	44.17	71.72
95th-Percentile Queue Length [veh]	2.01	12.85	2.83	34.99	3.40	0.29	4.07	6.21
95th-Percentile Queue Length [ft]	50.18	321.17	70.85	874.77	85.06	7.21	101.68	155.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.11	4.98	4.98	59.87	11.16	11.16	68.05	68.05	42.87	86.21	67.26	67.26
Movement LOS	D	A	A	E	B	B	E	E	D	F	E	E
d_A, Approach Delay [s/veh]	6.14			12.84			66.00			74.26		
Approach LOS	A			B			E			E		
d_I, Intersection Delay [s/veh]	14.26											
Intersection LOS	B											
Intersection V/C	0.761											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	33.8
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.954

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Base Volume Input [veh/h]	22	864	3	1	805	120	191	6	51	4	4	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	4.70	0.00	0.00	3.90	3.30	1.00	0.00	0.00	0.00	0.00	20.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	22	864	3	1	805	120	191	6	51	4	4	5
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	227	1	0	212	32	50	2	13	1	1	1
Total Analysis Volume [veh/h]	23	909	3	1	847	126	201	6	54	4	4	5
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			64			10			11		
Bicycle Volume [bicycles/h]	24			12			10			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	126
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	81	81	81	81	81	81	45	45	45	45	45	45
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	1	1	1	1	1	1	1	1	1	1	1	1
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	77	77	77	77	41	41
g / C, Green / Cycle	0.61	0.61	0.61	0.61	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.14	0.50	0.00	0.54	0.29	0.01
Total Saturation Flow Adjustment	0.09	0.95	0.13	0.94	0.47	0.89
s, saturation flow rate [veh/h]	170	1814	248	1793	900	1687
c, Capacity [veh/h]	104	1108	151	1096	293	549
d1, Uniform Delay [s]	11.02	19.16	9.57	20.83	40.38	28.89
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.84	6.94	0.08	10.73	30.83	0.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.82	0.01	0.89	0.89	0.02
d, Delay for Lane Group [s/veh]	15.85	26.10	9.65	31.56	71.20	28.97
Lane Group LOS	B	C	A	C	E	C
Critical Lane Group	no	no	no	yes	yes	no
50th-Percentile Queue Length [veh]	0.45	30.80	0.02	36.98	11.58	0.33
50th-Percentile Queue Length [ft]	11.13	769.89	0.41	924.38	289.40	8.31
95th-Percentile Queue Length [veh]	1.12	49.34	0.04	59.18	19.66	0.84
95th-Percentile Queue Length [ft]	28.00	1233.46	1.05	1479.57	491.62	21.07

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.85	26.10	26.10	9.65	31.56	31.56	71.20	71.20	71.20	28.97	28.97	28.97
Movement LOS	B	C	C	A	C	C	E	E	E	C	C	C
d_A, Approach Delay [s/veh]	25.85			31.54			71.20			28.97		
Approach LOS	C			C			E			C		
d_I, Intersection Delay [s/veh]	33.83											
Intersection LOS	C											
Intersection V/C	0.954											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	18.3
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.683

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	3	745	40	27	826	4	37	70	17	78	112	100
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.20	10.00	7.40	3.60	0.00	2.70	0.00	0.00	2.60	0.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	745	40	27	826	4	37	70	17	78	112	100
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	194	10	7	215	1	10	18	4	20	29	26
Total Analysis Volume [veh/h]	3	776	42	28	860	4	39	73	18	81	117	104
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			20			4			5		
Bicycle Volume [bicycles/h]	23			28			16			15		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	126
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	97	97	97	97	97	97	29	29	29	29	29	29
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	1	1	1	1	1	1	1	1	1	1	1	1
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	93	93	93	93	25	25	25	25
g / C, Green / Cycle	0.74	0.74	0.74	0.74	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.01	0.46	0.06	0.47	0.06	0.05	0.07	0.13
Total Saturation Flow Adjustment	0.24	0.94	0.25	0.96	0.36	0.97	0.61	0.93
s, saturation flow rate [veh/h]	465	1792	472	1833	682	1844	1155	1766
c, Capacity [veh/h]	343	1323	349	1353	135	366	229	350
d1, Uniform Delay [s]	4.35	7.95	4.59	8.18	42.93	42.58	43.53	46.27
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.05	2.18	0.45	2.32	5.29	1.62	4.24	8.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.62	0.08	0.64	0.29	0.25	0.35	0.63
d, Delay for Lane Group [s/veh]	4.40	10.13	5.04	10.50	48.23	44.20	47.77	54.63
Lane Group LOS	A	B	A	B	D	D	D	D
Critical Lane Group	no	no	no	yes	no	no	no	yes
50th-Percentile Queue Length [veh]	0.03	16.53	0.33	17.99	1.30	2.92	2.72	8.20
50th-Percentile Queue Length [ft]	0.84	413.14	8.33	449.83	32.58	73.02	68.04	204.91
95th-Percentile Queue Length [veh]	0.09	27.05	0.84	29.28	3.09	6.30	5.93	14.71
95th-Percentile Queue Length [ft]	2.19	676.18	21.12	732.03	77.23	157.54	148.34	367.63

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	4.40	10.13	10.13	5.04	10.50	10.50	48.23	44.20	44.20	47.77	54.63	54.63
Movement LOS	A	B	B	A	B	B	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	10.11			10.32			45.41			52.79		
Approach LOS	B			B			D			D		
d_I, Intersection Delay [s/veh]	18.35											
Intersection LOS	B											
Intersection V/C	0.683											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	48.7
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.623

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	28	201	139	458	75	391	80	368	256	320	356	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	3.60	2.60	2.70	3.80	2.50	0.50	5.50	5.30	3.70	13.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	119	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	28	201	20	458	75	0	80	368	0	320	356	15
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	53	5	122	20	0	21	98	0	85	95	4
Total Analysis Volume [veh/h]	30	214	21	487	80	0	85	391	0	340	379	16
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			11			3		
Bicycle Volume [bicycles/h]	33			43			24			24		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal Group	8	8	8	4	7	4	6	6	6	2	5	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	4	4	0	5	0	4	4	4	0	5	0
Maximum Green [s]	16	16	16	0	30	0	16	16	16	0	30	0
Amber [s]	3.5	3.5	3.5	0.0	3.0	0.0	3.5	3.5	3.5	0.0	3.0	0.0
All red [s]	0.5	0.5	0.5	0.0	1.0	0.0	0.5	0.5	0.5	0.0	1.0	0.0
Split [s]	29	29	29	0	39	0	27	27	27	0	35	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	1	1	1	0	1	0	1	1	1	0	1	0
Pedestrian Clearance [s]	1	1	1	0	1	0	1	1	1	0	1	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	R	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	25	25	35	35	23	23	23	31
g / C, Green / Cycle	0.19	0.19	0.19	0.27	0.27	0.18	0.18	0.18	0.24
(v / s)_i Volume / Saturation Flow Rate	0.02	0.12	0.01	0.17	0.00	0.05	0.11	0.00	0.15
Total Saturation Flow Adjustment	0.95	0.95	0.82	0.89	0.82	0.93	0.95	0.81	0.85
s, saturation flow rate [veh/h]	1805	1810	1559	3377	1556	1761	3600	1531	4862
c, Capacity [veh/h]	347	348	300	909	419	312	637	271	1159
d1, Uniform Delay [s]	43.12	48.09	42.98	41.71	34.71	46.27	49.40	44.03	44.41
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.49	7.90	0.45	3.22	0.00	2.15	4.38	0.00	2.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.09	0.61	0.07	0.62	0.00	0.27	0.61	0.00	0.63
d, Delay for Lane Group [s/veh]	43.61	55.99	43.43	44.93	34.71	48.42	53.79	44.03	47.06
Lane Group LOS	D	E	D	D	C	D	D	D	D
Critical Lane Group	no	yes	no	yes	no	no	yes	no	yes
50th-Percentile Queue Length [veh]	0.96	8.14	0.67	10.82	0.00	2.90	7.87	0.00	10.06
50th-Percentile Queue Length [ft]	23.91	203.47	16.72	270.47	0.00	72.44	196.85	0.00	251.49
95th-Percentile Queue Length [veh]	2.32	14.62	1.65	18.55	0.00	6.26	14.23	0.00	17.44
95th-Percentile Queue Length [ft]	58.00	365.51	41.37	463.82	0.00	156.48	355.71	0.00	436.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.61	55.99	43.43	44.93	44.93	34.71	48.42	53.79	44.03	47.06	47.06	47.06
Movement LOS	D	E	D	D	D	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	53.60			44.93			52.83			47.06		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	48.66											
Intersection LOS	D											
Intersection V/C	0.623											

Sequence

Ring 1	-	5	-	6	-	7	-	8	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	20.4
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.958

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	15	618	67	20	471	11	138	113	13	136	188	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.30	3.00	0.00	4.90	0.00	6.50	0.90	7.70	11.00	2.10	3.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	618	67	20	471	11	138	113	13	136	188	65
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	159	17	5	121	3	36	29	3	35	48	17
Total Analysis Volume [veh/h]	15	637	69	21	486	11	142	116	13	140	194	67
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	36			37			51			41		
Bicycle Volume [bicycles/h]	52			17			11			37		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	8	8	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	32	32	32	32	32	32	28	28	28	28	28	28
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no		no	no			no	
Maximum Recall		no			no		no	no			no	
Pedestrian Recall		no			no		no	no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	28	28	28	24	24	24
g / C, Green / Cycle	0.47	0.47	0.47	0.47	0.40	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.02	0.38	0.07	0.28	0.17	0.07	0.32
Total Saturation Flow Adjustment	0.34	0.97	0.16	0.95	0.44	0.98	0.66
s, saturation flow rate [veh/h]	647	1848	306	1805	842	1855	1251
c, Capacity [veh/h]	302	862	143	842	337	742	501
d1, Uniform Delay [s]	8.74	13.81	9.16	11.78	12.99	11.61	15.89
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.31	8.53	2.17	3.02	3.84	0.51	12.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

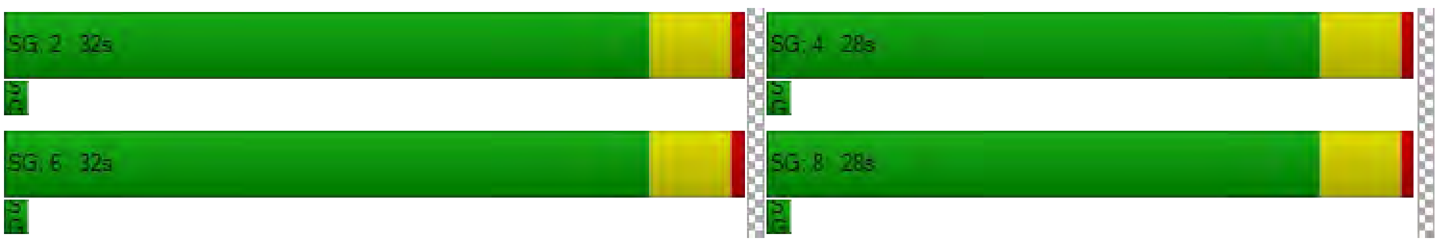
X, volume / capacity	0.05	0.82	0.15	0.59	0.42	0.17	0.80
d, Delay for Lane Group [s/veh]	9.05	22.34	11.33	14.80	16.84	12.12	28.57
Lane Group LOS	A	C	B	B	B	B	C
Critical Lane Group	no	yes	no	no	no	no	yes
50th-Percentile Queue Length [veh]	0.16	13.18	0.24	7.17	2.00	1.53	7.76
50th-Percentile Queue Length [ft]	3.90	329.60	5.96	179.17	49.94	38.33	193.93
95th-Percentile Queue Length [veh]	0.40	22.04	0.61	13.18	4.54	3.58	14.06
95th-Percentile Queue Length [ft]	10.02	550.96	15.21	329.41	113.39	89.53	351.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.05	22.34	22.34	11.33	14.80	14.80	16.84	12.12	12.12	28.57	28.57	28.57
Movement LOS	A	C	C	B	B	B	B	B	B	C	C	C
d_A, Approach Delay [s/veh]	22.06			14.66			14.59			28.57		
Approach LOS	C			B			B			C		
d_I, Intersection Delay [s/veh]	20.36											
Intersection LOS	C											
Intersection V/C	0.958											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.751

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	11	258	85	30	345	61	30	107	16	72	200	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	3.10	16.50	0.00	1.40	0.00	0.00	2.00	3.80	6.70	3.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	258	85	30	345	61	30	107	16	72	200	52
Peak Hour Factor	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	79	26	9	105	19	9	33	5	22	61	16
Total Analysis Volume [veh/h]	13	315	104	37	421	74	37	130	20	88	244	63
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			51			27			65		
Bicycle Volume [bicycles/h]	28			39			21			32		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	8	8	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	33	33	33	33	33	33	27	27	27	27	27	27
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	29	29	23	23
g / C, Green / Cycle	0.48	0.48	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.25	0.30	0.11	0.25
Total Saturation Flow Adjustment	0.92	0.92	0.86	0.84
s, saturation flow rate [veh/h]	1753	1756	1636	1596
c, Capacity [veh/h]	847	849	627	612
d1, Uniform Delay [s]	10.63	11.49	12.88	15.16
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.19	3.49	1.21	5.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

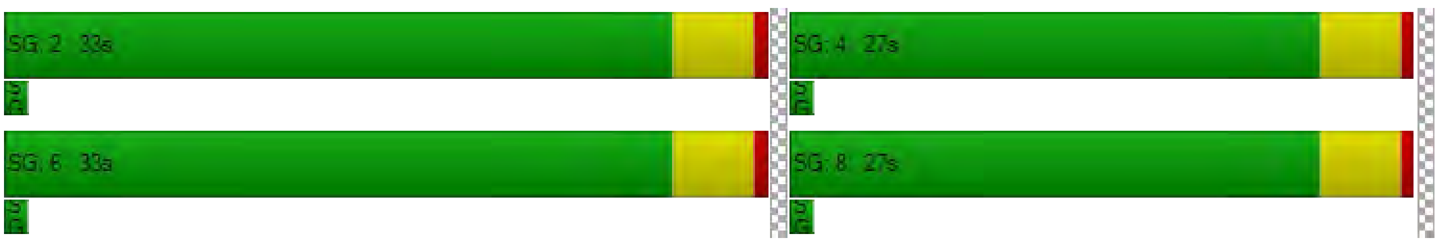
X, volume / capacity	0.51	0.63	0.30	0.65
d, Delay for Lane Group [s/veh]	12.81	14.98	14.10	20.35
Lane Group LOS	B	B	B	C
Critical Lane Group	no	yes	no	yes
50th-Percentile Queue Length [veh]	5.72	7.82	2.43	6.46
50th-Percentile Queue Length [ft]	143.02	195.52	60.81	161.59
95th-Percentile Queue Length [veh]	10.98	14.15	5.39	12.12
95th-Percentile Queue Length [ft]	274.38	353.75	134.68	302.91

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	12.81	12.81	12.81	14.98	14.98	14.98	14.10	14.10	14.10	20.35	20.35	20.35
Movement LOS	B	B	B	B	B	B	B	B	B	C	C	C
d_A, Approach Delay [s/veh]	12.81			14.98			14.10			20.35		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	15.64											
Intersection LOS	B											
Intersection V/C	0.751											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	18.1
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.646

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	8	57	9	156	14	149	16	840	113	169	1838	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	3.20	0.00	2.70	0.00	3.60	0.90	0.60	3.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	124	0	0	0
Total Hourly Volume [veh/h]	8	57	9	156	14	149	16	840	0	169	1838	71
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	15	2	42	4	40	4	228	0	46	499	19
Total Analysis Volume [veh/h]	9	62	10	170	15	162	17	913	0	184	1998	77
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			2			0			11		
Bicycle Volume [bicycles/h]	0			4			2			4		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	35	0	0	35	0	9	75	0	26	92	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	50.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	31	5	71	71	22	88
g / C, Green / Cycle	0.23	0.23	0.23	0.23	0.04	0.52	0.52	0.16	0.65
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.14	0.10	0.01	0.26	0.00	0.10	0.42
Total Saturation Flow Adjustment	0.46	0.98	0.68	0.83	0.95	0.92	0.84	0.94	0.87
s, saturation flow rate [veh/h]	868	1860	1284	1573	1805	3492	1601	1794	4982
c, Capacity [veh/h]	198	424	293	358	66	1823	836	290	3224
d1, Uniform Delay [s]	40.96	42.16	47.36	45.19	63.69	21.03	15.53	53.24	14.52
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.43	0.87	9.97	4.07	9.09	0.99	0.00	10.12	1.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.73	0.73	1.00	0.45

Lane Group Results

X, volume / capacity	0.05	0.17	0.63	0.45	0.26	0.50	0.00	0.63	0.64
d, Delay for Lane Group [s/veh]	41.39	43.03	57.33	49.26	72.79	16.38	11.37	63.36	7.50
Lane Group LOS	D	D	E	D	E	B	B	E	A
Critical Lane Group	no	no	yes	no	yes	no	no	no	yes
50th-Percentile Queue Length [veh]	0.29	2.35	7.33	5.87	0.70	9.90	0.00	7.35	11.83
50th-Percentile Queue Length [ft]	7.22	58.87	183.36	146.66	17.40	247.62	0.00	183.66	295.71
95th-Percentile Queue Length [veh]	0.73	5.24	13.43	11.20	1.72	17.21	0.00	13.44	20.04
95th-Percentile Queue Length [ft]	18.35	130.96	335.67	280.02	42.99	430.35	0.00	336.12	500.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	41.39	43.03	43.03	57.33	57.33	49.26	72.79	16.38	11.37	63.36	7.50	7.50
Movement LOS	D	D	D	E	E	D	E	B	B	E	A	A
d_A, Approach Delay [s/veh]	42.85			53.56			17.41			12.05		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	18.10											
Intersection LOS	B											
Intersection V/C	0.646											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	35.4
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.823

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	255	126	124	84	177	16	101	700	35	54	1349	547
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	2.40	1.60	0.00	2.80	0.00	0.00	3.90	0.00	1.90	3.90	3.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	74	0	0	0	0	0	29	0	0	285
Total Hourly Volume [veh/h]	255	126	50	84	177	16	101	700	6	54	1349	262
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	35	14	23	49	4	28	192	2	15	371	72
Total Analysis Volume [veh/h]	280	138	55	92	195	18	111	769	7	59	1482	288
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			12			10			5		
Bicycle Volume [bicycles/h]	18			15			4			9		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	121.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	24	0	0	23	0	15	77	0	12	74	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	19	19	11	73	73	8	70	70
g / C, Green / Cycle	0.15	0.15	0.14	0.14	0.08	0.54	0.54	0.06	0.51	0.51
(v / s)_i Volume / Saturation Flow Rate	0.12	0.03	0.05	0.12	0.06	0.22	0.00	0.03	0.43	0.18
Total Saturation Flow Adjustment	0.90	0.84	0.95	0.96	0.95	0.92	0.85	0.93	0.92	0.82
s, saturation flow rate [veh/h]	3418	1590	1805	1825	1805	3482	1615	1771	3482	1563
c, Capacity [veh/h]	503	234	252	255	146	1869	867	104	1792	805
d1, Uniform Delay [s]	56.36	51.24	53.03	56.98	61.21	18.73	14.66	62.31	27.88	19.63
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.79	2.35	4.04	26.43	30.49	0.67	0.02	20.42	4.54	1.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.71	0.71	1.00	0.74	0.74

Lane Group Results

X, volume / capacity	0.83	0.24	0.36	0.84	0.76	0.41	0.01	0.57	0.83	0.36
d, Delay for Lane Group [s/veh]	71.15	53.60	57.07	83.40	91.70	13.90	10.37	82.73	25.28	15.84
Lane Group LOS	E	D	E	F	F	B	B	F	C	B
Critical Lane Group	yes	no	no	yes	yes	no	no	no	yes	no
50th-Percentile Queue Length [veh]	10.20	2.00	3.48	9.96	5.10	7.19	0.09	2.53	26.83	5.25
50th-Percentile Queue Length [ft]	254.98	50.10	86.98	248.90	127.38	179.74	2.17	63.31	670.87	131.22
95th-Percentile Queue Length [veh]	17.64	4.55	7.30	17.29	9.99	13.21	0.22	5.58	43.06	10.24
95th-Percentile Queue Length [ft]	441.12	113.72	182.54	432.23	249.79	330.25	5.61	139.45	1076.52	255.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.15	71.15	53.60	57.07	83.40	83.40	91.70	13.90	10.37	82.73	25.28	15.84
Movement LOS	E	E	D	E	F	F	F	B	B	F	C	B
d_A, Approach Delay [s/veh]	69.11			75.46			23.61			25.64		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	35.36											
Intersection LOS	D											
Intersection V/C	0.823											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	30.6
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.728

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	57	196	53	117	254	63	89	731	73	125	1365	85
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	8.80	1.00	1.90	0.90	2.80	3.20	4.50	5.20	4.10	1.60	4.30	9.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	58	0	0	50	0	0	69	0	0	69
Total Hourly Volume [veh/h]	57	196	0	117	254	13	89	731	4	125	1365	16
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	51	0	30	66	3	23	190	1	33	355	4
Total Analysis Volume [veh/h]	59	204	0	122	265	14	93	761	4	130	1422	17
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			4			25			11		
Bicycle Volume [bicycles/h]	19			38			0			2		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	98.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	7	4	0	3	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	11	25	0	17	31	0	14	74	0	20	80	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	no	no		no	no		no	no		no	no	
Maximum Recall	no	no		no	no		no	no		no	no	
Pedestrian Recall	no	no		no	no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	50.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	21	21	13	27	27	10	70	70	16	76	76
g / C, Green / Cycle	0.05	0.15	0.15	0.10	0.20	0.20	0.07	0.51	0.51	0.12	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.04	0.11	0.00	0.07	0.14	0.01	0.05	0.22	0.00	0.07	0.41	0.01
Total Saturation Flow Adjustment	0.87	0.99	0.83	0.94	0.97	0.82	0.91	0.90	0.82	0.94	0.91	0.78
s, saturation flow rate [veh/h]	1659	1881	1585	1789	1848	1565	1727	3439	1551	1777	3468	1476
c, Capacity [veh/h]	85	290	245	171	367	311	127	1770	799	209	1938	825
d1, Uniform Delay [s]	63.44	54.54	48.62	59.69	50.99	44.07	61.69	20.57	16.06	57.12	22.43	13.39
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	37.19	13.30	0.00	22.34	11.66	0.27	30.86	0.76	0.01	13.15	2.51	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.29	0.29	1.00	0.66	0.66

Lane Group Results

X, volume / capacity	0.69	0.70	0.00	0.71	0.72	0.05	0.73	0.43	0.01	0.62	0.73	0.02
d, Delay for Lane Group [s/veh]	100.62	67.83	48.62	82.03	62.66	44.35	89.28	6.78	4.71	70.27	17.42	8.95
Lane Group LOS	F	E	D	F	E	D	F	A	A	E	B	A
Critical Lane Group	yes	no	no	no	yes	no	yes	no	no	no	yes	no
50th-Percentile Queue Length [veh]	2.72	8.66	0.00	5.43	11.10	0.46	4.21	4.47	0.03	5.37	19.69	0.19
50th-Percentile Queue Length [ft]	67.94	216.39	0.00	135.69	277.42	11.49	105.27	111.81	0.70	134.15	492.31	4.86
95th-Percentile Queue Length [veh]	5.93	15.38	0.00	10.52	18.96	1.15	8.55	8.98	0.07	10.42	31.89	0.50
95th-Percentile Queue Length [ft]	148.15	384.55	0.00	262.93	474.02	28.85	213.77	224.61	1.82	260.51	797.29	12.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	100.62	67.83	48.62	82.03	62.66	44.35	89.28	6.78	4.71	70.27	17.42	8.95
Movement LOS	F	E	D	F	E	D	F	A	A	E	B	A
d_A, Approach Delay [s/veh]	75.19			67.91			15.71			21.71		
Approach LOS	E			E			B			C		
d_I, Intersection Delay [s/veh]	30.59											
Intersection LOS	C											
Intersection V/C	0.728											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	11.3
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.658

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	78	54	76	41	44	30	0	818	39	0	1420	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.80	18.50	7.90	2.40	20.50	3.30	0.00	3.80	5.10	0.00	3.50	8.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	53	0	0	84
Total Hourly Volume [veh/h]	78	54	76	41	44	30	0	818	0	0	1420	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	1.0000	0.9700	0.9700	1.0000	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	14	20	11	11	8	0	211	0	0	366	0
Total Analysis Volume [veh/h]	80	56	78	42	45	31	0	843	0	0	1464	0
Presence of On-Street Parking	no		no	no		no			no			no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	19			15			43			20		
Bicycle Volume [bicycles/h]	14			36			2			4		

Intersection Settings

Located in CBD	yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	92.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	17	0	0	17	0	0	102	0	0	102	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	13	13	13	13	13	98	98	98	98
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.10	0.72	0.72	0.72	0.72
(v / s)_i Volume / Saturation Flow Rate	0.05	0.04	0.06	0.03	0.06	0.27	0.00	0.47	0.00
Total Saturation Flow Adjustment	0.82	0.76	0.71	0.83	0.70	0.83	0.73	0.83	0.71
s, saturation flow rate [veh/h]	1565	1443	1347	1586	1332	3137	1383	3146	1346
c, Capacity [veh/h]	150	138	129	152	127	2260	997	2267	970
d1, Uniform Delay [s]	58.62	57.87	59.04	57.13	58.99	7.26	5.31	9.93	5.31
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.02	8.64	19.36	4.49	18.94	0.47	0.00	1.44	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.15	0.15	0.15	0.15

Lane Group Results

X, volume / capacity	0.53	0.41	0.61	0.28	0.60	0.37	0.00	0.65	0.00
d, Delay for Lane Group [s/veh]	71.64	66.51	78.40	61.62	77.93	1.60	0.82	2.97	0.82
Lane Group LOS	E	E	E	E	E	A	A	A	A
Critical Lane Group	no	no	yes	no	yes	no	no	yes	no
50th-Percentile Queue Length [veh]	3.32	2.24	3.34	1.63	3.25	2.14	0.00	6.26	0.00
50th-Percentile Queue Length [ft]	83.05	56.12	83.62	40.71	81.22	53.40	0.00	156.53	0.00
95th-Percentile Queue Length [veh]	7.02	5.02	7.07	3.78	6.89	4.81	0.00	11.81	0.00
95th-Percentile Queue Length [ft]	175.61	125.61	176.63	94.52	172.37	120.28	0.00	295.19	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.64	66.51	78.40	61.62	77.93	77.93	0.00	1.60	0.82	0.00	2.97	0.82
Movement LOS	E	E	E	E	E	E		A	A		A	A
d_A, Approach Delay [s/veh]	72.76			72.12			1.60			2.97		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	11.28											
Intersection LOS	B											
Intersection V/C	0.658											

Sequence

Ring 1	-	2	-	-	4	-	8	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	37.8
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.824

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	24	345	60	417	214	44	88	779	396	161	1420	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	1.20	1.70	2.20	1.40	6.80	10.20	3.10	2.50	3.10	3.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	58	0	0	377	0	0	14
Total Hourly Volume [veh/h]	24	345	60	417	214	0	88	779	19	161	1420	2
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	89	15	107	55	0	23	201	5	41	366	1
Total Analysis Volume [veh/h]	25	356	62	430	221	0	91	803	20	166	1464	2
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23			3			1			20		
Bicycle Volume [bicycles/h]	41			11			1			4		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	109.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	8	8	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	4	16	16	4	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	25	25	25	25	25	25	14	64	64	22	72	72
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	21	21	10	60	60	18	68	68
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.07	0.44	0.44	0.13	0.50	0.50
(v / s)_i Volume / Saturation Flow Rate	0.13	0.13	0.12	0.00	0.06	0.23	0.01	0.09	0.42	0.00
Total Saturation Flow Adjustment	0.92	0.90	0.99	0.80	0.86	0.92	0.83	0.92	0.92	0.85
s, saturation flow rate [veh/h]	3490	3430	1874	1512	1638	3509	1576	1751	3495	1615
c, Capacity [veh/h]	539	530	289	233	120	1548	695	232	1748	807
d1, Uniform Delay [s]	55.69	55.59	55.12	48.62	61.80	27.54	21.51	56.55	29.25	17.02
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.24	12.75	17.30	0.00	35.04	1.25	0.08	17.28	4.98	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.90	0.33	0.33

Lane Group Results

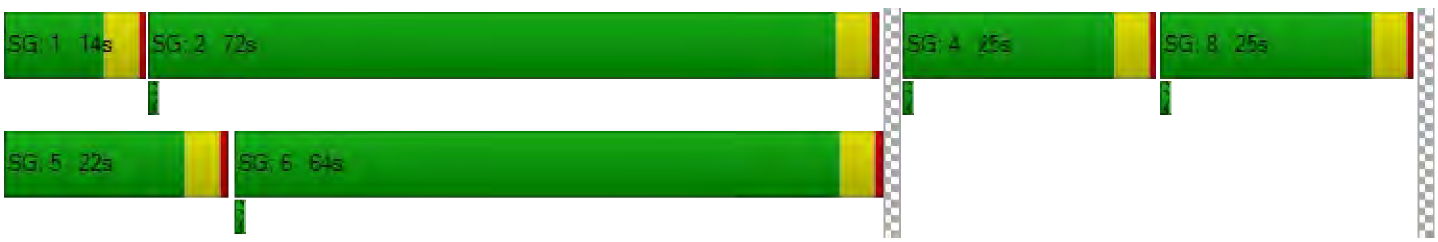
X, volume / capacity	0.82	0.81	0.76	0.00	0.76	0.52	0.03	0.72	0.84	0.00
d, Delay for Lane Group [s/veh]	68.94	68.34	72.43	48.62	96.84	24.59	18.31	68.08	14.72	5.67
Lane Group LOS	E	E	E	D	F	C	B	E	B	A
Critical Lane Group	yes	yes	no	no	yes	no	no	no	yes	no
50th-Percentile Queue Length [veh]	10.68	10.10	9.73	0.00	4.22	10.83	0.35	7.01	21.71	0.02
50th-Percentile Queue Length [ft]	266.99	252.59	243.16	0.00	105.40	270.66	8.79	175.30	542.67	0.40
95th-Percentile Queue Length [veh]	18.35	17.51	16.95	0.00	8.56	18.56	0.89	12.94	35.01	0.04
95th-Percentile Queue Length [ft]	458.73	437.63	423.81	0.00	213.99	464.11	22.26	323.60	875.34	1.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	68.94	68.94	68.94	68.34	72.43	48.62	96.84	24.59	18.31	68.08	14.72	5.67
Movement LOS	E	E	E	E	E	D	F	C	B	E	B	A
d_A, Approach Delay [s/veh]	68.94			69.73			31.64			20.14		
Approach LOS	E			E			C			C		
d_I, Intersection Delay [s/veh]	37.83											
Intersection LOS	D											
Intersection V/C	0.824											

Sequence

Ring 1	1	2	-	4	-	8	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	8.7
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.569

Intersection Setup

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	65	8	68	6	3	10	43	1188	25	43	1755	43
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	10.00	0.00	2.90	0.00	2.30	2.60	2.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	9	0	0	0	0	0	0
Total Hourly Volume [veh/h]	65	8	68	6	3	1	43	1188	25	43	1755	43
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	2	18	2	1	0	11	313	7	11	462	11
Total Analysis Volume [veh/h]	68	8	72	6	3	1	45	1251	26	45	1847	45
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			0			2		
Bicycle Volume [bicycles/h]	16			0			3			5		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	65.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	8	8	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	4	16	16	4	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	29	29	29	29	29	29	11	96	96	11	96	96
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	6.0	6.0	6.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	25	25	7	92	7	92
g / C, Green / Cycle	0.18	0.18	0.18	0.05	0.68	0.05	0.68
(v / s)_i Volume / Saturation Flow Rate	0.10	0.01	0.00	0.02	0.25	0.03	0.38
Total Saturation Flow Adjustment	0.77	0.87	0.77	0.95	0.88	0.93	0.88
s, saturation flow rate [veh/h]	1463	1655	1468	1805	5014	1764	5026
c, Capacity [veh/h]	269	304	270	93	3392	91	3400
d1, Uniform Delay [s]	50.39	45.55	45.33	62.74	9.55	62.78	11.41
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.88	0.18	0.02	16.96	0.32	18.03	0.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	0.35	1.00	0.35

Lane Group Results

X, volume / capacity	0.55	0.03	0.00	0.48	0.38	0.50	0.56
d, Delay for Lane Group [s/veh]	58.27	45.73	45.35	79.70	3.66	80.82	4.65
Lane Group LOS	E	D	D	E	A	F	A
Critical Lane Group	yes	no	no	yes	no	no	yes
50th-Percentile Queue Length [veh]	5.79	0.30	0.03	1.90	3.70	1.91	7.34
50th-Percentile Queue Length [ft]	144.68	7.48	0.83	47.45	92.41	47.65	183.53
95th-Percentile Queue Length [veh]	11.08	0.76	0.09	4.34	7.68	4.35	13.44
95th-Percentile Queue Length [ft]	276.96	19.01	2.15	108.38	191.98	108.79	335.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.27	58.27	58.27	45.73	45.73	45.35	79.70	3.66	3.66	80.82	4.65	4.65
Movement LOS	E	E	E	D	D	D	E	A	A	F	A	A
d_A, Approach Delay [s/veh]	58.27			45.69			6.24			6.42		
Approach LOS	E			D			A			A		
d_I, Intersection Delay [s/veh]	8.71											
Intersection LOS	A											
Intersection V/C	0.569											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	16.8
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.685

Intersection Setup

Name	Middle Avenue		El Camino Real (SR 82)		El Camino Real (SR 82)	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	0
Pocket Length [ft]	100.00	55.00	275.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		no		yes	

Volumes

Name	Middle Avenue		El Camino Real (SR 82)		El Camino Real (SR 82)	
Base Volume Input [veh/h]	185	285	182	1040	1753	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	0.70	2.20	4.80	3.60	2.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	183	0	0	0	0
Total Hourly Volume [veh/h]	185	102	182	1040	1753	68
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	28	49	283	476	18
Total Analysis Volume [veh/h]	201	111	198	1130	1905	74
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13		0		8	
Bicycle Volume [bicycles/h]	5		3		4	

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	76.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	4	0	1	6	2	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	27	0	26	109	83	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	1	0	0	1	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	no		no	no	no	
Maximum Recall	no		no	no	no	
Pedestrian Recall	no		no	no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	22	105	79
g / C, Green / Cycle	0.17	0.17	0.16	0.77	0.58
(v / s)_i Volume / Saturation Flow Rate	0.11	0.07	0.11	0.23	0.40
Total Saturation Flow Adjustment	0.93	0.84	0.93	0.87	0.87
s, saturation flow rate [veh/h]	1766	1604	1766	4939	4968
c, Capacity [veh/h]	299	271	286	3813	2886
d1, Uniform Delay [s]	52.97	50.44	53.81	4.58	19.85
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.50	4.52	13.00	0.20	1.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.33	1.24	1.33
PF, progression factor	1.00	1.00	1.00	0.23	0.62

Lane Group Results

X, volume / capacity	0.67	0.41	0.69	0.30	0.69
d, Delay for Lane Group [s/veh]	64.47	54.96	66.81	1.27	13.64
Lane Group LOS	E	D	E	A	B
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	8.34	4.16	8.18	1.82	16.42
50th-Percentile Queue Length [ft]	208.58	103.96	204.51	45.49	410.61
95th-Percentile Queue Length [veh]	14.92	8.46	14.68	4.18	26.89
95th-Percentile Queue Length [ft]	373.05	211.59	367.04	104.39	672.36

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	64.47	54.96	66.81	1.27	13.64	13.64
Movement LOS	E	D	E	A	B	B
d_A, Approach Delay [s/veh]	61.09		11.04		13.64	
Approach LOS	E		B		B	
d_I, Intersection Delay [s/veh]	16.78					
Intersection LOS	B					
Intersection V/C	0.685					

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	4.3
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.591

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	28	0	50	1	0	0	119	1204	1	30	2068	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	0.00	0.00	0.00	0.00	0.00	0.80	3.70	0.00	6.70	2.60	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	54	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	0	0	1	0	0	119	1204	1	30	2068	15
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	0	0	0	0	31	317	0	8	544	4
Total Analysis Volume [veh/h]	29	0	0	1	0	0	125	1267	1	32	2177	16
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			0			0			6		
Bicycle Volume [bicycles/h]	0			0			5			5		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	111.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	9	0	0	9	0	21	108	0	19	106	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	5	17	104	15	102
g / C, Green / Cycle	0.04	0.04	0.04	0.13	0.76	0.11	0.75
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.00	0.07	0.25	0.02	0.44
Total Saturation Flow Adjustment	0.92	0.85	0.80	0.94	0.88	0.89	0.88
s, saturation flow rate [veh/h]	1742	1615	1520	1791	4990	1692	5039
c, Capacity [veh/h]	64	59	56	224	3816	187	3779
d1, Uniform Delay [s]	64.16	63.09	63.13	55.97	5.05	54.87	7.52
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.39	0.00	0.59	9.70	0.23	1.99	0.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.25	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	0.22	1.00	0.00

Lane Group Results

X, volume / capacity	0.45	0.00	0.02	0.56	0.33	0.17	0.58
d, Delay for Lane Group [s/veh]	85.55	63.09	63.72	65.67	1.37	56.85	0.66
Lane Group LOS	F	E	E	E	A	E	A
Critical Lane Group	yes	no	no	yes	no	no	yes
50th-Percentile Queue Length [veh]	1.25	0.00	0.04	4.98	2.13	1.15	2.58
50th-Percentile Queue Length [ft]	31.26	0.00	1.00	124.55	53.36	28.87	64.48
95th-Percentile Queue Length [veh]	2.97	0.00	0.10	9.81	4.81	2.76	5.67
95th-Percentile Queue Length [ft]	74.35	0.00	2.60	245.27	120.20	69.11	141.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	85.55	85.55	63.09	63.72	63.72	63.72	65.67	1.37	1.37	56.85	0.66	0.66
Movement LOS	F	F	E	E	E	E	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	85.55			63.72			7.14			1.47		
Approach LOS	F			E			A			A		
d_I, Intersection Delay [s/veh]	4.32											
Intersection LOS	A											
Intersection V/C	0.591											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	16.9
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.601

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	30.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	397	386	59	340	302	67
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.93	1.92	2.00	1.94	1.90	1.74
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	397	386	59	340	302	67
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	107	104	16	91	81	18
Total Analysis Volume [veh/h]	427	415	63	366	325	72
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		21		23	
Bicycle Volume [bicycles/h]	11		91		16	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal Group	2	2	1	6	8	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	4	4	5	4	4	4
Maximum Green [s]	16	16	30	16	16	16
Amber [s]	3.5	3.5	3.0	3.5	3.5	3.5
All red [s]	0.5	0.5	1.0	0.5	0.5	0.5
Split [s]	29	29	9	38	22	22
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no		no	no	no	
Maximum Recall	yes		no	yes	no	
Pedestrian Recall	yes		no	yes	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	25	5	34	18	18
g / C, Green / Cycle	0.42	0.42	0.08	0.57	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.23	0.26	0.04	0.20	0.18	0.05
Total Saturation Flow Adjustment	0.98	0.83	0.93	0.98	0.93	0.84
s, saturation flow rate [veh/h]	1864	1585	1770	1864	1771	1587
c, Capacity [veh/h]	777	660	147	1056	531	476
d1, Uniform Delay [s]	13.24	13.83	26.14	7.01	18.00	15.40
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.79	4.49	8.80	0.90	5.18	0.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

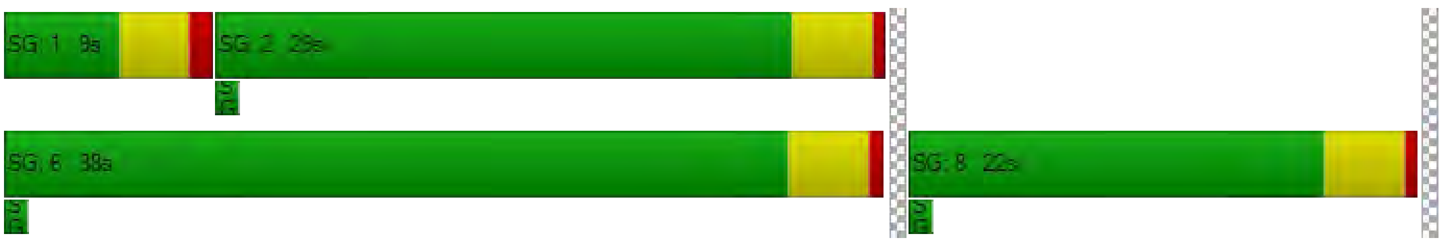
X, volume / capacity	0.55	0.63	0.43	0.35	0.61	0.15
d, Delay for Lane Group [s/veh]	16.03	18.32	34.94	7.91	23.18	16.07
Lane Group LOS	B	B	C	A	C	B
Critical Lane Group	no	yes	yes	no	yes	no
50th-Percentile Queue Length [veh]	6.25	6.52	1.16	3.76	5.49	0.97
50th-Percentile Queue Length [ft]	156.20	162.97	29.09	94.01	137.15	24.27
95th-Percentile Queue Length [veh]	11.79	12.20	2.78	7.79	10.61	2.35
95th-Percentile Queue Length [ft]	294.68	304.99	69.58	194.73	265.22	58.82

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	16.03	18.32	34.94	7.91	23.18	16.07
Movement LOS	B	B	C	A	C	B
d_A, Approach Delay [s/veh]	17.16		11.88		21.89	
Approach LOS	B		B		C	
d_I, Intersection Delay [s/veh]	16.93					
Intersection LOS	B					
Intersection V/C	0.601					

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#39: Santa Cruz Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	52.6
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.782

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	231	1143	261	331	559	51	94	615	389	223	669	236
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.50	1.40	4.20	1.50	3.40	3.90	8.50	3.90	1.50	0.90	3.40	4.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	144	0	0	38	0	0	288	0	0	281
Total Hourly Volume [veh/h]	231	1143	117	331	559	13	94	615	101	223	669	0
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	304	31	88	149	3	25	164	27	59	178	0
Total Analysis Volume [veh/h]	246	1216	124	352	595	14	100	654	107	237	712	0
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			5			7		
Bicycle Volume [bicycles/h]	33			33			29			49		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Protecte
Signal Group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	4	4	5	4	4	5	4	4	5	4	4
Maximum Green [s]	30	16	16	30	16	16	30	16	16	30	16	16
Amber [s]	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
All red [s]	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5
Split [s]	35	72	72	22	59	59	13	39	39	17	43	43
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	0	1	1	0	1	1	0	1	1	0	1	1
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no		no	no		no	no	no
Maximum Recall	no	yes		no	yes		no	no		no	no	no
Pedestrian Recall	no	yes		no	yes		no	no		no	no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	68	68	18	55	55	9	35	35	13	39	39
g / C, Green / Cycle	0.21	0.45	0.45	0.12	0.37	0.37	0.06	0.23	0.23	0.09	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.07	0.34	0.08	0.10	0.17	0.01	0.03	0.19	0.07	0.07	0.20	0.00
Total Saturation Flow Adjustment	0.89	0.94	0.82	0.91	0.92	0.82	0.85	0.92	0.84	0.91	0.92	0.81
s, saturation flow rate [veh/h]	3387	3568	1550	3454	3499	1554	3231	3482	1591	3474	3499	1543
c, Capacity [veh/h]	700	1617	703	414	1283	570	194	812	371	301	910	401
d1, Uniform Delay [s]	50.90	34.00	24.36	64.67	36.25	30.36	68.39	54.28	47.26	67.14	51.56	41.07
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.39	3.28	0.55	19.11	1.21	0.08	9.48	8.35	1.95	18.53	6.67	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

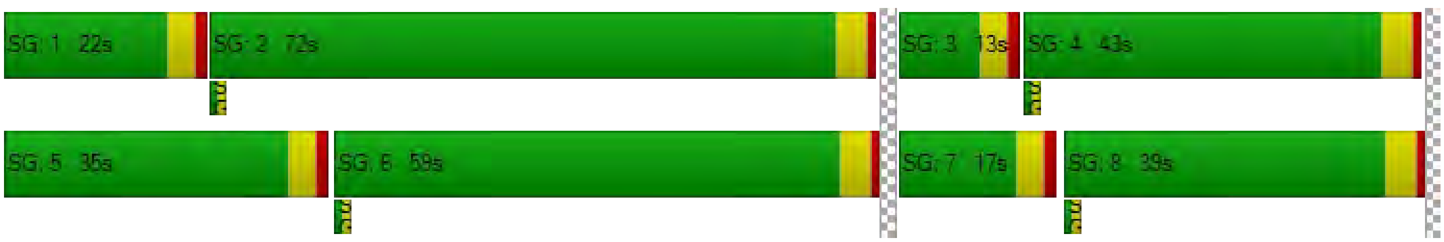
X, volume / capacity	0.35	0.75	0.18	0.85	0.46	0.02	0.52	0.81	0.29	0.79	0.78	0.00
d, Delay for Lane Group [s/veh]	52.29	37.28	24.91	83.78	37.46	30.44	77.87	62.63	49.21	85.67	58.24	41.07
Lane Group LOS	D	D	C	F	D	C	E	E	D	F	E	D
Critical Lane Group	no	yes	no	yes	no	no	no	yes	no	yes	no	no
50th-Percentile Queue Length [veh]	4.94	25.92	3.34	9.46	10.98	0.40	2.41	16.41	3.99	6.24	17.35	0.00
50th-Percentile Queue Length [ft]	123.56	648.01	83.56	236.60	274.59	10.01	60.25	410.35	99.79	156.00	433.71	0.00
95th-Percentile Queue Length [veh]	9.75	41.62	7.06	16.57	18.79	1.01	5.34	26.88	8.18	11.78	28.30	0.00
95th-Percentile Queue Length [ft]	243.67	1040.45	176.52	414.21	469.87	25.26	133.61	671.95	204.58	294.39	707.43	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.29	37.28	24.91	83.78	37.46	30.44	77.87	62.63	49.21	85.67	58.24	41.07
Movement LOS	D	D	C	F	D	C	E	E	D	F	E	D
d_A, Approach Delay [s/veh]	38.64			54.32			62.73			65.09		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	52.62											
Intersection LOS	D											
Intersection V/C	0.782											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	146.8
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.196

Intersection Setup

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	no			no			no			no		

Volumes

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Base Volume Input [veh/h]	42	508	0	0	1449	140	6	0	1	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.30	4.70	2.00	2.00	2.60	4.30	5.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	508	0	0	1449	140	6	0	1	0	0	0
Peak Hour Factor	0.9300	0.9300	1.0000	1.0000	0.9300	0.9300	0.9300	0.9300	0.9300	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	137	0	0	390	38	2	0	0	0	0	0
Total Analysis Volume [veh/h]	45	546	0	0	1558	151	6	0	1	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.01	0.00	0.00	0.02	0.00	0.20	0.00	0.00	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	18.21	0.00	0.00	0.00	0.00	0.00	146.82	131.34	40.78	0.00	0.00	0.00
Movement LOS	C	A			A	A	F	F	E			
95th-Percentile Queue Length [veh]	0.49	0.00	0.00	0.00	0.00	0.00	0.63	0.63	0.63	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	12.21	0.00	0.00	0.00	0.00	0.00	15.84	15.84	15.84	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	1.39			0.00			131.67			0.00		
Approach LOS	A			A			F			A		
d_I, Intersection Delay [s/veh]	0.75											
Intersection LOS	F											

Intersection Level Of Service Report
#74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	3.7
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.569

Intersection Setup

Name	University Avenue		University Avenue		O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	University Avenue		University Avenue		O'Brien Drive	
Base Volume Input [veh/h]	67	532	1284	142	16	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	5.10	2.90	3.50	18.80	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	67	532	1284	142	16	25
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	139	334	37	4	7
Total Analysis Volume [veh/h]	70	554	1338	148	17	26
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		1		0	
Bicycle Volume [bicycles/h]	7		5		1	

Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	0	2	6	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.5	3.5	0.0	3.5	0.0
All red [s]	0.0	0.5	1.0	0.0	1.0	0.0
Split [s]	0	75	75	0	10	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	1	1	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	2.5	0.0	2.5	0.0
Minimum Recall		no	no		no	
Maximum Recall		yes	yes		no	
Pedestrian Recall		no	no		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.50	2.50	2.50
g_i, Effective Green Time [s]	71	71	6	6
g / C, Green / Cycle	0.84	0.83	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.18	0.48	0.01	0.02
Total Saturation Flow Adjustment	0.82	0.82	0.72	0.74
s, saturation flow rate [veh/h]	3098	3117	1367	1398
c, Capacity [veh/h]	2588	2585	88	90
d1, Uniform Delay [s]	1.40	2.36	37.65	37.88
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	0.94	4.78	7.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.21	0.57	0.19	0.29
d, Delay for Lane Group [s/veh]	1.59	3.30	42.42	45.72
Lane Group LOS	A	A	D	D
Critical Lane Group	no	yes	no	yes
50th-Percentile Queue Length [veh]	1.75	7.80	0.43	0.67
50th-Percentile Queue Length [ft]	43.69	195.03	10.69	16.66
95th-Percentile Queue Length [veh]	4.03	14.12	1.08	1.65
95th-Percentile Queue Length [ft]	100.70	353.02	26.92	41.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	1.59	3.30	3.30	42.42	45.72
Movement LOS		A	A	A	D	D
d_A, Approach Delay [s/veh]	1.59		3.30		44.42	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	3.70					
Intersection LOS	A					
Intersection V/C	0.569					

Sequence

Ring 1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	19.8
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.675

Intersection Setup

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Base Volume Input [veh/h]	152	429	122	42	550	59	56	85	33	71	51	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.80	2.40	4.20	0.00	0.00	8.70	0.00	0.00	13.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	429	122	42	550	59	56	85	33	71	51	62
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	45	128	36	13	164	18	17	25	10	21	15	18
Total Analysis Volume [veh/h]	181	511	145	50	655	70	67	101	39	85	61	74
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	54			1			12			21		
Bicycle Volume [bicycles/h]	26			2			7			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	5	0	5	5	0	0	5	0	0	5	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	9	53	0	9	53	0	0	23	0	0	23	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	1	0	0	1	0	0	1	0	0	1	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	yes		no	yes			no			no	
Pedestrian Recall	no	yes		no	yes			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	58	49	58	49	19	19	19
g / C, Green / Cycle	0.68	0.58	0.68	0.58	0.22	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.30	0.36	0.07	0.40	0.16	0.09	0.09
Total Saturation Flow Adjustment	0.32	0.95	0.35	0.95	0.69	0.50	0.81
s, saturation flow rate [veh/h]	610	1803	670	1797	1312	943	1534
c, Capacity [veh/h]	416	1039	457	1036	293	211	343
d1, Uniform Delay [s]	7.97	11.98	6.16	12.78	30.43	28.16	28.10
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.28	2.91	0.48	3.94	13.39	5.65	3.37
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

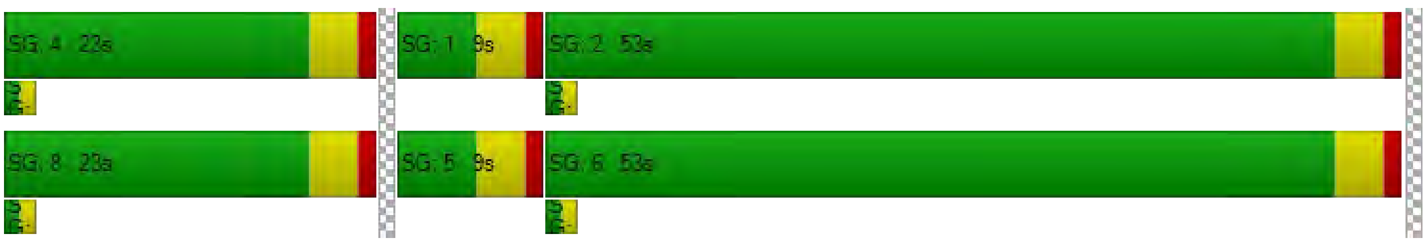
X, volume / capacity	0.43	0.63	0.11	0.70	0.71	0.40	0.39
d, Delay for Lane Group [s/veh]	11.25	14.90	6.64	16.72	43.81	33.82	31.47
Lane Group LOS	B	B	A	B	D	C	C
Critical Lane Group	no	no	no	yes	yes	no	no
50th-Percentile Queue Length [veh]	2.38	12.17	0.48	14.62	5.53	1.96	3.05
50th-Percentile Queue Length [ft]	59.51	304.26	12.08	365.49	138.15	48.96	76.16
95th-Percentile Queue Length [veh]	5.29	20.54	1.21	24.18	10.67	4.46	6.53
95th-Percentile Queue Length [ft]	132.18	513.49	30.29	604.42	266.79	111.42	163.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.25	14.90	14.90	6.64	16.72	16.72	43.81	43.81	43.81	33.82	31.47	31.47
Movement LOS	B	B	B	A	B	B	D	D	D	C	C	C
d_A, Approach Delay [s/veh]	14.11			16.07			43.81			32.37		
Approach LOS	B			B			D			C		
d_I, Intersection Delay [s/veh]	19.84											
Intersection LOS	B											
Intersection V/C	0.675											

Sequence

Ring 1	4	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	8	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	155.5
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.668

Intersection Setup

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	23	2	41	2	2	7	103	1888	233	113	852	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	2	41	2	2	7	103	1888	233	113	852	39
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	1	11	1	1	2	27	502	62	30	227	10
Total Analysis Volume [veh/h]	24	2	44	2	2	7	110	2009	248	120	906	41
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			1			6		
Bicycle Volume [bicycles/h]	0			0			27			22		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	9.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	13	0	0	10	0	11	41	0	8	38	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	6.0	0.0	3.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	yes		no	yes	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	11	11	8	8	9	39	39	6	36
g / C, Green / Cycle	0.11	0.11	0.08	0.08	0.09	0.39	0.39	0.06	0.36
(v / s)_i Volume / Saturation Flow Rate	0.01	0.03	0.00	0.01	0.06	0.57	0.16	0.07	0.27
Total Saturation Flow Adjustment	0.89	0.83	0.93	0.87	0.93	0.93	0.80	0.93	0.93
s, saturation flow rate [veh/h]	3390	1577	1770	1645	1770	3547	1522	1770	3519
c, Capacity [veh/h]	373	173	142	132	159	1383	594	106	1267
d1, Uniform Delay [s]	39.91	40.74	42.37	42.55	44.15	30.50	22.23	47.00	28.02
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.36	3.49	0.18	1.00	21.82	207.69	2.16	126.66	4.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

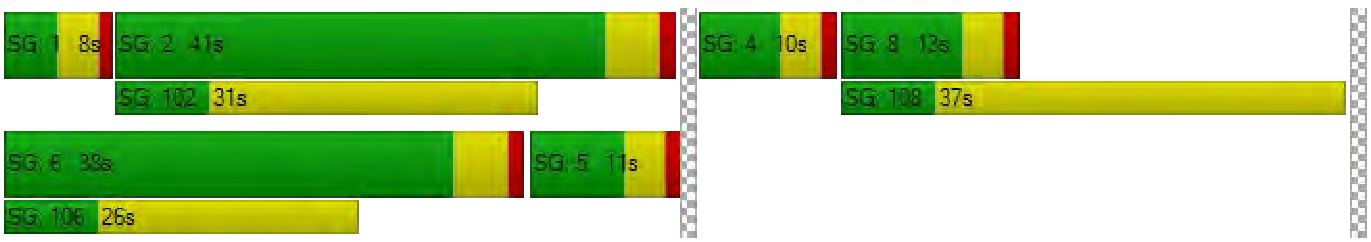
X, volume / capacity	0.07	0.25	0.01	0.07	0.69	1.45	0.42	1.13	0.75
d, Delay for Lane Group [s/veh]	40.27	44.23	42.55	43.55	65.97	238.19	24.38	173.66	32.08
Lane Group LOS	D	D	D	D	E	F	C	F	C
Critical Lane Group	no	yes	no	yes	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	0.37	1.24	0.06	0.25	3.65	73.34	5.62	6.34	14.55
50th-Percentile Queue Length [ft]	9.24	31.02	1.39	6.33	91.20	1833.48	140.60	158.46	363.73
95th-Percentile Queue Length [veh]	0.93	2.95	0.14	0.65	7.60	117.34	10.82	11.93	24.07
95th-Percentile Queue Length [ft]	23.37	73.83	3.60	16.14	189.88	2933.57	270.61	298.14	601.79

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.27	40.27	44.23	42.55	43.55	43.55	65.97	238.19	24.38	173.66	32.08	32.08
Movement LOS	D	D	D	D	D	D	E	F	C	F	C	C
d_A, Approach Delay [s/veh]	42.76			43.37			207.78			48.01		
Approach LOS	D			D			F			D		
d_I, Intersection Delay [s/veh]	155.48											
Intersection LOS	F											
Intersection V/C	0.668											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	46.4
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.784

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	40.00		35.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	663	556	65	172	852	517
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	4.00	3.10	1.70	2.70	0.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	663	556	65	172	852	517
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	178	149	17	46	229	139
Total Analysis Volume [veh/h]	713	598	70	185	916	556
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		1		1	
Bicycle Volume [bicycles/h]	43		21		15	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal Group	0	7	1	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	55	26	0	69	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	1	1	0	1	0
Pedestrian Clearance [s]	0	1	1	0	1	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		no	no		no	
Maximum Recall		no	no		no	
Pedestrian Recall		no	no		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	51	22	22	65	65
g / C, Green / Cycle	0.34	0.15	0.15	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.27	0.04	0.12	0.26	0.34
Total Saturation Flow Adjustment	0.85	0.92	0.84	0.93	0.85
s, saturation flow rate [veh/h]	4845	1751	1588	3522	1612
c, Capacity [veh/h]	1647	257	233	1526	698
d1, Uniform Delay [s]	44.79	56.89	61.81	32.55	36.77
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.08	2.61	23.75	1.75	9.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.27	0.79	0.60	0.80
d, Delay for Lane Group [s/veh]	48.87	59.49	85.56	34.30	45.91
Lane Group LOS	D	E	F	C	D
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	21.77	2.83	9.20	17.35	24.08
50th-Percentile Queue Length [ft]	544.28	70.66	230.08	433.77	602.07
95th-Percentile Queue Length [veh]	35.11	6.13	16.19	28.30	38.73
95th-Percentile Queue Length [ft]	877.84	153.21	404.65	707.53	968.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.87	48.87	59.49	85.56	34.30	45.91
Movement LOS	D	D	E	F	C	D
d_A, Approach Delay [s/veh]	48.87		78.41		38.69	
Approach LOS	D		E		D	
d_I, Intersection Delay [s/veh]	46.42					
Intersection LOS	D					
Intersection V/C	0.784					

Sequence

Ring 1	1	3	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#110: Marsh Road and US 101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	17.1
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.681

Intersection Setup

Name	Marsh Road		Marsh Road			
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	no		yes		yes	

Volumes

Name	Marsh Road		Marsh Road			
Base Volume Input [veh/h]	1097	0	0	1261	848	349
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	0.00	0.00	5.20	1.90	4.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1097	0	0	1261	848	349
Peak Hour Factor	0.9000	1.0000	1.0000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	305	0	0	350	236	97
Total Analysis Volume [veh/h]	1219	0	0	1401	942	388
Presence of On-Street Parking	no			no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	35.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal Group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	16	0	0	16	16	30
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	41	0	0	50	30	9
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	2.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	18	0	0	0	20	0
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	yes			yes	no	no
Maximum Recall	no			no	no	no
Pedestrian Recall	no			no	no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	39	48	28	78
g / C, Green / Cycle	0.49	0.60	0.35	0.98
(v / s)_i Volume / Saturation Flow Rate	0.35	0.41	0.27	0.25
Total Saturation Flow Adjustment	0.91	0.90	0.91	0.81
s, saturation flow rate [veh/h]	3462	3439	3440	1548
c, Capacity [veh/h]	1688	2063	1204	1510
d1, Uniform Delay [s]	16.22	10.80	23.27	0.03
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.72	1.82	5.11	0.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

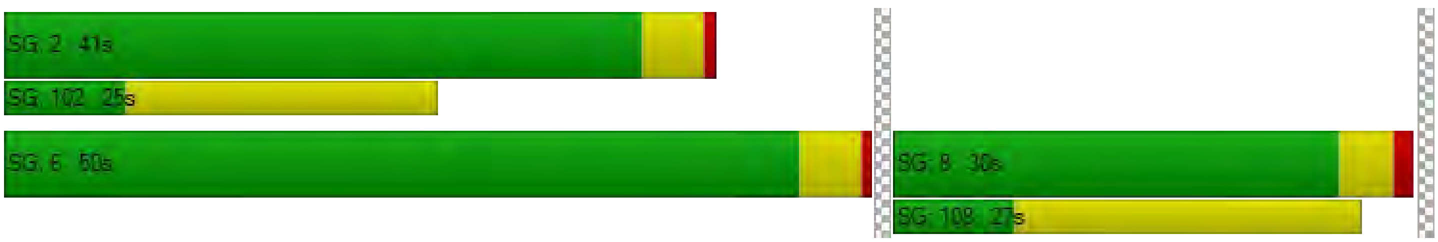
X, volume / capacity	0.72	0.68	0.78	0.26
d, Delay for Lane Group [s/veh]	18.93	12.62	28.38	0.45
Lane Group LOS	B	B	C	A
Critical Lane Group	no	yes	yes	no
50th-Percentile Queue Length [veh]	13.59	13.28	12.02	0.77
50th-Percentile Queue Length [ft]	339.79	331.90	300.53	19.28
95th-Percentile Queue Length [veh]	22.64	22.17	20.32	1.90
95th-Percentile Queue Length [ft]	566.08	554.36	508.00	47.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	18.93	0.00	0.00	12.62	28.38	0.45
Movement LOS	B			B	C	A
d_A, Approach Delay [s/veh]	18.93		12.62		20.23	
Approach LOS	B		B		C	
d_I, Intersection Delay [s/veh]	17.13					
Intersection LOS	B					
Intersection V/C	0.681					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	18.2
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.789

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	35.00		35.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	1794	740	38	77	189
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.20	1.90	2.60	0.00	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1794	740	38	77	189
Peak Hour Factor	1.0000	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	504	208	11	22	53
Total Analysis Volume [veh/h]	0	2016	831	43	87	212
Presence of On-Street Parking		no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27		0		5	
Bicycle Volume [bicycles/h]	31		28		9	

Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal Group	0	2	6	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	117	117	0	33	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	1	1	0	1	0
Pedestrian Clearance [s]	0	1	1	0	1	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		no	no		no	
Maximum Recall		yes	yes		no	
Pedestrian Recall		yes	yes		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	113	113	29	29
g / C, Green / Cycle	0.75	0.75	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.63	0.28	0.05	0.15
Total Saturation Flow Adjustment	0.85	0.83	0.86	0.76
s, saturation flow rate [veh/h]	3217	3172	1625	1446
c, Capacity [veh/h]	2424	2389	314	280
d1, Uniform Delay [s]	12.22	6.30	51.56	57.19
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.51	0.43	2.18	17.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.37	0.28	0.76
d, Delay for Lane Group [s/veh]	15.73	6.73	53.75	74.59
Lane Group LOS	B	A	D	E
Critical Lane Group	yes	no	no	yes
50th-Percentile Queue Length [veh]	36.62	7.60	3.37	10.09
50th-Percentile Queue Length [ft]	915.53	190.12	84.13	252.24
95th-Percentile Queue Length [veh]	58.62	13.83	7.10	17.48
95th-Percentile Queue Length [ft]	1465.45	345.73	177.52	437.12

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	15.73	6.73	6.73	53.75	74.59
Movement LOS		B	A	A	D	E
d_A, Approach Delay [s/veh]	15.73		6.73		68.52	
Approach LOS	B		A		E	
d_I, Intersection Delay [s/veh]	18.22					
Intersection LOS	B					
Intersection V/C	0.789					

Sequence

Ring 1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	54.3
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.605

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	10	0	33	14	1	9	211	1594	117	73	760	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	33	14	1	9	211	1594	117	73	760	50
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	9	4	0	2	58	438	32	20	209	14
Total Analysis Volume [veh/h]	11	0	36	15	1	10	232	1752	129	80	835	55
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			10			7			0		
Bicycle Volume [bicycles/h]	1			7			23			14		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	62.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	12	0	0	12	0	4	10	0	6	10	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	28	0	0	28	0	25	55	0	17	47	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	yes		no	yes	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	26	26	26	26	23	53	15	45
g / C, Green / Cycle	0.25	0.25	0.25	0.25	0.22	0.50	0.14	0.42
(v / s)_i Volume / Saturation Flow Rate	0.01	0.02	0.01	0.01	0.13	0.54	0.05	0.25
Total Saturation Flow Adjustment	0.73	0.82	0.86	0.81	0.93	0.92	0.93	0.92
s, saturation flow rate [veh/h]	1382	1564	1630	1547	1770	3506	1770	3508
c, Capacity [veh/h]	339	384	400	380	384	1753	250	1489
d1, Uniform Delay [s]	30.43	30.90	30.49	30.39	37.40	26.50	40.91	23.52
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.18	0.49	0.19	0.13	6.89	44.15	3.34	1.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

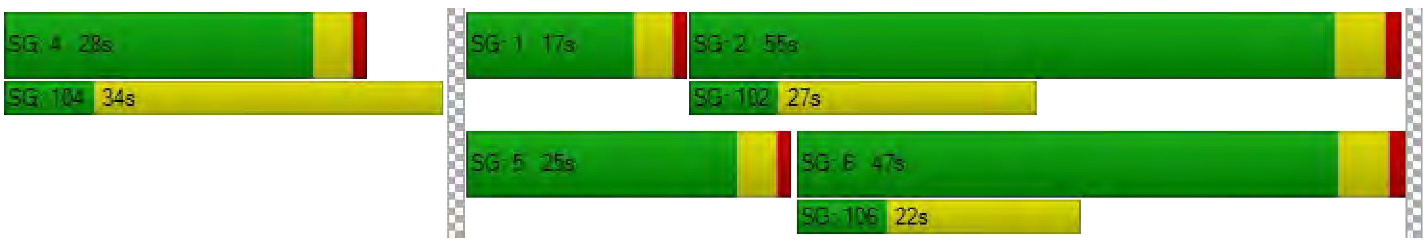
X, volume / capacity	0.03	0.09	0.04	0.03	0.60	1.07	0.32	0.60
d, Delay for Lane Group [s/veh]	30.61	31.38	30.68	30.51	44.29	70.65	44.25	25.29
Lane Group LOS	C	C	C	C	D	E	D	C
Critical Lane Group	no	yes	no	no	no	yes	yes	no
50th-Percentile Queue Length [veh]	0.27	0.89	0.39	0.24	7.11	46.22	2.34	12.15
50th-Percentile Queue Length [ft]	6.66	22.16	9.68	6.03	177.72	1155.50	58.59	303.84
95th-Percentile Queue Length [veh]	0.68	2.16	0.98	0.62	13.09	73.96	5.22	20.51
95th-Percentile Queue Length [ft]	16.98	54.02	24.44	15.40	327.23	1848.91	130.41	512.87

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.61	30.61	31.38	30.68	30.68	30.51	44.29	70.65	70.65	44.25	25.29	25.29
Movement LOS	C	C	C	C	C	C	D	E	E	D	C	C
d_A, Approach Delay [s/veh]	31.20			30.61			67.76			26.86		
Approach LOS	C			C			E			C		
d_I, Intersection Delay [s/veh]	54.34											
Intersection LOS	D											
Intersection V/C	0.605											

Sequence

Ring 1	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	44.3
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.575

Intersection Setup

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	8	3	0	2	11	473	3	5	246	6
Total Analysis Volume [veh/h]	8	1	33	14	1	9	42	1893	14	19	985	24
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			6			0			11		
Bicycle Volume [bicycles/h]	2			0			32			53		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	92.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	34	0	0	34	0	13	54	0	12	53	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	yes		no	yes	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	C	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	32	32	11	52	10	51
g / C, Green / Cycle	0.32	0.32	0.11	0.51	0.10	0.50
(v / s)_i Volume / Saturation Flow Rate	0.03	0.01	0.02	0.54	0.01	0.29
Total Saturation Flow Adjustment	0.84	0.84	0.93	0.93	0.93	0.93
s, saturation flow rate [veh/h]	1596	1601	1770	3542	1770	3531
c, Capacity [veh/h]	506	507	193	1824	175	1783
d1, Uniform Delay [s]	24.21	23.93	41.07	24.50	41.44	17.33
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.32	0.18	2.58	34.15	1.25	1.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

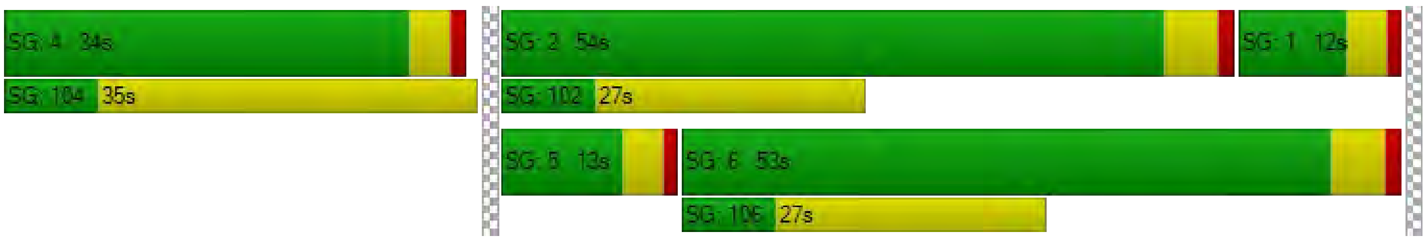
X, volume / capacity	0.08	0.05	0.22	1.05	0.11	0.57
d, Delay for Lane Group [s/veh]	24.53	24.10	43.66	58.65	42.69	18.63
Lane Group LOS	C	C	D	E	D	B
Critical Lane Group	yes	no	no	yes	yes	no
50th-Percentile Queue Length [veh]	0.90	0.51	1.18	43.40	0.53	11.80
50th-Percentile Queue Length [ft]	22.41	12.63	29.60	1084.98	13.25	295.05
95th-Percentile Queue Length [veh]	2.18	1.27	2.83	69.45	1.32	20.00
95th-Percentile Queue Length [ft]	54.58	31.63	70.71	1736.16	33.11	499.93

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.53	24.53	24.53	24.10	24.10	24.10	43.66	58.65	58.65	42.69	18.63	18.63
Movement LOS	C	C	C	C	C	C	D	E	E	D	B	B
d_A, Approach Delay [s/veh]	24.53			24.10			58.33			19.08		
Approach LOS	C			C			E			B		
d_I, Intersection Delay [s/veh]	44.33											
Intersection LOS	D											
Intersection V/C	0.575											

Sequence

Ring 1	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	29.4
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.650

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Base Volume Input [veh/h]	145	1496	17	27	732	136	2	0	9	215	3	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	145	1496	17	27	732	136	2	0	9	215	3	174
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	402	5	7	197	37	1	0	2	58	1	47
Total Analysis Volume [veh/h]	156	1609	18	29	787	146	2	0	10	231	3	187
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			0			4			3		
Bicycle Volume [bicycles/h]	0			32			20			61		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	99.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	5	10	0	0	6	0	0	6	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	22	53	0	12	43	0	0	35	0	0	35	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	yes		no	yes			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	20	51	10	41	33	33	33
g / C, Green / Cycle	0.20	0.51	0.10	0.41	0.33	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.09	0.46	0.02	0.27	0.01	0.17	0.13
Total Saturation Flow Adjustment	0.93	0.93	0.93	0.91	0.83	0.71	0.78
s, saturation flow rate [veh/h]	1770	3541	1770	3446	1584	1343	1491
c, Capacity [veh/h]	354	1806	177	1413	523	443	492
d1, Uniform Delay [s]	35.09	22.21	41.17	23.87	22.62	27.18	25.66
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.95	7.73	1.98	2.44	0.08	4.45	2.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

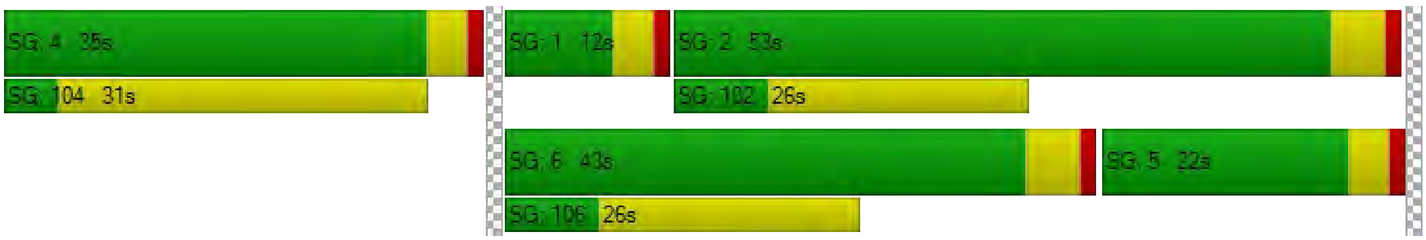
X, volume / capacity	0.44	0.90	0.16	0.66	0.02	0.53	0.38
d, Delay for Lane Group [s/veh]	39.04	29.94	43.16	26.30	22.70	31.63	27.89
Lane Group LOS	D	C	D	C	C	C	C
Critical Lane Group	no	yes	yes	no	no	yes	no
50th-Percentile Queue Length [veh]	4.26	28.34	0.81	12.85	0.24	6.03	4.43
50th-Percentile Queue Length [ft]	106.54	708.51	20.21	321.14	6.08	150.74	110.82
95th-Percentile Queue Length [veh]	8.64	45.44	1.98	21.54	0.62	11.45	8.92
95th-Percentile Queue Length [ft]	215.90	1136.07	49.54	538.43	15.53	286.32	222.98

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.04	29.94	29.94	43.16	26.30	26.30	22.70	22.70	22.70	31.63	31.63	27.89
Movement LOS	D	C	C	D	C	C	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	30.74			26.81			22.70			29.97		
Approach LOS	C			C			C			C		
d_I, Intersection Delay [s/veh]	29.42											
Intersection LOS	C											
Intersection V/C	0.650											

Sequence

Ring 1	4	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	140.9
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.173

Intersection Setup

Name				Haven Avenue			Bayfront Expressway			Marsh Road		
Approach	Northbound			Eastbound			Westbound			Southwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name				Haven Avenue			Bayfront Expressway			Marsh Road		
Base Volume Input [veh/h]	143	35	1141	5	66	209	2636	407	12	6	35	8
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.00	0.00	4.60	0.00	18.20	9.10	4.70	4.90	0.00	0.00	0.00	16.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	143	35	1141	5	66	209	2636	407	12	6	35	8
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	9	300	1	17	55	694	107	3	2	9	2
Total Analysis Volume [veh/h]	151	37	1201	5	69	220	2775	428	13	6	37	8
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			2			0			9		
Bicycle Volume [bicycles/h]	1			14			0			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	125.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss
Signal Group	2	3	2	4	1	4	8	2	8	6	4	6
Auxiliary Signal Groups			2,3									
Lead / Lag	Lag	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	10	6	10	4	12	4	0	10	0	0	4	0
Maximum Green [s]	50	26	50	30	30	30	0	50	0	0	30	0
Amber [s]	4.7	3.6	4.7	3.6	3.6	3.6	0.0	4.7	0.0	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	0.5	0.0	0.5	0.0	1.0	0.0	0.0	0.5	0.0
Split [s]	71	20	71	34	35	34	0	71	0	0	34	0
Vehicle Extension [s]	4.5	2.5	4.5	2.8	2.5	2.8	0.0	4.5	0.0	0.0	2.8	0.0
Walk [s]	7	5	7	7	5	7	0	7	0	0	7	0
Pedestrian Clearance [s]	16	10	16	22	26	22	0	16	0	0	22	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	3.7	2.6	3.7	2.1	1.6	2.1	0.0	3.7	0.0	0.0	2.1	0.0
Minimum Recall		no	no		no			no			no	
Maximum Recall		no	yes		no			yes			no	
Pedestrian Recall		no	no		no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.60	4.60	3.60	3.60	5.70	5.70	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	1.60	1.60	3.70	3.70	2.10
g_i, Effective Green Time [s]	15	86	31	31	65	65	30
g / C, Green / Cycle	0.10	0.54	0.20	0.20	0.41	0.41	0.19
(v / s)_i Volume / Saturation Flow Rate	0.10	0.44	0.02	0.15	0.55	0.24	0.03
Total Saturation Flow Adjustment	0.96	0.72	0.80	0.76	0.88	0.95	0.97
s, saturation flow rate [veh/h]	1827	2728	3050	1440	5022	1803	1847
c, Capacity [veh/h]	176	1473	599	283	2050	736	345
d1, Uniform Delay [s]	72.30	30.24	52.97	61.00	47.35	37.10	54.40
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	87.49	5.08	0.42	18.82	162.56	3.59	0.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.07	0.82	0.12	0.78	1.35	0.60	0.15
d, Delay for Lane Group [s/veh]	159.79	35.33	53.39	79.82	209.91	40.69	55.30
Lane Group LOS	F	D	D	E	F	D	E
Critical Lane Group	no	yes	no	yes	yes	no	yes
50th-Percentile Queue Length [veh]	12.65	30.00	1.53	11.25	77.94	17.32	2.04
50th-Percentile Queue Length [ft]	316.22	750.05	38.24	281.35	1948.41	432.90	50.89
95th-Percentile Queue Length [veh]	21.25	48.08	3.57	19.19	124.70	28.25	4.61
95th-Percentile Queue Length [ft]	531.15	1201.94	89.35	479.79	3117.46	706.20	115.29

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	159.79	159.79	35.33	53.39	53.39	79.82	209.91	40.69	40.69	55.30	55.30	55.30
Movement LOS	F	F	D	D	D	E	F	D	D	E	E	E
d_A, Approach Delay [s/veh]	52.18			73.16			186.71			55.30		
Approach LOS	D			E			F			E		
d_I, Intersection Delay [s/veh]	140.86											
Intersection LOS	F											
Intersection V/C	1.173											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	15.4
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.545

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Base Volume Input [veh/h]	64	636	403	112	100	74
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	3.20	5.40	1.00	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	636	403	112	100	74
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	181	114	32	28	21
Total Analysis Volume [veh/h]	73	723	458	127	114	84
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		20		20	
Bicycle Volume [bicycles/h]	24		13		11	

Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	5	2	6	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	5	0	5	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	13	83	70	0	17	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	1	0	1	0
Pedestrian Clearance [s]	0	0	1	0	1	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	no	no	no		no	
Maximum Recall	no	yes	yes		no	
Pedestrian Recall	no	no	no		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	79	66	13	13
g / C, Green / Cycle	0.09	0.79	0.66	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.04	0.43	0.36	0.07	0.06
Total Saturation Flow Adjustment	0.86	0.88	0.85	0.85	0.75
s, saturation flow rate [veh/h]	1625	1678	1608	1608	1433
c, Capacity [veh/h]	146	1326	1062	209	186
d1, Uniform Delay [s]	43.35	3.87	9.08	40.73	40.20
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.67	1.62	2.06	9.85	7.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.50	0.55	0.55	0.55	0.45
d, Delay for Lane Group [s/veh]	55.03	5.49	11.14	50.58	47.89
Lane Group LOS	E	A	B	D	D
Critical Lane Group	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	2.24	9.17	10.22	3.44	2.46
50th-Percentile Queue Length [ft]	56.02	229.15	255.44	85.98	61.51
95th-Percentile Queue Length [veh]	5.02	16.13	17.67	7.23	5.44
95th-Percentile Queue Length [ft]	125.42	403.28	441.80	180.79	136.02

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.03	5.49	11.14	11.14	50.58	47.89
Movement LOS	E	A	B	B	D	D
d_A, Approach Delay [s/veh]	10.03		11.14		49.44	
Approach LOS	B		B		D	
d_I, Intersection Delay [s/veh]	15.39					
Intersection LOS	B					
Intersection V/C	0.545					

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	18.9
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.843

Intersection Setup

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	1
Pocket Length [ft]	80.00	100.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	205	26	176	2726	933	169
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	23.10	6.30	3.80	5.10	5.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	205	26	176	2726	933	169
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	7	47	725	248	45
Total Analysis Volume [veh/h]	218	28	187	2900	993	180
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		2		2	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Split	Split	Protected	Permissive	Permissive	Permissive
Signal Group	5	0	7	4	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	26	0	26	104	78	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	1	0	0	1	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	no		no	no	no	
Maximum Recall	no		no	yes	yes	
Pedestrian Recall	no		no	no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22	22	100	74	74
g / C, Green / Cycle	0.17	0.17	0.17	0.77	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.14	0.02	0.12	0.65	0.22	0.13
Total Saturation Flow Adjustment	0.83	0.62	0.80	0.79	0.78	0.73
s, saturation flow rate [veh/h]	1571	1181	1528	4488	4432	1380
c, Capacity [veh/h]	266	200	259	3452	2523	786
d1, Uniform Delay [s]	52.09	45.95	51.12	9.78	15.54	13.87
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	23.82	1.46	16.09	2.64	0.46	0.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

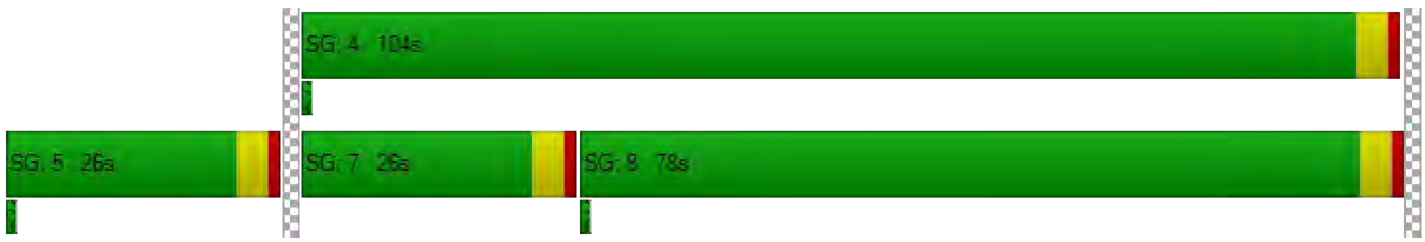
X, volume / capacity	0.82	0.14	0.72	0.84	0.39	0.23
d, Delay for Lane Group [s/veh]	75.91	47.41	67.21	12.43	16.01	14.55
Lane Group LOS	E	D	E	B	B	B
Critical Lane Group	yes	no	no	yes	no	no
50th-Percentile Queue Length [veh]	9.59	0.94	7.70	32.22	8.21	3.59
50th-Percentile Queue Length [ft]	239.74	23.45	192.46	805.62	205.13	89.72
95th-Percentile Queue Length [veh]	16.75	2.28	13.97	51.61	14.72	7.49
95th-Percentile Queue Length [ft]	418.81	56.97	349.21	1290.27	367.96	187.33

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	75.91	47.41	67.21	12.43	16.01	14.55
Movement LOS	E	D	E	B	B	B
d_A, Approach Delay [s/veh]	72.67		15.75		15.78	
Approach LOS	E		B		B	
d_I, Intersection Delay [s/veh]	18.86					
Intersection LOS	B					
Intersection V/C	0.843					

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	15.1
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.883

Intersection Setup

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	140.00	100.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	179	12	1106	56	22	2914
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.30	8.30	5.30	7.10	0.00	3.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	179	12	1106	56	22	2914
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	3	294	15	6	775
Total Analysis Volume [veh/h]	190	13	1177	60	23	3100
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		4	
Bicycle Volume [bicycles/h]	1		1		1	

Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal Group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	0	5	0	5	5
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	24	0	97	0	9	106
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	1	0	1	0	0	1
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
Minimum Recall	no		no		no	no
Maximum Recall	no		yes		no	yes
Pedestrian Recall	no		no		no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	20.0	0.0	0.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	93	93	5	102
g / C, Green / Cycle	0.15	0.15	0.72	0.72	0.04	0.78
(v / s)_i Volume / Saturation Flow Rate	0.13	0.01	0.27	0.04	0.01	0.69
Total Saturation Flow Adjustment	0.76	0.71	0.78	0.71	0.86	0.79
s, saturation flow rate [veh/h]	1447	1342	4424	1357	1625	4492
c, Capacity [veh/h]	223	206	3165	971	62	3524
d1, Uniform Delay [s]	53.58	46.99	7.17	5.51	60.96	9.73
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	31.82	0.58	0.34	0.12	15.89	3.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.06	0.37	0.06	0.37	0.88
d, Delay for Lane Group [s/veh]	85.40	47.58	7.51	5.63	76.85	13.24
Lane Group LOS	F	D	A	A	E	B
Critical Lane Group	yes	no	no	no	no	yes
50th-Percentile Queue Length [veh]	8.70	0.43	7.01	0.74	0.93	37.44
50th-Percentile Queue Length [ft]	217.46	10.85	175.31	18.51	23.27	936.10
95th-Percentile Queue Length [veh]	15.44	1.09	12.94	1.82	2.26	59.93
95th-Percentile Queue Length [ft]	386.11	27.31	323.62	45.58	56.54	1498.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	85.40	47.58	7.51	5.63	76.85	13.24
Movement LOS	F	D	A	A	E	B
d_A, Approach Delay [s/veh]	82.98		7.42		13.70	
Approach LOS	F		A		B	
d_I, Intersection Delay [s/veh]	15.08					
Intersection LOS	B					
Intersection V/C	0.883					

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Base Volume Input [veh/h]	114	148	74	133	204	8	5	5	17	14	8	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	10.10	6.80	2.30	3.40	0.00	40.00	40.00	29.40	14.30	37.50	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	114	148	74	133	204	8	5	5	17	14	8	28
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	40	20	36	55	2	1	1	5	4	2	8
Total Analysis Volume [veh/h]	124	161	80	145	222	9	5	5	18	15	9	30
Pedestrian Volume [ped/h]	0			1			0			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.54	2.71	0.14	0.28
95th-Percentile Queue Length [ft]	63.46	67.76	3.62	6.88
Approach Delay [s/veh]	11.69	12.04	9.22	9.14
Approach LOS	B	B	A	A
Intersection Delay [s/veh]	11.60			
Intersection LOS	B			

Intersection Level Of Service Report
#209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	9.6
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	1	0	0	1	53	0	2	17	1	1	0	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.90	0.00	0.00	5.90	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	0	1	53	0	2	17	1	1	0	11
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	0	18	0	1	6	0	0	0	4
Total Analysis Volume [veh/h]	1	0	0	1	71	0	3	23	1	1	0	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	no			no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	9.20	9.57	8.40	7.25	0.00	0.00	7.34	0.00	0.00	9.15	9.62	8.67
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.14	0.14	0.14	0.05	0.05	0.05	0.05	0.05	0.05
95th-Percentile Queue Length [ft]	0.09	0.09	0.09	3.52	3.52	3.52	1.34	1.34	1.34	1.23	1.23	1.23
d_A, Approach Delay [s/veh]	9.20			0.10			0.82			8.70		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	1.53											
Intersection LOS	A											

Intersection Level Of Service Report
#213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Base Volume Input [veh/h]	8	33	5	1	6	0	29	11	91	0	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	9.10	20.00	100.00	33.30	0.00	10.30	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	33	5	1	6	0	29	11	91	0	0	1
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	10	1	0	2	0	9	3	27	0	0	0
Total Analysis Volume [veh/h]	10	39	6	1	7	0	35	13	108	0	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.10	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.23	0.00	0.00	8.24	0.00	0.00	9.72	10.10	9.18	9.84	9.42	8.33
Movement LOS	A	A	A	A	A	A	A	B	A	A	A	A
95th-Percentile Queue Length [veh]	0.10	0.10	0.10	0.02	0.02	0.02	0.57	0.57	0.57	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.62	2.62	2.62	0.54	0.54	0.54	14.15	14.15	14.15	0.07	0.07	0.07
d_A, Approach Delay [s/veh]	1.31			1.03			9.38			8.33		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.05											
Intersection LOS	B											

Intersection Level Of Service Report
#214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	12.2
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Approach	Southbound			Northeastbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Base Volume Input [veh/h]	111	39	0	0	23	14	7	0	11	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	10.30	2.00	2.00	26.10	7.10	0.00	0.00	18.20	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	39	0	0	23	14	7	0	11	0	0	0
Peak Hour Factor	0.7800	0.7800	1.0000	1.0000	0.7800	0.7800	0.7800	0.7800	0.7800	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	13	0	0	7	4	2	0	4	0	0	0
Total Analysis Volume [veh/h]	142	50	0	0	29	18	9	0	14	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.55	0.00	0.00	0.00	0.00	0.00	11.74	12.23	8.79	0.00	0.00	0.00
Movement LOS	A	A			A	A	B	B	A			
95th-Percentile Queue Length [veh]	0.42	0.42	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	10.53	10.53	0.00	0.00	0.00	0.00	2.37	2.37	2.37	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	5.58			0.00			9.95			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	4.96											
Intersection LOS	B											

Intersection Level Of Service Report
#215: Chrysler Dr/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	8.8
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chrysler Drive						Constitution Drive					
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Chrysler Drive						Constitution Drive					
Base Volume Input [veh/h]	23	47	12	19	127	97	19	5	102	1	28	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	13.00	8.50	8.30	21.10	0.80	3.10	5.30	40.00	9.80	0.00	17.90	100.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	47	12	19	127	97	19	5	102	1	28	2
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	13	3	5	35	27	5	1	28	0	8	1
Total Analysis Volume [veh/h]	26	52	13	21	141	108	21	6	113	1	31	2
Pedestrian Volume [ped/h]	0			1			1			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.43	1.36	0.59	0.16
95th-Percentile Queue Length [ft]	10.76	34.03	14.72	3.93
Approach Delay [s/veh]	8.70	9.15	8.08	8.56
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.76			
Intersection LOS	A			

Intersection Level Of Service Report
#233: Sand Hill Road and Sand Hill Circle

Control Type:	Signalized	Delay (sec / veh):	63.7
Analysis Method:	HCM2000	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.435

Intersection Setup

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Base Volume Input [veh/h]	4	293	0	0	51	40	0	0	0	0	795	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	26.60	2.00	2.00	5.90	7.50	2.00	2.00	2.00	3.00	3.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	293	0	0	51	40	0	0	0	0	795	32
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	73	0	0	13	10	0	0	0	0	199	8
Total Analysis Volume [veh/h]	4	293	0	0	51	40	0	0	0	0	795	32
Presence of On-Street Parking	no					no				no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Permiss	Permiss	Permiss
Signal Group	0	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	13	0	0	13	0	0	0	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	10	0	0	10	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	0	0	0	14	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no						yes	
Maximum Recall		no			no						no	
Pedestrian Recall		no			no						no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	R		C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		0.00
g_i, Effective Green Time [s]	15	15	15		32
g / C, Green / Cycle	0.16	0.16	0.16		0.35
(v / s)_i Volume / Saturation Flow Rate	0.20	0.03	0.03		0.24
Total Saturation Flow Adjustment	0.79	0.94	0.78		0.92
s, saturation flow rate [veh/h]	1498	1794	1485		3490
c, Capacity [veh/h]	241	289	239		1222
d1, Uniform Delay [s]	37.75	32.59	32.54		24.92
k, delay calibration	0.50	0.50	0.50		0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00
d2, Incremental Delay [s]	134.53	1.33	1.50		3.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00
PF, progression factor	1.00	1.00	1.00		1.00

Lane Group Results

X, volume / capacity	1.23	0.18	0.17		0.68
d, Delay for Lane Group [s/veh]	172.28	33.92	34.05		27.94
Lane Group LOS	F	C	C		C
Critical Lane Group	yes	no	no		yes
50th-Percentile Queue Length [veh]	16.18	1.20	0.95		10.90
50th-Percentile Queue Length [ft]	404.41	30.08	23.65		272.49
95th-Percentile Queue Length [veh]	26.52	2.87	2.30		18.67
95th-Percentile Queue Length [ft]	662.96	71.77	57.42		466.79

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	172.28	172.28	0.00	0.00	33.92	34.05	0.00	0.00	0.00	27.94	27.94	27.94
Movement LOS	F	F			C	C				C	C	C
d_A, Approach Delay [s/veh]	172.28			33.98			0.00			27.94		
Approach LOS	F			C			A			C		
d_I, Intersection Delay [s/veh]	63.68											
Intersection LOS	E											
Intersection V/C	0.435											

Sequence

Ring 1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	233.2
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	0	112	478	48	0	0	156	1696	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.70	3.60	4.20	2.00	2.00	2.60	1.50	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	112	478	48	0	0	156	1696	0	0	0	0
Peak Hour Factor	1.0000	0.9500	0.9500	0.9500	1.0000	1.0000	0.9500	0.9500	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	29	126	13	0	0	41	446	0	0	0	0
Total Analysis Volume [veh/h]	0	118	503	51	0	0	164	1785	0	0	0	0
Presence of On-Street Parking			no	no			no					
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			40			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Split	Split	Split	Protecte	Permiss	Protecte	Permiss	Permiss	Protecte	Protecte	Permiss
Signal Group	0	8	0	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	6	0	0	4	8	0	0	0	0
Maximum Green [s]	0	13	0	25	0	0	16	30	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0
All red [s]	0.0	1.0	0.0	1.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	5	0	5	0	0	0	5	0	0	0	0
Pedestrian Clearance [s]	0	10	0	10	0	0	0	10	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
Minimum Recall		no		no			no	yes				
Maximum Recall		no		no			no	no				
Pedestrian Recall		no		no			no	no				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	L	C	
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	
g_i, Effective Green Time [s]	13	25	30	30	
g / C, Green / Cycle	0.14	0.28	0.33	0.33	
(v / s)_i Volume / Saturation Flow Rate	0.20	0.03	0.09	0.50	
Total Saturation Flow Adjustment	0.81	0.91	0.93	0.94	
s, saturation flow rate [veh/h]	3095	1732	1759	3564	
c, Capacity [veh/h]	447	481	586	1188	
d1, Uniform Delay [s]	38.50	24.18	22.06	30.00	
k, delay calibration	0.50	0.50	0.50	0.50	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	188.54	0.44	1.19	230.55	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	

Lane Group Results

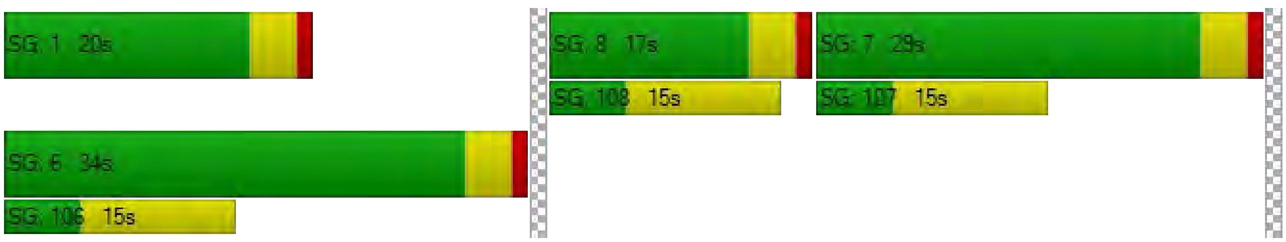
X, volume / capacity	1.39	0.11	0.28	1.50	
d, Delay for Lane Group [s/veh]	227.04	24.63	23.24	260.55	
Lane Group LOS	F	C	C	F	
Critical Lane Group	yes	yes	no	yes	
50th-Percentile Queue Length [veh]	20.90	1.03	3.32	64.95	
50th-Percentile Queue Length [ft]	522.57	25.74	82.94	1623.66	
95th-Percentile Queue Length [veh]	33.76	2.49	7.02	103.91	
95th-Percentile Queue Length [ft]	844.09	62.14	175.43	2597.85	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	227.04	227.04	24.63	0.00	0.00	23.24	260.55	0.00	0.00	0.00	0.00
Movement LOS		F	F	C			C	F				
d_A, Approach Delay [s/veh]		227.04			24.63			240.58			0.00	
Approach LOS		F			C			F			A	
d_I, Intersection Delay [s/veh]						233.17						
Intersection LOS						F						
Intersection V/C						0.731						

Sequence

Ring 1	1	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Menlo Park GP Circulation Update

Vistro File: J:\...\Menlo Park AM_update.vistro | Scenario 1: Existing AM

Report File: J:\...\Menlo Park_AM Results.pdf | 1/9/2015

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	784	1747	953	320	3804

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	28	1184	14	439	1422	296	15	4	71	239	12	5	3729

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	99	767	90	27	1068	435	447	47	198	27	16	25	3246

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	1	803	82	268	867	31	114	78	7	45	19	173	2488

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	85	522	446	364	420	75	1912

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringswood Ave	5	3	12	136	44	251	55	559	84	216	653	62	2080

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	873	85	1495	3915	185	359	6912

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	128	380	361	16	59	42	217	713	155	732	2780	24	5607

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	124	807	71	88	795	57	78	22	50	26	24	23	2165

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	129	1141	842	9	17	147	2285

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1201	304	54	969	195	58	2781

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	151	1407	166	51	1132	10	37	169	281	273	120	42	3839

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	67	1278	1161	445	363	60	3374

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	26	1040	16	36	925	89	40	3	10	48	12	70	2315

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	22	864	3	1	805	120	191	6	51	4	4	5	2076

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	3	745	40	27	826	4	37	70	17	78	112	100	2059

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	28	201	139	458	75	391	80	368	256	320	356	15	2687

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	15	618	67	20	471	11	138	113	13	136	188	65	1855

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	11	258	85	30	345	61	30	107	16	72	200	52	1267

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	8	57	9	156	14	149	16	840	113	169	1838	71	3440

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	255	126	124	84	177	16	101	700	35	54	1349	547	3568

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	57	196	53	117	254	63	89	731	73	125	1365	85	3208

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	78	54	76	41	44	30	818	39	1420	16	2616

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	24	345	60	417	214	44	88	779	396	161	1420	16	3964

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	65	8	68	6	3	10	43	1188	25	43	1755	43	3257

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	185	285	182	1040	1753	68	3513

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	28	0	50	1	0	0	119	1204	1	30	2068	15	3516

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	397	386	59	340	302	67	1551

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Santa Cruz Ave/Sand Hill Rd	231	1143	261	331	559	51	94	615	389	223	669	236	4802

ID	Intersection Name	Northbound		Southbound		Eastbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
58	University Avenue and Adams Drive	42	508	1449	140	6	0	1	2146

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	67	532	1284	142	16	25	2066

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	152	429	122	42	550	59	56	85	33	71	51	62	1712

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	23	2	41	2	2	7	103	1888	233	113	852	39	3305

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	663	556	65	172	852	517	2825

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road and US 101 NB Ramps	1097	1261	848	349	3555

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	1794	740	38	77	189	2838

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	10	0	33	14	1	9	211	1594	117	73	760	50	2872

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	7	1	29	12	1	8	37	1666	12	17	867	21	2678

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	145	1496	17	27	732	136	2	0	9	215	3	174	2956

ID	Intersection Name	Northbound			Eastbound			Westbound			Southwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	143	35	1141	5	66	209	2636	407	12	6	35	8	4703

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	64	636	403	112	100	74	1389

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	205	26	176	2726	933	169	4235

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	179	12	1106	56	22	2914	4289

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	114	148	74	133	204	8	5	5	17	14	8	28	758

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	1	0	0	1	53	0	2	17	1	1	0	11	87

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	8	33	5	1	6	0	29	11	91	0	0	1	185

ID	Intersection Name	Southbound		Northeastbound		Northwestbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
214	Chrysler Dr/Jefferson Dr	111	39	23	14	7	0	11	205

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	23	47	12	19	127	97	19	5	102	1	28	2	482

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Road and Sand Hill Circle	4	293	51	40	0	795	32	1215

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	112	478	48	156	1696	2490

Menlo Park GP Circulation Update

Vistro File: J:\...\Menlo Park AM_update.vistro

Report File: J:\...\Menlo Park_AM Results.pdf

Scenario 1: Existing AM

1/9/2015

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound	Southwestbound	Southeastbound		Total Volume
			Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	Final Base	784	1747	953	320	3804
		Growth Rate	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0
		Net New Trips	0	0	0	0	0
		Other	0	0	0	0	0
		Future Total	**784**	**1747**	**953**	**320**	**3804**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	Final Base	28	1184	14	439	1422	296	15	4	71	239	12	5	3729
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**28**	**1184**	**14**	**439**	**1422**	**296**	**15**	**4**	**71**	**239**	**12**	**5**	**3729**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	Final Base	99	767	90	27	1068	435	447	47	198	27	16	25	3246
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**99**	**767**	**90**	**27**	**1068**	**435**	**447**	**47**	**198**	**27**	**16**	**25**	**3246**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	Final Base	1	803	82	268	867	31	114	78	7	45	19	173	2488
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**1**	**803**	**82**	**268**	**867**	**31**	**114**	**78**	**7**	**45**	**19**	**173**	**2488**

ID	Intersection Name	Volume Type	Northeastbound		Northwestbound		Southeastbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	Final Base	85	522	446	364	420	75	1912
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**85**	**522**	**446**	**364**	**420**	**75**	**1912**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringswood Ave	Final Base	5	3	12	136	44	251	55	559	84	216	653	62	2080
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**5**	**3**	**12**	**136**	**44**	**251**	**55**	**559**	**84**	**216**	**653**	**62**	**2080**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Final Base	873	85	1495	3915	185	359	6912
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**873**	**85**	**1495**	**3915**	**185**	**359**	**6912**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Final Base	128	380	361	16	59	42	217	713	155	732	2780	24	5607
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**128**	**380**	**361**	**16**	**59**	**42**	**217**	**713**	**155**	**732**	**2780**	**24**	**5607**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	Final Base	124	807	71	88	795	57	78	22	50	26	24	23	2165
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**124**	**807**	**71**	**88**	**795**	**57**	**78**	**22**	**50**	**26**	**24**	**23**	**2165**

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	Final Base	129	1141	842	9	17	147	2285
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**129**	**1141**	**842**	**9**	**17**	**147**	**2285**

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	Final Base	1201	304	54	969	195	58	2781
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**1201**	**304**	**54**	**969**	**195**	**58**	**2781**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	Final Base	151	1407	166	51	1132	10	37	169	281	273	120	42	3839
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**151**	**1407**	**166**	**51**	**1132**	**10**	**37**	**169**	**281**	**273**	**120**	**42**	**3839**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Southeastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	Final Base	67	1278	1161	445	363	60	3374
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**67**	**1278**	**1161**	**445**	**363**	**60**	**3374**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	Final Base	26	1040	16	36	925	89	40	3	10	48	12	70	2315
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**26**	**1040**	**16**	**36**	**925**	**89**	**40**	**3**	**10**	**48**	**12**	**70**	**2315**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	Final Base	22	864	3	1	805	120	191	6	51	4	4	5	2076
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**22**	**864**	**3**	**1**	**805**	**120**	**191**	**6**	**51**	**4**	**4**	**5**	**2076**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	Final Base	3	745	40	27	826	4	37	70	17	78	112	100	2059
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**3**	**745**	**40**	**27**	**826**	**4**	**37**	**70**	**17**	**78**	**112**	**100**	**2059**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	Final Base	28	201	139	458	75	391	80	368	256	320	356	15	2687
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**28**	**201**	**139**	**458**	**75**	**391**	**80**	**368**	**256**	**320**	**356**	**15**	**2687**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	Final Base	15	618	67	20	471	11	138	113	13	136	188	65	1855
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**15**	**618**	**67**	**20**	**471**	**11**	**138**	**113**	**13**	**136**	**188**	**65**	**1855**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	Final Base	11	258	85	30	345	61	30	107	16	72	200	52	1267
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**11**	**258**	**85**	**30**	**345**	**61**	**30**	**107**	**16**	**72**	**200**	**52**	**1267**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Final Base	8	57	9	156	14	149	16	840	113	169	1838	71	3440
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**8**	**57**	**9**	**156**	**14**	**149**	**16**	**840**	**113**	**169**	**1838**	**71**	**3440**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Final Base	255	126	124	84	177	16	101	700	35	54	1349	547	3568
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**255**	**126**	**124**	**84**	**177**	**16**	**101**	**700**	**35**	**54**	**1349**	**547**	**3568**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	Final Base	57	196	53	117	254	63	89	731	73	125	1365	85	3208
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**57**	**196**	**53**	**117**	**254**	**63**	**89**	**731**	**73**	**125**	**1365**	**85**	**3208**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
			Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	Final Base	78	54	76	41	44	30	818	39	1420	16	2616
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**78**	**54**	**76**	**41**	**44**	**30**	**818**	**39**	**1420**	**16**	**2616**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Final Base	24	345	60	417	214	44	88	779	396	161	1420	16	3964
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**24**	**345**	**60**	**417**	**214**	**44**	**88**	**779**	**396**	**161**	**1420**	**16**	**3964**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	Final Base	65	8	68	6	3	10	43	1188	25	43	1755	43	3257
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**65**	**8**	**68**	**6**	**3**	**10**	**43**	**1188**	**25**	**43**	**1755**	**43**	**3257**

ID	Intersection Name	Volume Type	Northeastbound		Northwestbound		Southeastbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	Final Base	185	285	182	1040	1753	68	3513
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**185**	**285**	**182**	**1040**	**1753**	**68**	**3513**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	Final Base	28	0	50	1	0	0	119	1204	1	30	2068	15	3516
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**28**	**0**	**50**	**1**	**0**	**0**	**119**	**1204**	**1**	**30**	**2068**	**15**	**3516**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	Final Base	397	386	59	340	302	67	1551
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**397**	**386**	**59**	**340**	**302**	**67**	**1551**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Santa Cruz Ave/Sand Hill Rd	Final Base	231	1143	261	331	559	51	94	615	389	223	669	236	4802
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**231**	**1143**	**261**	**331**	**559**	**51**	**94**	**615**	**389**	**223**	**669**	**236**	**4802**

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound			Total Volume
			Left	Thru	Thru	Right	Left	Thru	Right	
58	University Avenue and Adams Drive	Final Base	42	508	1449	140	6	0	1	2146
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0
		Future Total	**42**	**508**	**1449**	**140**	**6**	**0**	**1**	**2146**

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	Final Base	67	532	1284	142	16	25	2066
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**67**	**532**	**1284**	**142**	**16**	**25**	**2066**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	Final Base	152	429	122	42	550	59	56	85	33	71	51	62	1712
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**152**	**429**	**122**	**42**	**550**	**59**	**56**	**85**	**33**	**71**	**51**	**62**	**1712**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	Final Base	23	2	41	2	2	7	103	1888	233	113	852	39	3305
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**23**	**2**	**41**	**2**	**2**	**7**	**103**	**1888**	**233**	**113**	**852**	**39**	**3305**

ID	Intersection Name	Volume Type	Southbound		Westbound		Northeastbound		Total Volume
			Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Final Base	663	556	65	172	852	517	2825
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**663**	**556**	**65**	**172**	**852**	**517**	**2825**

ID	Intersection Name	Volume Type	Northbound	Southbound	Northwestbound		Total Volume
			Thru	Thru	Left	Right	
110	Marsh Road and US 101 NB Ramps	Final Base	1097	1261	848	349	3555
		Growth Rate	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0
		Net New Trips	0	0	0	0	0
		Other	0	0	0	0	0
		Future Total	**1097**	**1261**	**848**	**349**	**3555**

ID	Intersection Name	Volume Type	Northeastbound	Southwestbound		Southeastbound		Total Volume
			Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	Final Base	1794	740	38	77	189	2838
		Growth Rate	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0
		Other	0	0	0	0	0	0
		Future Total	**1794**	**740**	**38**	**77**	**189**	**2838**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	Final Base	10	0	33	14	1	9	211	1594	117	73	760	50	2872
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**10**	**0**	**33**	**14**	**1**	**9**	**211**	**1594**	**117**	**73**	**760**	**50**	**2872**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	Final Base	7	1	29	12	1	8	37	1666	12	17	867	21	2678
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**7**	**1**	**29**	**12**	**1**	**8**	**37**	**1666**	**12**	**17**	**867**	**21**	**2678**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	Final Base	145	1496	17	27	732	136	2	0	9	215	3	174	2956
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**145**	**1496**	**17**	**27**	**732**	**136**	**2**	**0**	**9**	**215**	**3**	**174**	**2956**

ID	Intersection Name	Volume Type	Northbound			Eastbound			Westbound			Southwestbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	Final Base	143	35	1141	5	66	209	2636	407	12	6	35	8	4703
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**143**	**35**	**1141**	**5**	**66**	**209**	**2636**	**407**	**12**	**6**	**35**	**8**	**4703**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Southeastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	Final Base	64	636	403	112	100	74	1389
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**64**	**636**	**403**	**112**	**100**	**74**	**1389**

ID	Intersection Name	Volume Type	Northbound		Westbound		Southeastbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	Final Base	205	26	176	2726	933	169	4235
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**205**	**26**	**176**	**2726**	**933**	**169**	**4235**

ID	Intersection Name	Volume Type	Northbound		Eastbound		Westbound		Total Volume
			Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	Final Base	179	12	1106	56	22	2914	4289
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**179**	**12**	**1106**	**56**	**22**	**2914**	**4289**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	Final Base	114	148	74	133	204	8	5	5	17	14	8	28	758
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**114**	**148**	**74**	**133**	**204**	**8**	**5**	**5**	**17**	**14**	**8**	**28**	**758**

ID	Intersection Name	Volume Type	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	Final Base	1	0	0	1	53	0	2	17	1	1	0	11	87
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**1**	**0**	**0**	**1**	**53**	**0**	**2**	**17**	**1**	**1**	**0**	**11**	**87**

ID	Intersection Name	Volume Type	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	Final Base	8	33	5	1	6	0	29	11	91	0	0	1	185
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**8**	**33**	**5**	**1**	**6**	**0**	**29**	**11**	**91**	**0**	**0**	**1**	**185**

ID	Intersection Name	Volume Type	Southbound		Northeastbound		Northwestbound			Total Volume
			Left	Thru	Thru	Right	Left	Thru	Right	
214	Chrysler Dr/Jefferson Dr	Final Base	111	39	23	14	7	0	11	205
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0
		Future Total	**111**	**39**	**23**	**14**	**7**	**0**	**11**	**205**

ID	Intersection Name	Volume Type	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	Final Base	23	47	12	19	127	97	19	5	102	1	28	2	482
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**23**	**47**	**12**	**19**	**127**	**97**	**19**	**5**	**102**	**1**	**28**	**2**	**482**

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound			Total Volume
			Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Road and Sand Hill Circle	Final Base	4	293	51	40	0	795	32	1215
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0
		Future Total	**4**	**293**	**51**	**40**	**0**	**795**	**32**	**1215**

ID	Intersection Name	Volume Type	Northbound		Southbound	Eastbound		Total Volume
			Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Final Base	112	478	48	156	1696	2490
		Growth Rate	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0
		Other	0	0	0	0	0	0
		Future Total	**112**	**478**	**48**	**156**	**1696**	**2490**

Signal Warrants Report For Intersection #58: University Avenue and Adams Drive

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	11	32	0
2	11	32	0
3	17	48	0
4	17	48	0
5	22	64	0
6	55	159	1
7	61	175	1
8	110	318	1
9	193	556	2
10	198	572	3
11	198	572	3
12	215	620	3
13	237	683	3
14	248	715	3
15	248	715	3
16	264	763	3
17	330	953	4
18	347	1001	4
19	374	1081	5
20	418	1208	5
21	440	1271	6
22	517	1494	7
23	528	1525	7
24	550	1589	7

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	5	43	1	0	No	No	No	No	No	No	No	No	No	No
2	5	43	1	0	No	No	No	No	No	No	No	No	No	No
3	5	65	1	0	No	No	No	No	No	No	No	No	No	No
4	5	65	1	0	No	No	No	No	No	No	No	No	No	No
5	5	86	1	0	No	No	No	No	No	No	No	No	No	No
6	5	214	1	1	No	No	No	No	No	No	No	No	No	No
7	5	236	1	1	No	No	No	No	No	No	No	No	No	No
8	5	428	1	1	No	No	No	No	No	No	No	No	No	No
9	5	749	1	2	No	No	No	No	No	No	No	No	No	No
10	5	770	1	3	No	No	No	No	No	No	No	No	No	No
11	5	770	1	3	No	No	No	No	No	No	No	No	No	No
12	5	835	1	3	No	No	No	No	No	No	No	No	No	No
13	5	920	1	3	No	No	No	No	No	No	No	No	No	No
14	5	963	1	3	No	No	No	No	No	No	No	No	No	No
15	5	963	1	3	No	No	No	No	No	No	No	No	No	No
16	5	1027	1	3	No	No	No	No	No	No	No	No	No	No
17	5	1283	1	4	No	No	No	No	No	No	No	No	No	No
18	5	1348	1	4	No	No	No	No	No	No	No	No	No	No
19	5	1455	1	5	No	No	No	No	No	No	No	No	No	No
20	5	1626	1	5	No	No	No	No	No	No	No	No	No	No
21	5	1711	1	6	No	No	No	No	No	No	No	No	No	No
22	5	2011	1	7	No	No	No	No	No	No	No	No	No	No
23	5	2053	1	7	No	No	No	No	No	No	No	No	No	No
24	5	2139	1	7	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	131.7
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:15
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	7
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2146
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection #207: Chilco St/Constitution Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	SE, W
Minor Approaches	N, S
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	SE	W	N	S
1	1	1	7	7
2	1	1	7	7
3	2	1	10	10
4	2	1	10	10
5	2	1	14	13
6	5	3	35	34
7	6	3	38	37
8	10	5	69	67
9	18	9	121	118
10	18	10	124	121
11	18	10	124	121
12	20	11	135	131
13	22	12	148	144
14	23	12	155	151
15	23	12	155	151
16	24	13	166	161
17	30	16	207	202
18	32	17	217	212
19	34	18	235	228
20	38	21	262	255
21	40	22	276	269
22	47	25	324	316
23	48	26	331	323
24	50	27	345	336

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	2	2	14	No	No	No	No	No	No	No	No	No	No
2	2	2	2	14	No	No	No	No	No	No	No	No	No	No
3	2	3	2	20	No	No	No	No	No	No	No	No	No	No
4	2	3	2	20	No	No	No	No	No	No	No	No	No	No
5	2	3	2	27	No	No	No	No	No	No	No	No	No	No
6	2	8	2	69	No	No	No	No	No	No	No	No	No	No
7	2	9	2	75	No	No	No	No	No	No	No	No	No	No
8	2	15	2	136	No	No	No	No	No	No	No	No	No	No
9	2	27	2	239	No	No	No	No	No	No	No	No	No	No
10	2	28	2	245	No	No	No	No	No	No	No	No	No	No
11	2	28	2	245	No	No	No	No	No	No	No	No	No	No
12	2	31	2	266	No	No	No	No	No	No	No	No	No	No
13	2	34	2	292	No	No	No	No	No	No	No	No	No	No
14	2	35	2	306	No	No	No	No	No	No	No	No	No	No
15	2	35	2	306	No	No	No	No	No	No	No	No	No	No
16	2	37	2	327	No	No	No	No	No	No	No	No	No	No
17	2	46	2	409	No	No	No	No	No	No	No	No	No	No
18	2	49	2	429	No	No	No	No	No	No	No	No	No	No
19	2	52	2	463	No	No	No	No	No	No	No	No	No	No
20	2	59	2	517	No	No	No	No	No	No	No	No	No	No
21	2	62	2	545	No	No	No	No	No	No	No	No	No	No
22	2	72	2	640	No	No	No	No	No	No	No	No	No	No
23	2	74	2	654	No	No	No	No	No	No	No	No	No	No
24	2	77	2	681	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N	S
Total Stopped Delay Per Vehicle on Minor Approach (s)	12	11.7
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	1:09	1:05
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	345	336
High Minor Volume Condition Met	Yes	Yes
Total Entering Volume on All Approaches During Same Hour	758	758
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection #209: Jefferson Dr/Constitution Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N, SW
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	N	SW
1	0	1	0	0
2	0	1	0	0
3	1	2	0	0
4	1	2	0	0
5	1	2	0	0
6	2	5	0	1
7	2	6	0	1
8	4	11	0	2
9	7	19	0	4
10	7	19	0	4
11	7	19	0	4
12	8	21	0	5
13	9	23	0	5
14	9	24	0	5
15	9	24	0	5
16	10	26	0	6
17	12	32	1	7
18	13	34	1	8
19	14	37	1	8
20	15	41	1	9
21	16	43	1	10
22	19	51	1	11
23	19	52	1	12
24	20	54	1	12

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	1	2	0	No	No	No	No	No	No	No	No	No	No
2	2	1	2	0	No	No	No	No	No	No	No	No	No	No
3	2	3	2	0	No	No	No	No	No	No	No	No	No	No
4	2	3	2	0	No	No	No	No	No	No	No	No	No	No
5	2	3	2	0	No	No	No	No	No	No	No	No	No	No
6	2	7	2	1	No	No	No	No	No	No	No	No	No	No
7	2	8	2	1	No	No	No	No	No	No	No	No	No	No
8	2	15	2	2	No	No	No	No	No	No	No	No	No	No
9	2	26	2	4	No	No	No	No	No	No	No	No	No	No
10	2	26	2	4	No	No	No	No	No	No	No	No	No	No
11	2	26	2	4	No	No	No	No	No	No	No	No	No	No
12	2	29	2	5	No	No	No	No	No	No	No	No	No	No
13	2	32	2	5	No	No	No	No	No	No	No	No	No	No
14	2	33	2	5	No	No	No	No	No	No	No	No	No	No
15	2	33	2	5	No	No	No	No	No	No	No	No	No	No
16	2	36	2	6	No	No	No	No	No	No	No	No	No	No
17	2	44	2	8	No	No	No	No	No	No	No	No	No	No
18	2	47	2	9	No	No	No	No	No	No	No	No	No	No
19	2	51	2	9	No	No	No	No	No	No	No	No	No	No
20	2	56	2	10	No	No	No	No	No	No	No	No	No	No
21	2	59	2	11	No	No	No	No	No	No	No	No	No	No
22	2	70	2	12	No	No	No	No	No	No	No	No	No	No
23	2	71	2	13	No	No	No	No	No	No	No	No	No	No
24	2	74	2	13	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N	SW
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.2	8.7
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:00	0:01
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	1	12
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	87	87
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection #213: Chrysler Dr/Independence Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	NE, S
Minor Approaches	SE, NW
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	NE	S	SE	NW
1	0	1	3	0
2	0	1	3	0
3	0	1	4	0
4	0	1	4	0
5	0	2	5	0
6	1	5	13	0
7	1	5	14	0
8	1	9	26	0
9	2	16	46	0
10	3	17	47	0
11	3	17	47	0
12	3	18	51	0
13	3	20	56	0
14	3	21	59	0
15	3	21	59	0
16	3	22	63	0
17	4	28	79	1
18	4	29	83	1
19	5	31	89	1
20	5	35	100	1
21	6	37	105	1
22	7	43	123	1
23	7	44	126	1
24	7	46	131	1

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	1	2	3	No	No	No	No	No	No	No	No	No	No
2	2	1	2	3	No	No	No	No	No	No	No	No	No	No
3	2	1	2	4	No	No	No	No	No	No	No	No	No	No
4	2	1	2	4	No	No	No	No	No	No	No	No	No	No
5	2	2	2	5	No	No	No	No	No	No	No	No	No	No
6	2	6	2	13	No	No	No	No	No	No	No	No	No	No
7	2	6	2	14	No	No	No	No	No	No	No	No	No	No
8	2	10	2	26	No	No	No	No	No	No	No	No	No	No
9	2	18	2	46	No	No	No	No	No	No	No	No	No	No
10	2	20	2	47	No	No	No	No	No	No	No	No	No	No
11	2	20	2	47	No	No	No	No	No	No	No	No	No	No
12	2	21	2	51	No	No	No	No	No	No	No	No	No	No
13	2	23	2	56	No	No	No	No	No	No	No	No	No	No
14	2	24	2	59	No	No	No	No	No	No	No	No	No	No
15	2	24	2	59	No	No	No	No	No	No	No	No	No	No
16	2	25	2	63	No	No	No	No	No	No	No	No	No	No
17	2	32	2	80	No	No	No	No	No	No	No	No	No	No
18	2	33	2	84	No	No	No	No	No	No	No	No	No	No
19	2	36	2	90	No	No	No	No	No	No	No	No	No	No
20	2	40	2	101	No	No	No	No	No	No	No	No	No	No
21	2	43	2	106	No	No	No	No	No	No	No	No	No	No
22	2	50	2	124	No	No	No	No	No	No	No	No	No	No
23	2	51	2	127	No	No	No	No	No	No	No	No	No	No
24	2	53	2	132	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	SE	NW
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.4	8.3
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:20	0:00
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	131	1
High Minor Volume Condition Met	Yes	No
Total Entering Volume on All Approaches During Same Hour	185	185
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection #214: Chrysler Dr/Jefferson Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	N, SW
Minor Approaches	SE
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	SW	SE
1	3	1	0
2	3	1	0
3	5	1	1
4	5	1	1
5	6	1	1
6	15	4	2
7	17	4	2
8	30	7	4
9	53	13	6
10	54	13	6
11	54	13	6
12	59	14	7
13	65	16	8
14	68	17	8
15	68	17	8
16	72	18	9
17	90	22	11
18	95	23	11
19	102	25	12
20	114	28	14
21	120	30	14
22	141	35	17
23	144	36	17
24	150	37	18

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	4	1	0	No	No	No	No	No	No	No	No	No	No
2	2	4	1	0	No	No	No	No	No	No	No	No	No	No
3	2	6	1	1	No	No	No	No	No	No	No	No	No	No
4	2	6	1	1	No	No	No	No	No	No	No	No	No	No
5	2	7	1	1	No	No	No	No	No	No	No	No	No	No
6	2	19	1	2	No	No	No	No	No	No	No	No	No	No
7	2	21	1	2	No	No	No	No	No	No	No	No	No	No
8	2	37	1	4	No	No	No	No	No	No	No	No	No	No
9	2	66	1	6	No	No	No	No	No	No	No	No	No	No
10	2	67	1	6	No	No	No	No	No	No	No	No	No	No
11	2	67	1	6	No	No	No	No	No	No	No	No	No	No
12	2	73	1	7	No	No	No	No	No	No	No	No	No	No
13	2	81	1	8	No	No	No	No	No	No	No	No	No	No
14	2	85	1	8	No	No	No	No	No	No	No	No	No	No
15	2	85	1	8	No	No	No	No	No	No	No	No	No	No
16	2	90	1	9	No	No	No	No	No	No	No	No	No	No
17	2	112	1	11	No	No	No	No	No	No	No	No	No	No
18	2	118	1	11	No	No	No	No	No	No	No	No	No	No
19	2	127	1	12	No	No	No	No	No	No	No	No	No	No
20	2	142	1	14	No	No	No	No	No	No	No	No	No	No
21	2	150	1	14	No	No	No	No	No	No	No	No	No	No
22	2	176	1	17	No	No	No	No	No	No	No	No	No	No
23	2	180	1	17	No	No	No	No	No	No	No	No	No	No
24	2	187	1	18	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	SE
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.9
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:02
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	18
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	205
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection #215: Chrysler Dr/Constitution Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N, SW
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	N	SW
1	3	5	2	1
2	3	5	2	1
3	4	7	2	1
4	4	7	2	1
5	5	10	3	1
6	13	24	8	3
7	14	27	9	3
8	25	49	16	6
9	44	85	29	11
10	45	87	30	11
11	45	87	30	11
12	49	95	32	12
13	54	104	35	13
14	57	109	37	14
15	57	109	37	14
16	60	117	39	15
17	76	146	49	19
18	79	153	52	20
19	86	165	56	21
20	96	185	62	24
21	101	194	66	25
22	118	228	77	29
23	121	233	79	30
24	126	243	82	31

Warrant Analysis by Hour

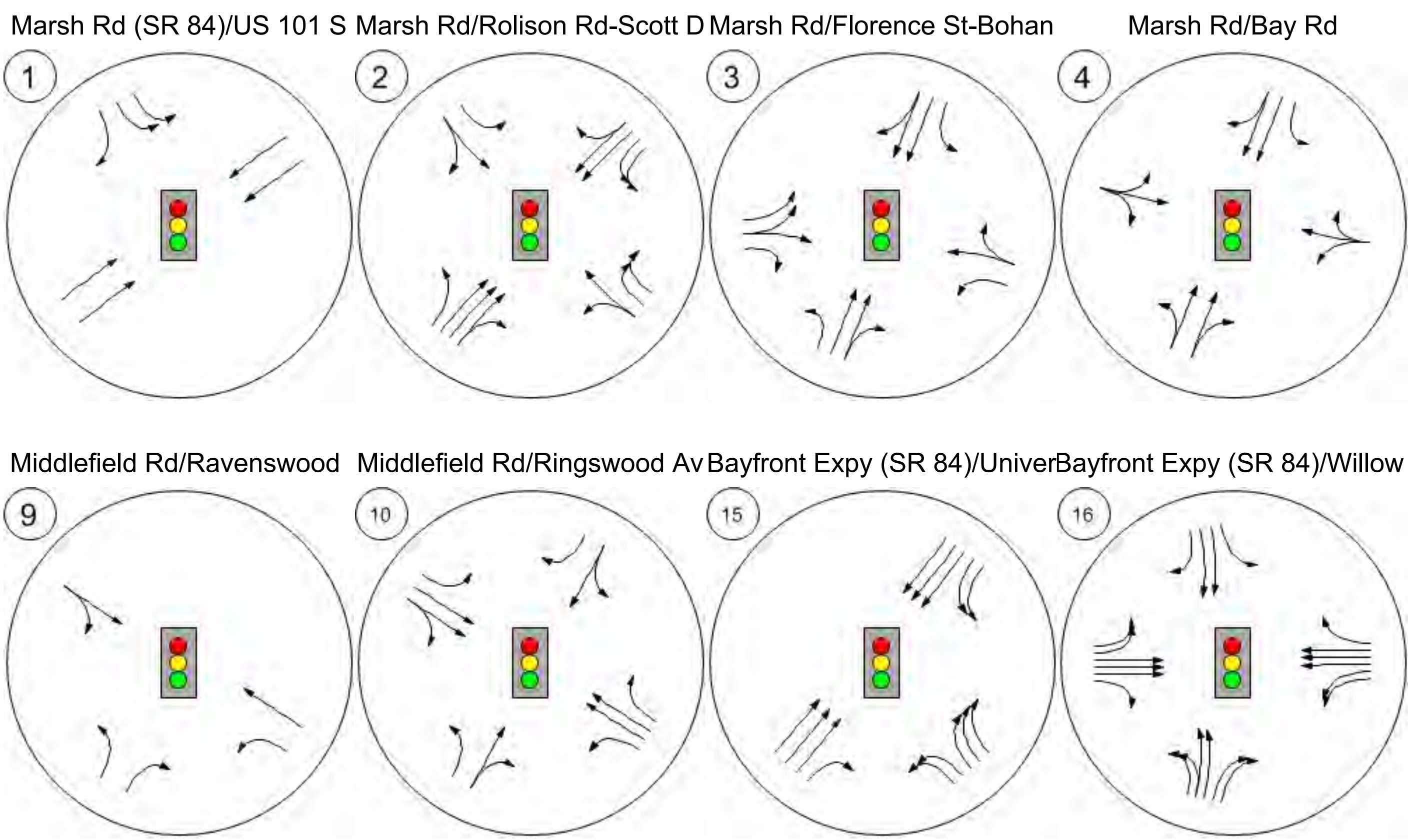
Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	8	2	3	No	No	No	No	No	No	No	No	No	No
2	2	8	2	3	No	No	No	No	No	No	No	No	No	No
3	2	11	2	3	No	No	No	No	No	No	No	No	No	No
4	2	11	2	3	No	No	No	No	No	No	No	No	No	No
5	2	15	2	4	No	No	No	No	No	No	No	No	No	No
6	2	37	2	11	No	No	No	No	No	No	No	No	No	No
7	2	41	2	12	No	No	No	No	No	No	No	No	No	No
8	2	74	2	22	No	No	No	No	No	No	No	No	No	No
9	2	129	2	40	No	No	No	No	No	No	No	No	No	No
10	2	132	2	41	No	No	No	No	No	No	No	No	No	No
11	2	132	2	41	No	No	No	No	No	No	No	No	No	No
12	2	144	2	44	No	No	No	No	No	No	No	No	No	No
13	2	158	2	48	No	No	No	No	No	No	No	No	No	No
14	2	166	2	51	No	No	No	No	No	No	No	No	No	No
15	2	166	2	51	No	No	No	No	No	No	No	No	No	No
16	2	177	2	54	No	No	No	No	No	No	No	No	No	No
17	2	222	2	68	No	No	No	No	No	No	No	No	No	No
18	2	232	2	72	No	No	No	No	No	No	No	No	No	No
19	2	251	2	77	No	No	No	No	No	No	No	No	No	No
20	2	281	2	86	No	No	No	No	No	No	No	No	No	No
21	2	295	2	91	No	No	No	No	No	No	No	No	No	No
22	2	346	2	106	No	No	No	No	No	No	No	No	No	No
23	2	354	2	109	No	No	No	No	No	No	No	No	No	No
24	2	369	2	113	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	N	SW
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.7	8.6
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:11	0:04
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	82	31
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	482	482
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

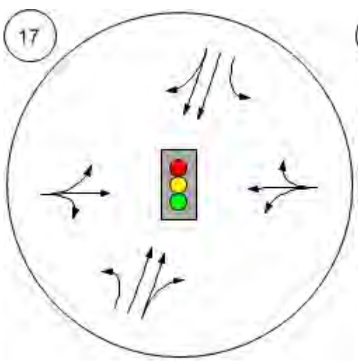
Study Intersections

Lane Configuration and Traffic Control

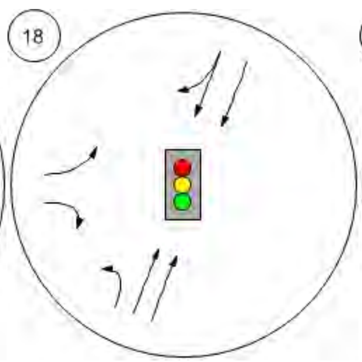


Lane Configuration and Traffic Control

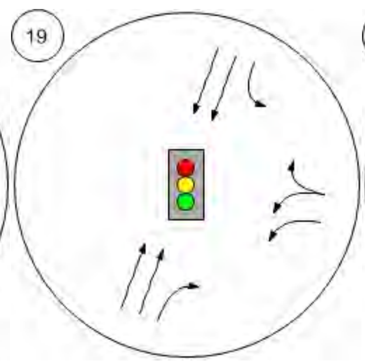
Willow Rd (SR 114)/Hamilton



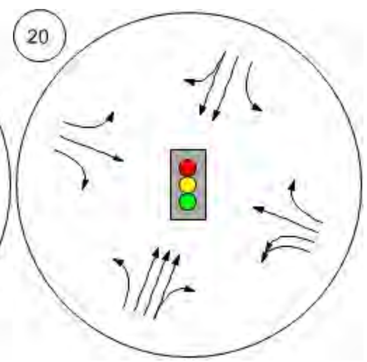
Willow Rd (SR 114)/Ivy Dr



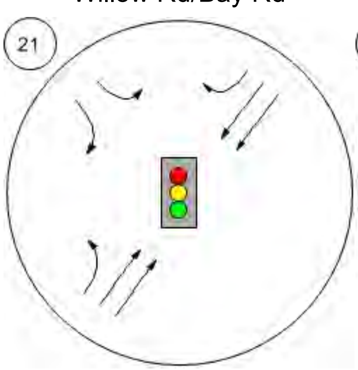
Willow Rd (SR 114)/O'Brien



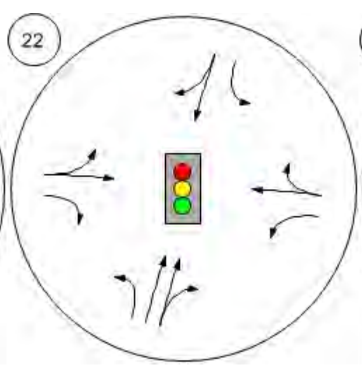
Willow Rd (SR 114)/Newbrid



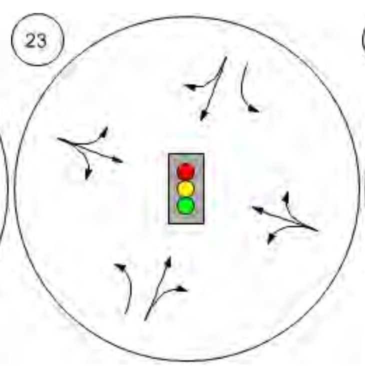
Willow Rd/Bay Rd



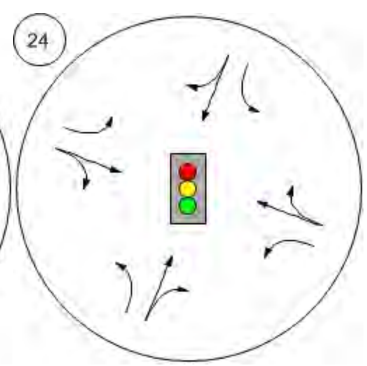
Willow Rd/Durham St-VA Me



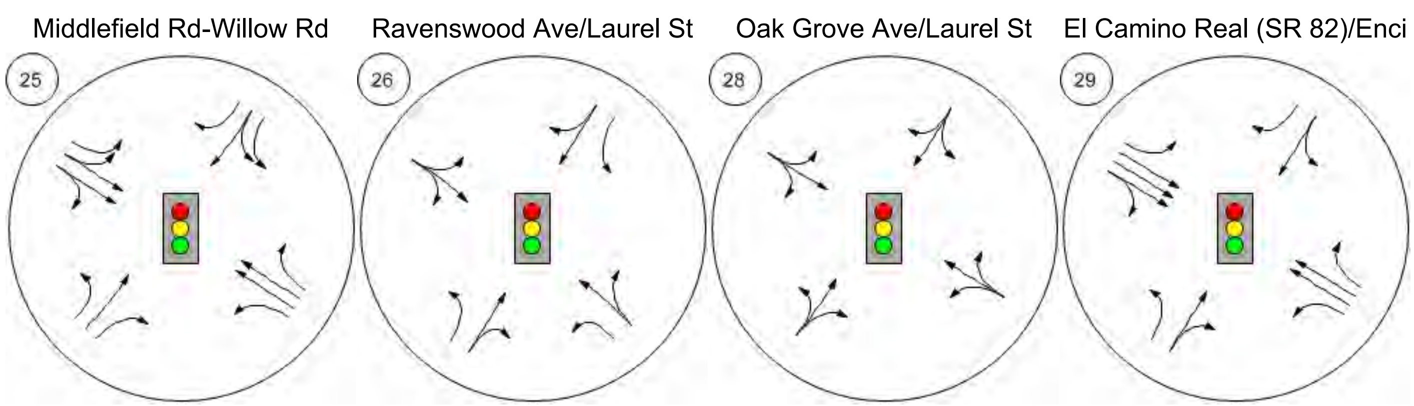
Willow Rd/Coleman Ave

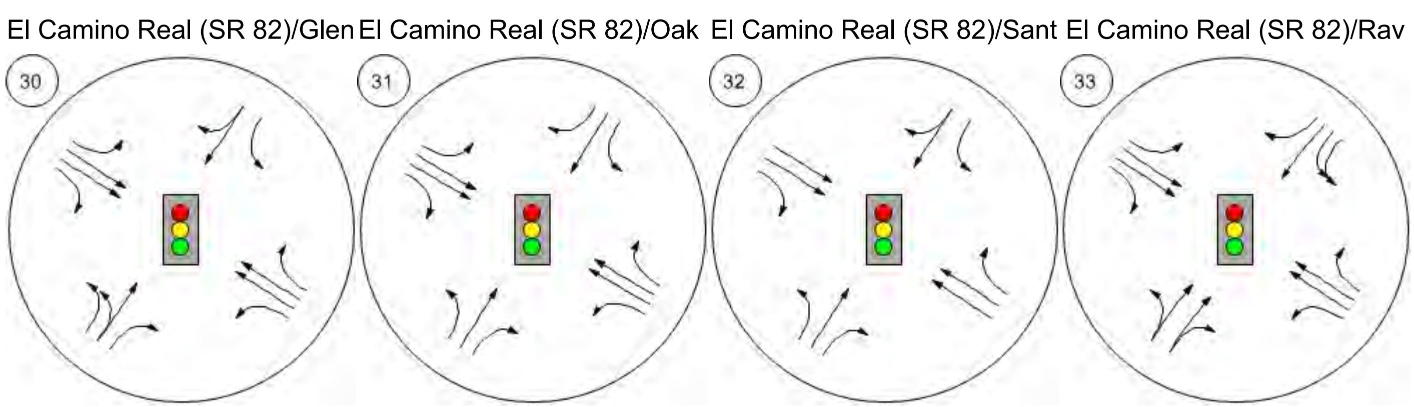


Willow Rd/Gilbert Ave

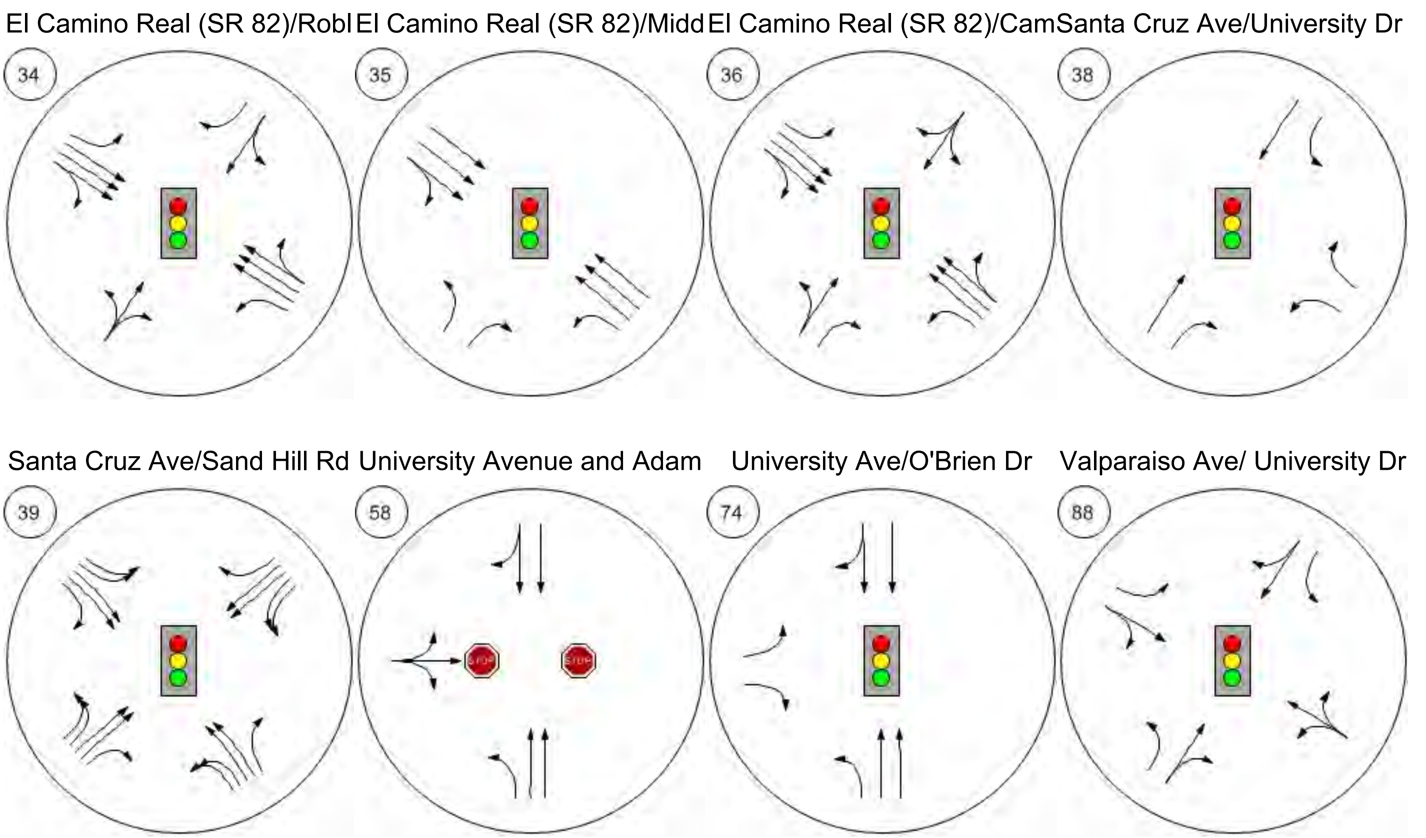


Lane Configuration and Traffic Control

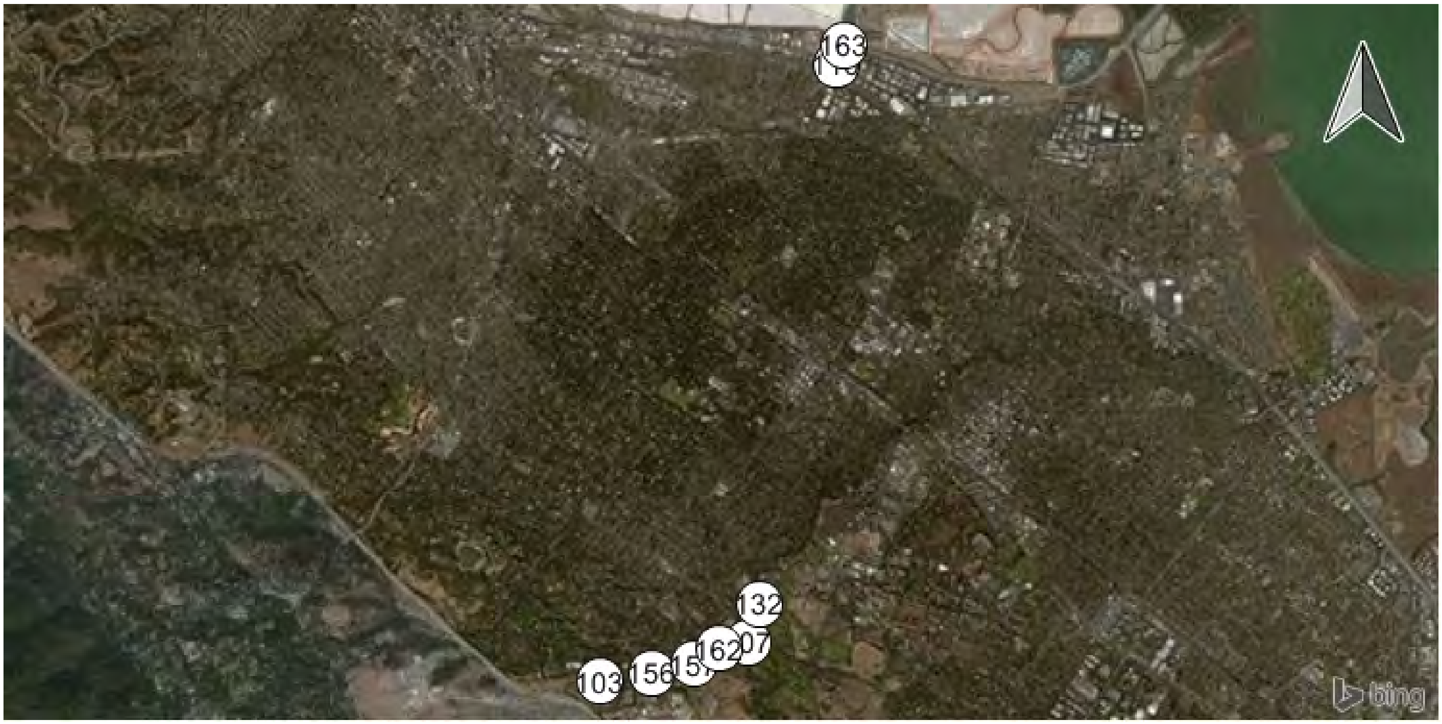




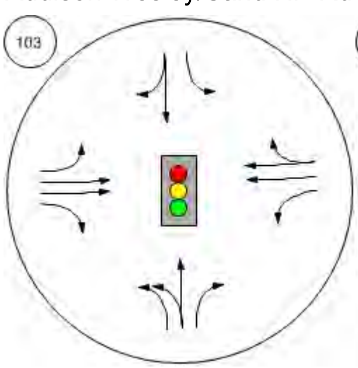
Lane Configuration and Traffic Control



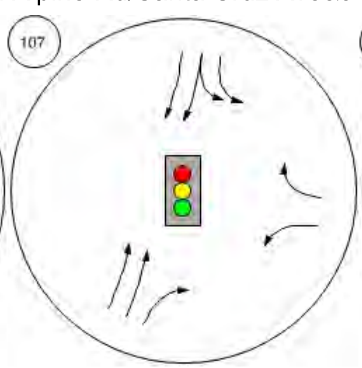
Lane Configuration and Traffic Control



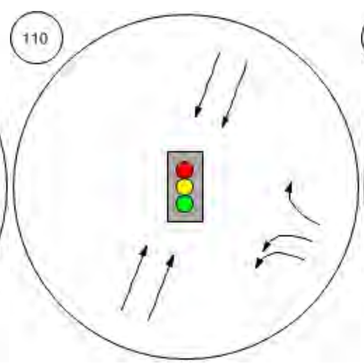
Addison Wesley/Sand Hill Rd



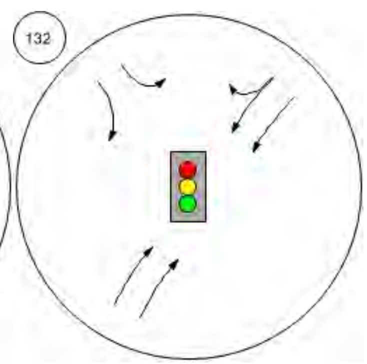
Alpine Rd/Santa Cruz Ave&J



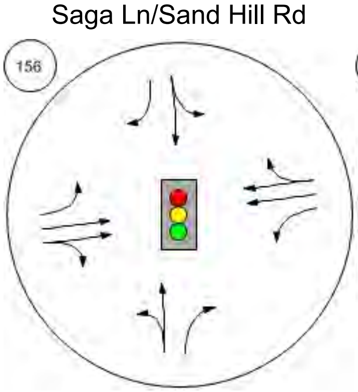
Marsh Road and US 101 NB



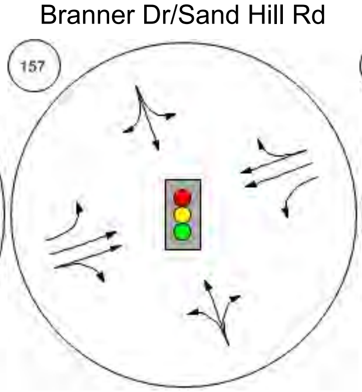
Oak Ave/Sand Hill Rd



Saga Ln/Sand Hill Rd

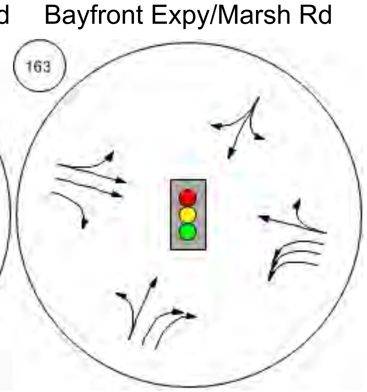


Branner Dr/Sand Hill Rd

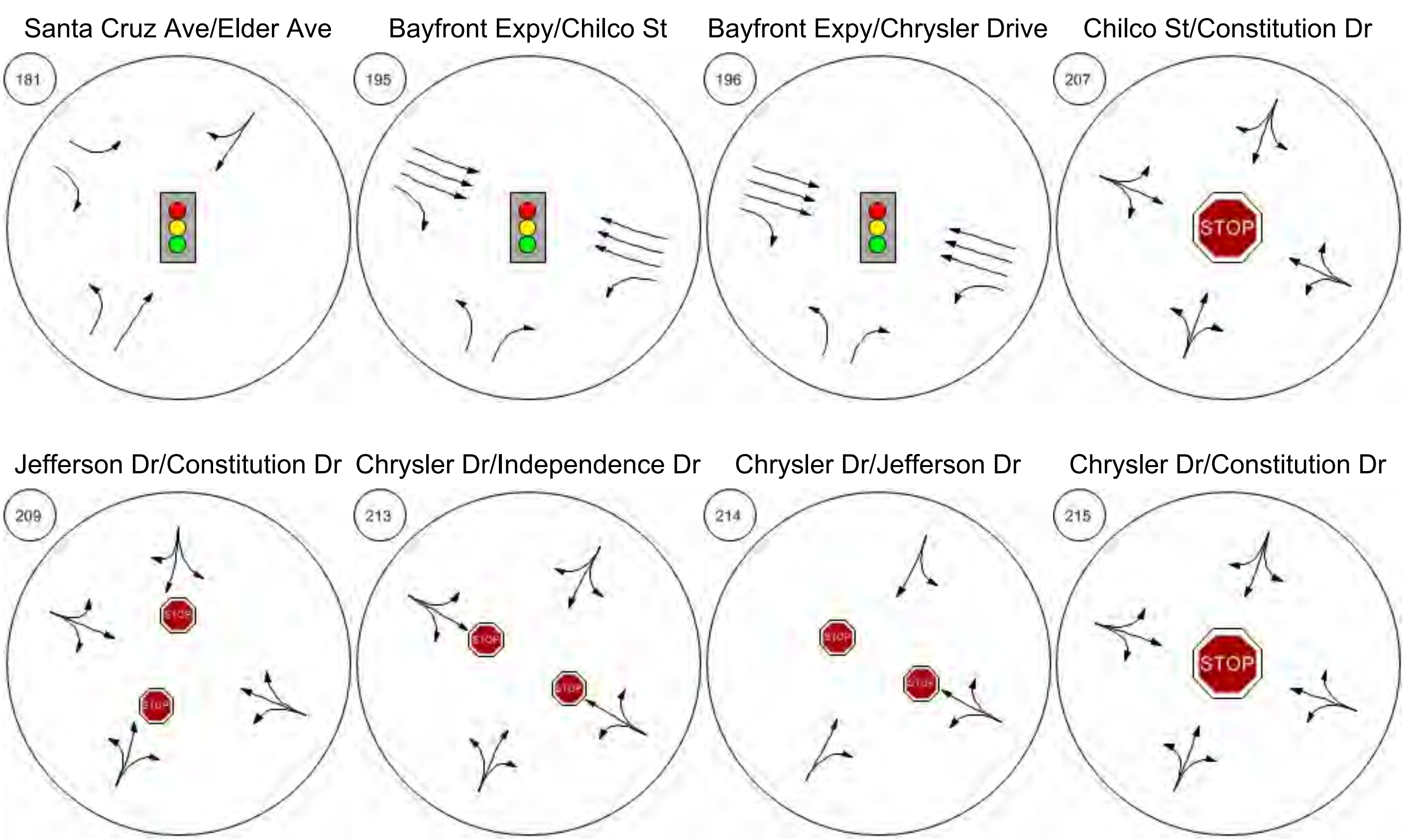


Sharon Park Dr/ Sand Hill Rd

Bayfront Expy/Marsh Rd



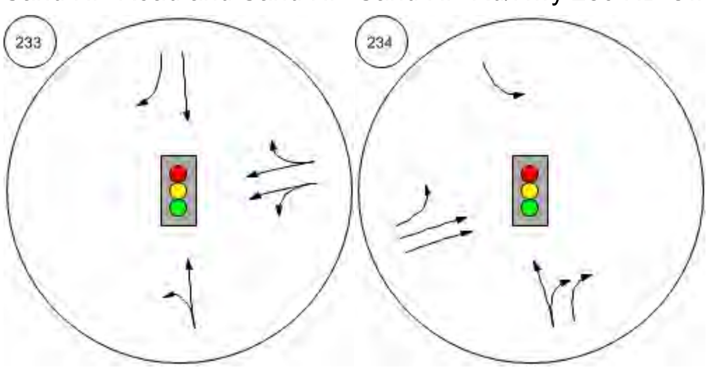
Lane Configuration and Traffic Control



Lane Configuration and Traffic Control

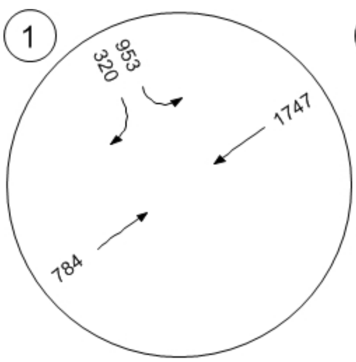
Sand Hill Road and Sand Hill

Sand Hill Rd/Hwy 280 NB Off

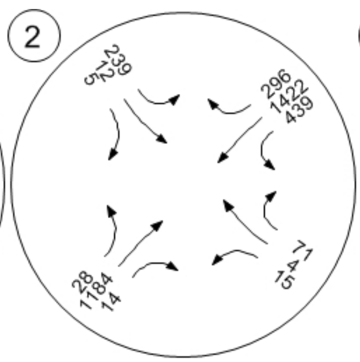


Traffic Volume - Base Volume

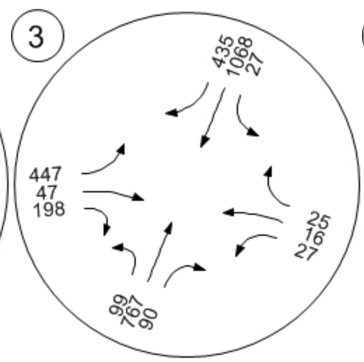
Marsh Rd (SR 84)/US 101 S



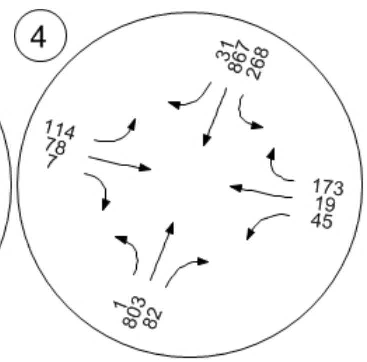
Marsh Rd/Rolison Rd-Scott D



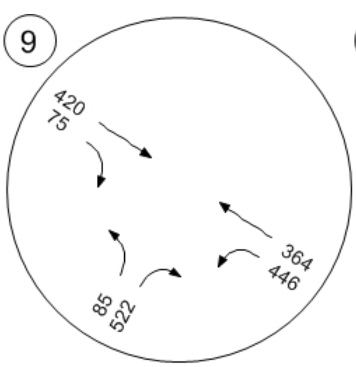
Marsh Rd/Florence St-Bohan



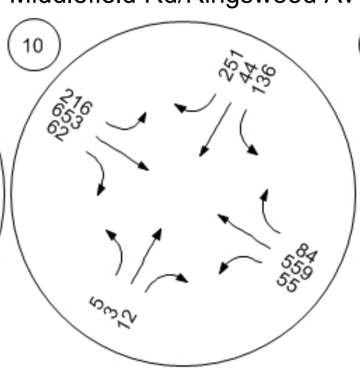
Marsh Rd/Bay Rd



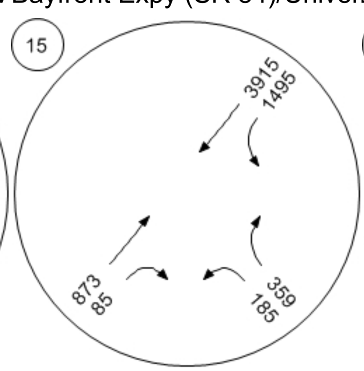
Middlefield Rd/Ravenswood



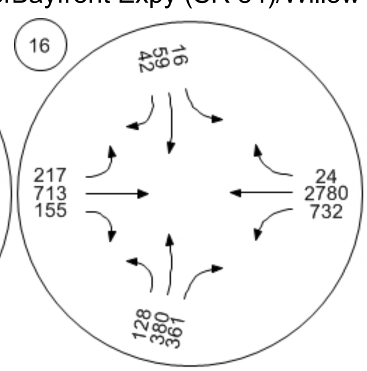
Middlefield Rd/Ringswood Av



Bayfront Expy (SR 84)/Univer

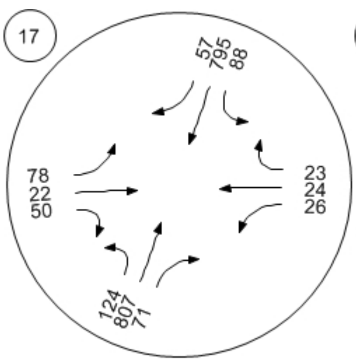


Bayfront Expy (SR 84)/Willow

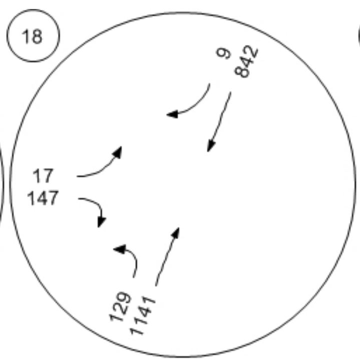


Traffic Volume - Base Volume

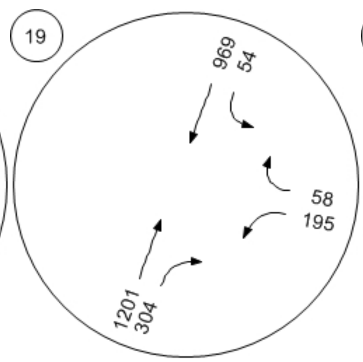
Willow Rd (SR 114)/Hamilton



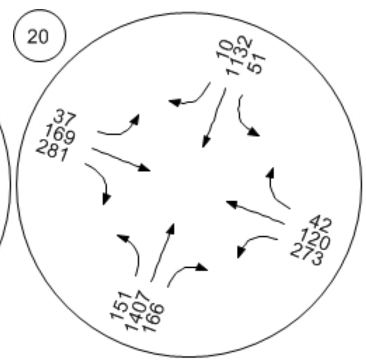
Willow Rd (SR 114)/Ivy Dr



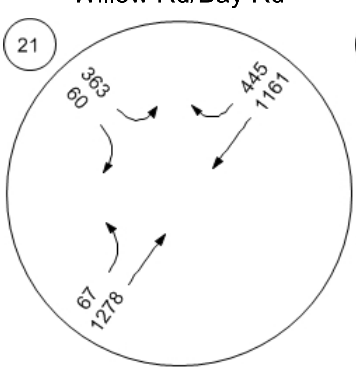
Willow Rd (SR 114)/O'Brien



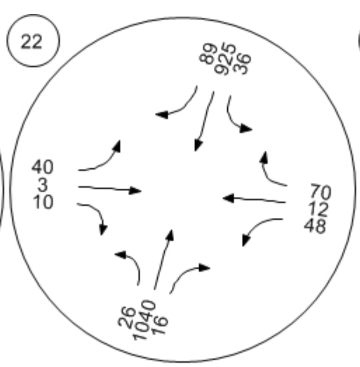
Willow Rd (SR 114)/Newbrid



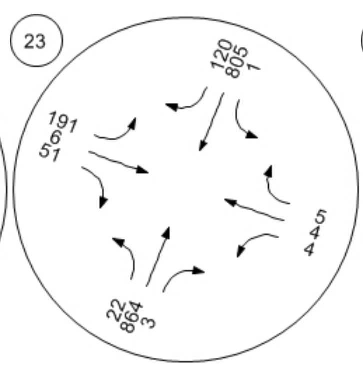
Willow Rd/Bay Rd



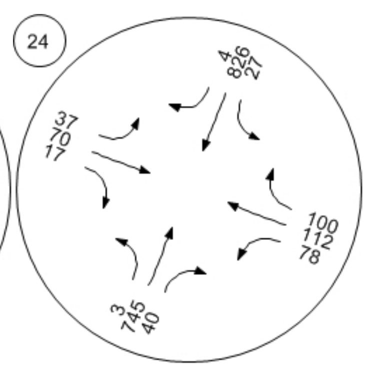
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

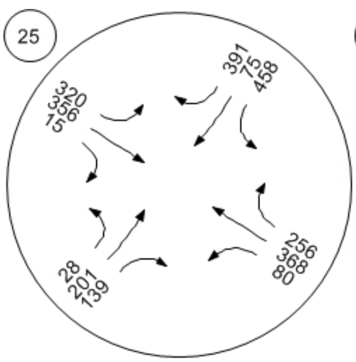


Willow Rd/Gilbert Ave

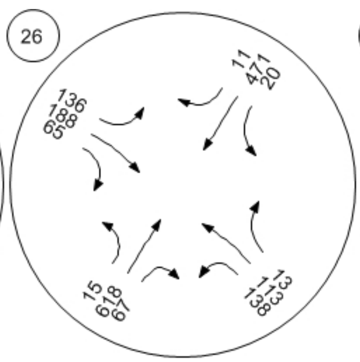


Traffic Volume - Base Volume

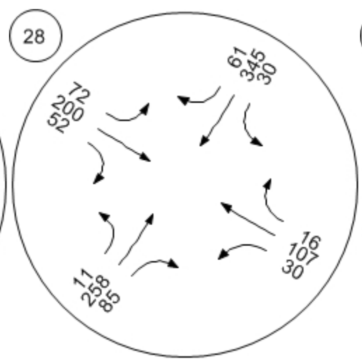
Middlefield Rd-Willow Rd



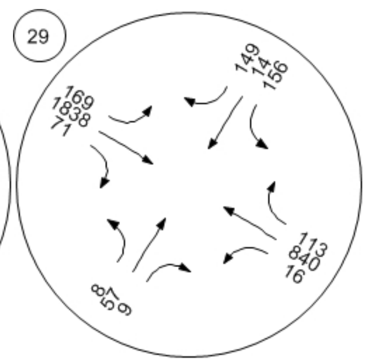
Ravenswood Ave/Laurel St



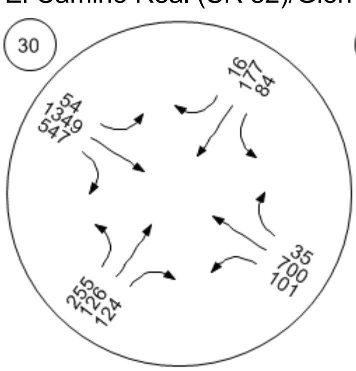
Oak Grove Ave/Laurel St



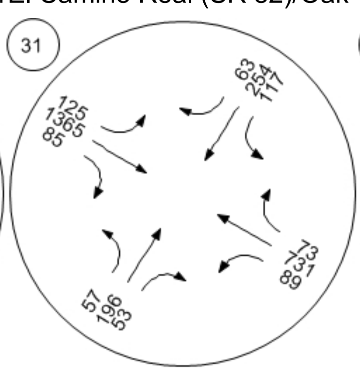
El Camino Real (SR 82)/Enci



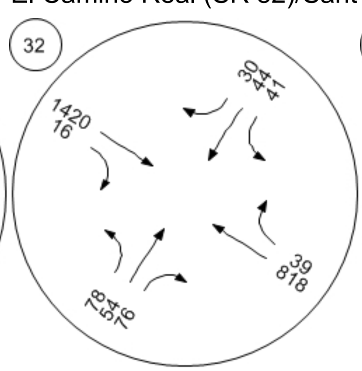
El Camino Real (SR 82)/Glen



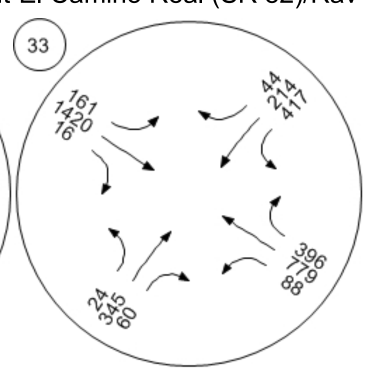
El Camino Real (SR 82)/Oak



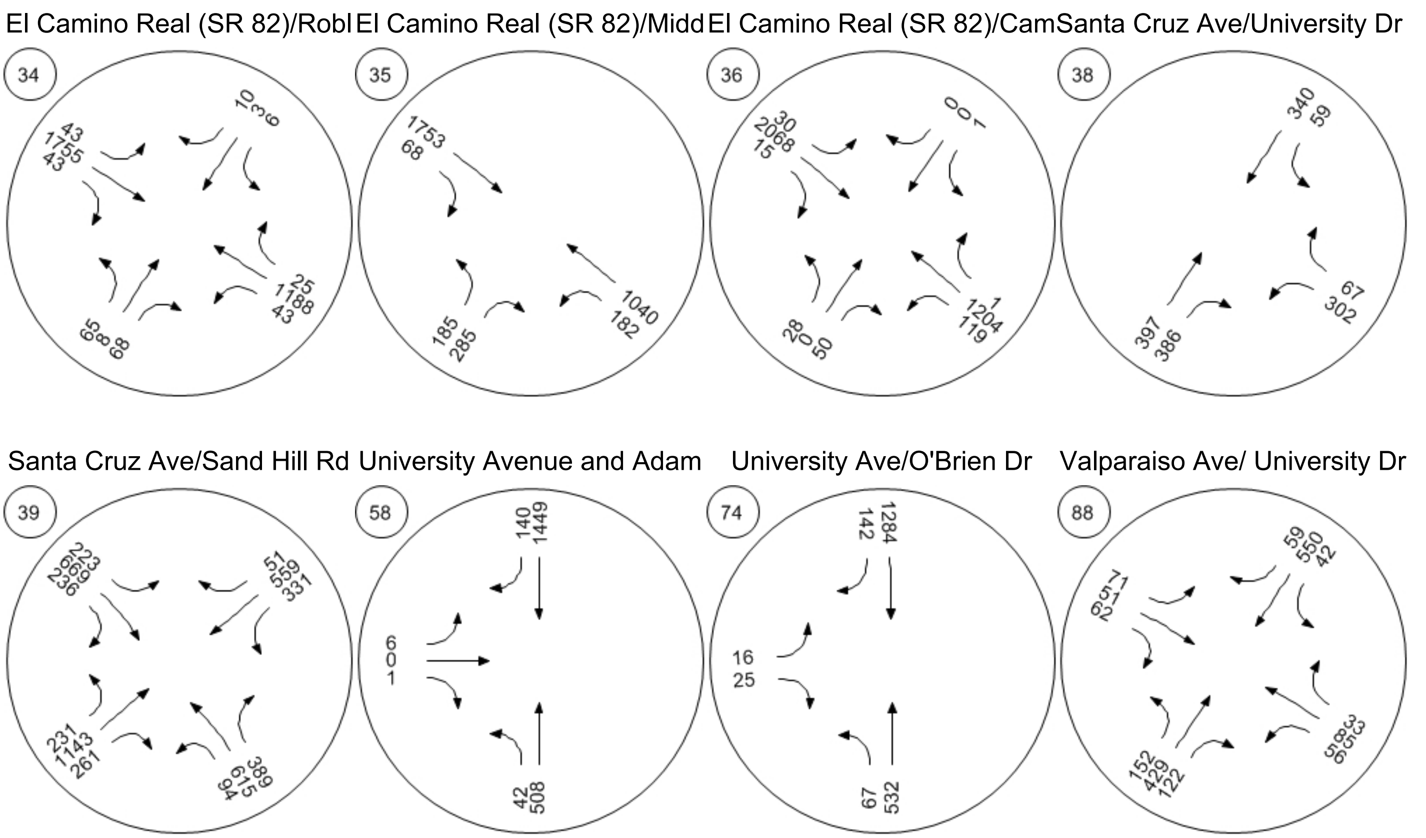
El Camino Real (SR 82)/Sant



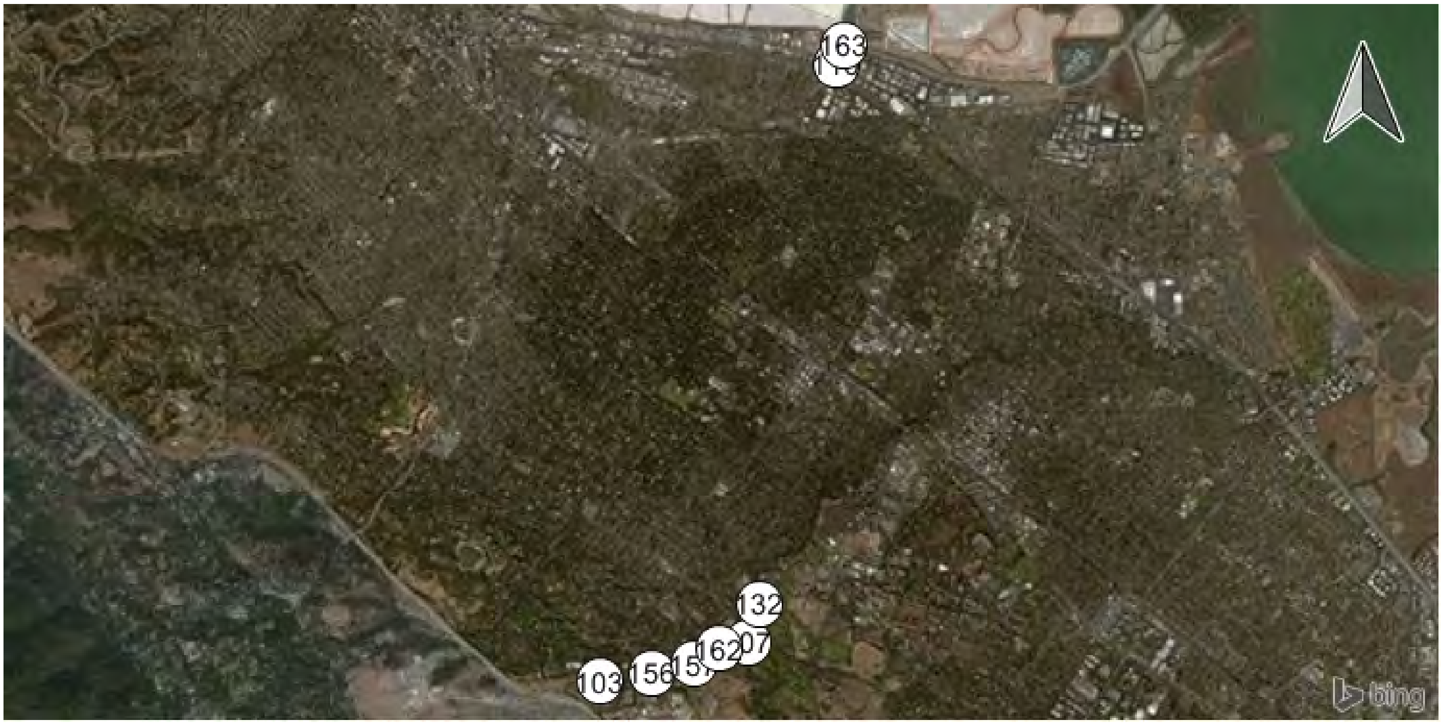
El Camino Real (SR 82)/Rav



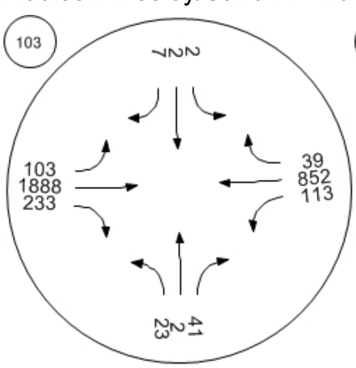
Traffic Volume - Base Volume



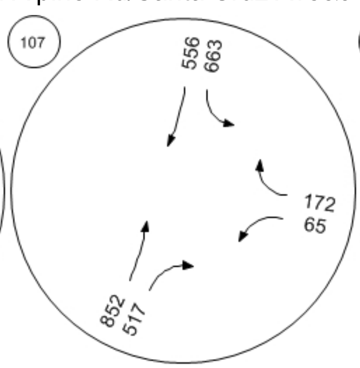
Traffic Volume - Base Volume



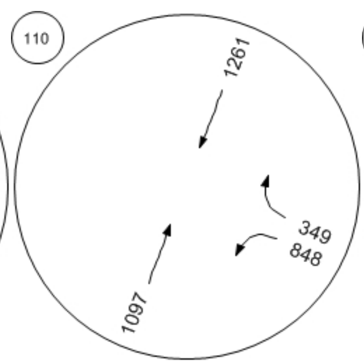
Addison Wesley/Sand Hill Rd



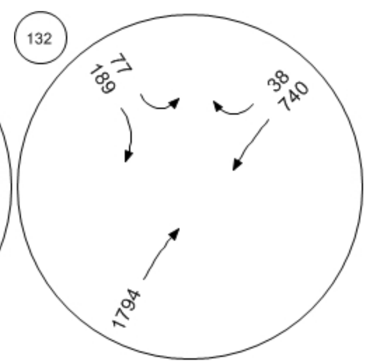
Alpine Rd/Santa Cruz Ave&J



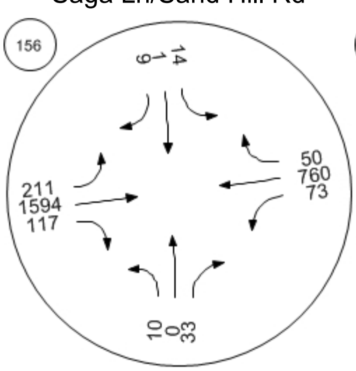
Marsh Road and US 101 NB



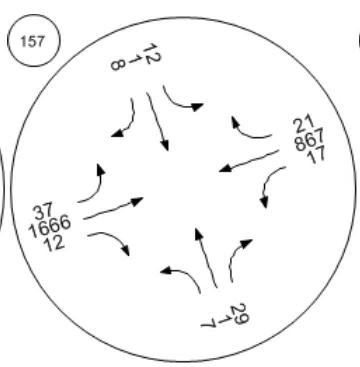
Oak Ave/Sand Hill Rd



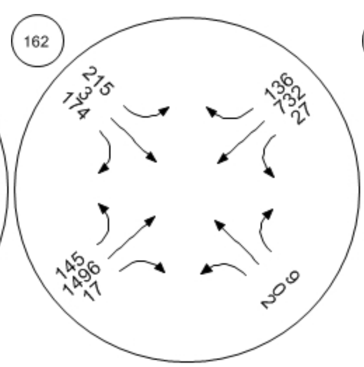
Saga Ln/Sand Hill Rd



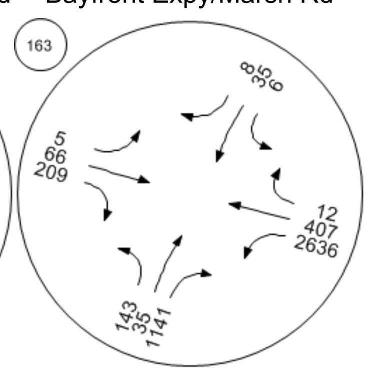
Branner Dr/Sand Hill Rd



Sharon Park Dr/ Sand Hill Rd

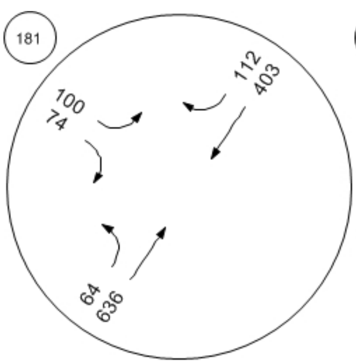


Bayfront Expy/Marsh Rd

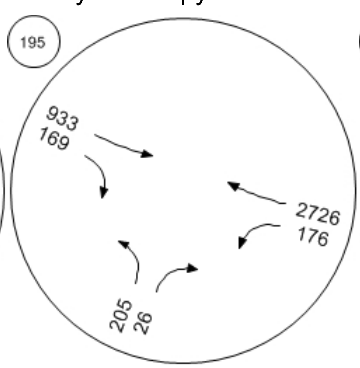


Traffic Volume - Base Volume

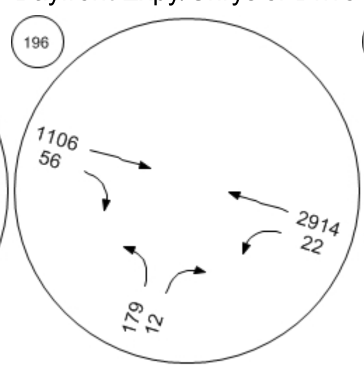
Santa Cruz Ave/Elder Ave



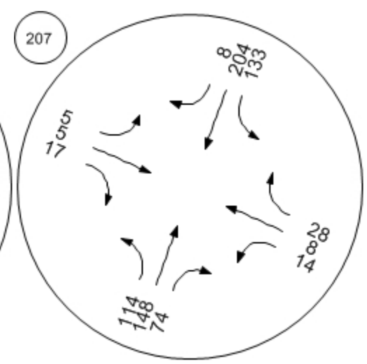
Bayfront Expy/Chilco St



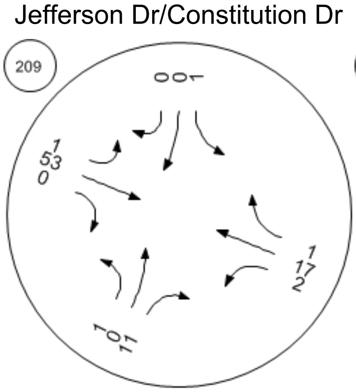
Bayfront Expy/Chrysler Drive



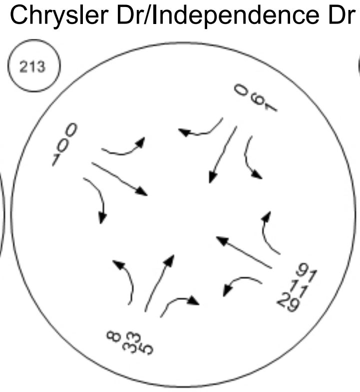
Chilco St/Constitution Dr



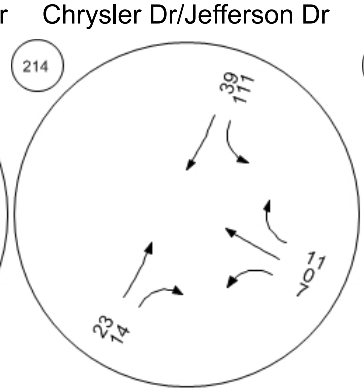
Jefferson Dr/Constitution Dr



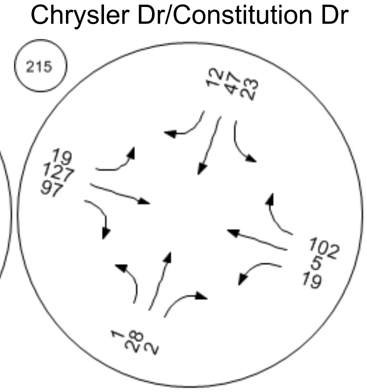
Chrysler Dr/Independence Dr



Chrysler Dr/Jefferson Dr

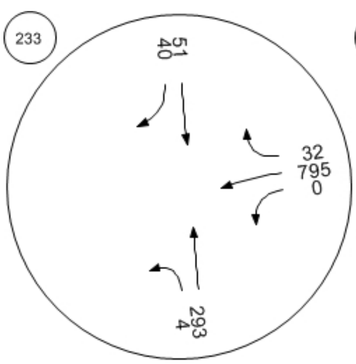


Chrysler Dr/Constitution Dr

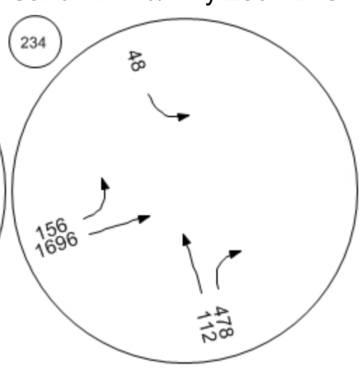


Traffic Volume - Base Volume

Sand Hill Road and Sand Hill

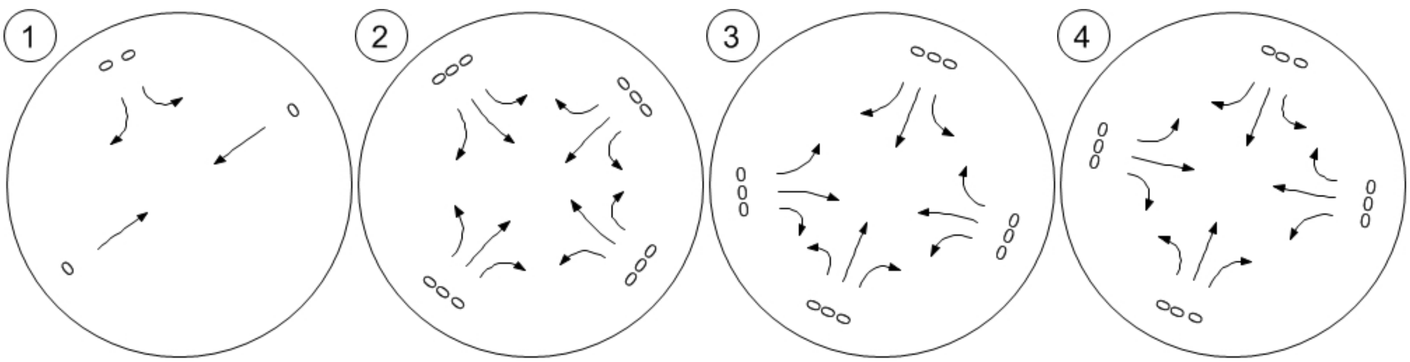


Sand Hill Rd/Hwy 280 NB Off

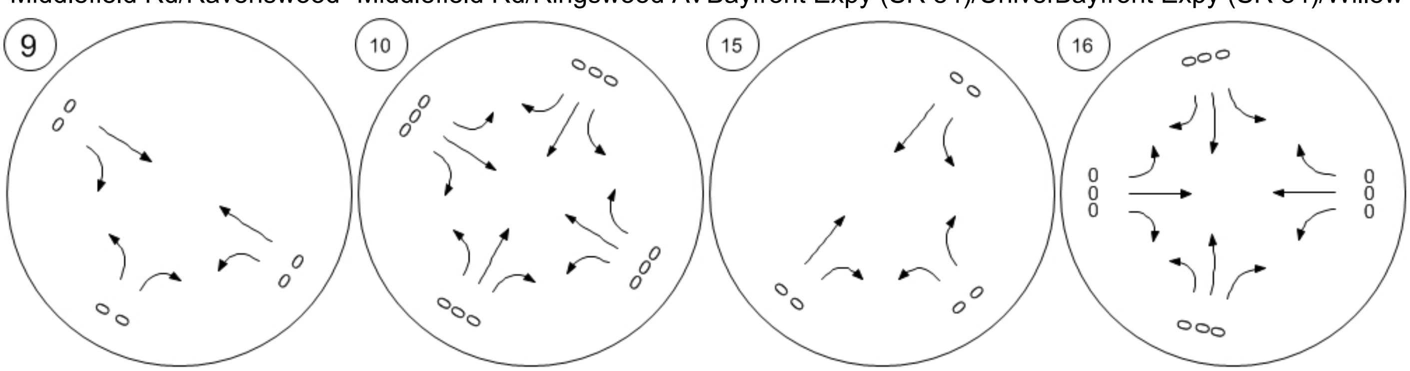


Traffic Volume - In-Process Volume

Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd

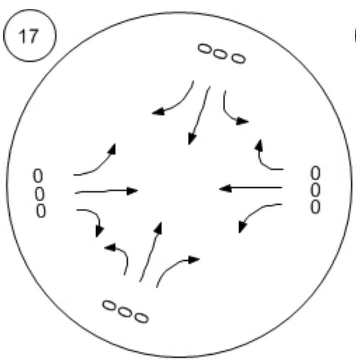


Middlefield Rd/Ravenswood | Middlefield Rd/Ringswood Av | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

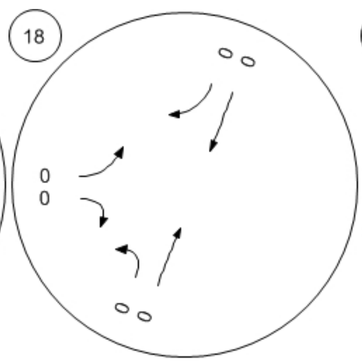


Traffic Volume - In-Process Volume

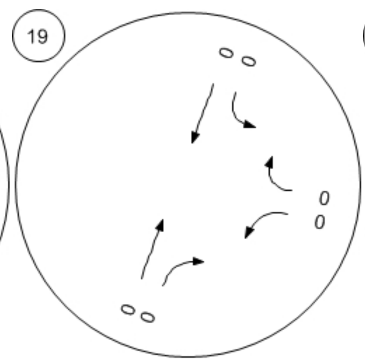
Willow Rd (SR 114)/Hamilton



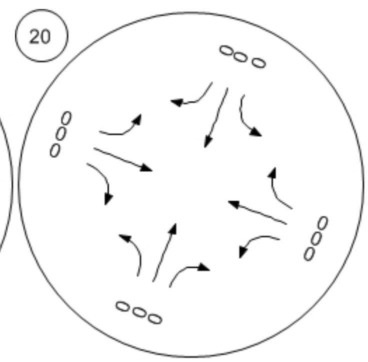
Willow Rd (SR 114)/Ivy Dr



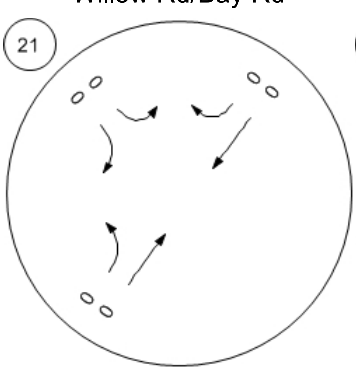
Willow Rd (SR 114)/O'Brien



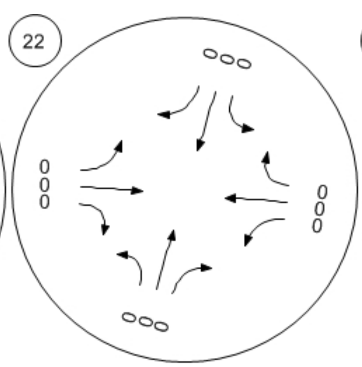
Willow Rd (SR 114)/Newbrid



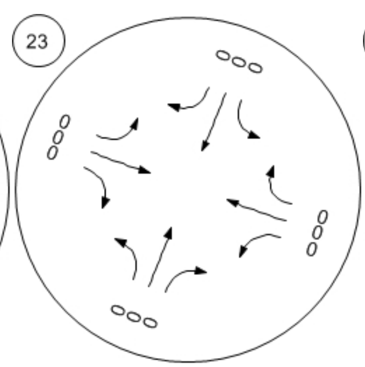
Willow Rd/Bay Rd



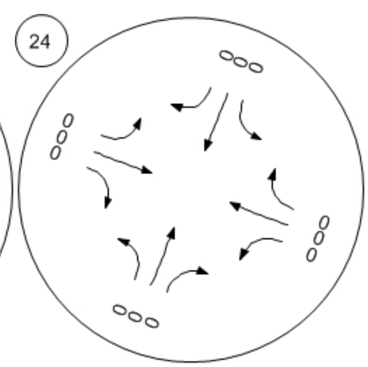
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave



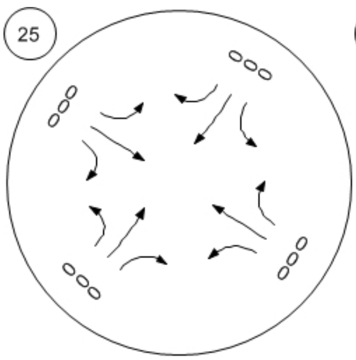
Willow Rd/Gilbert Ave



Traffic Volume - In-Process Volume

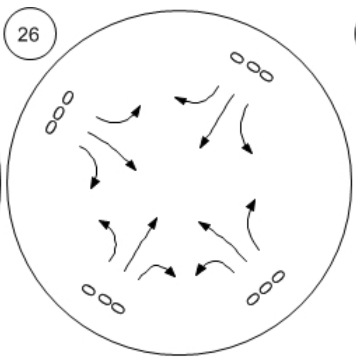
Middlefield Rd-Willow Rd

25



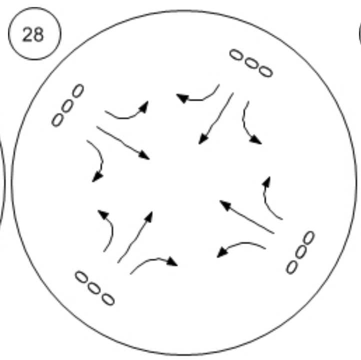
Ravenswood Ave/Laurel St

26



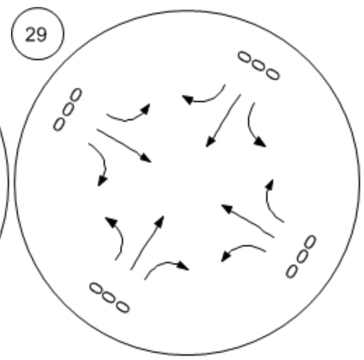
Oak Grove Ave/Laurel St

28



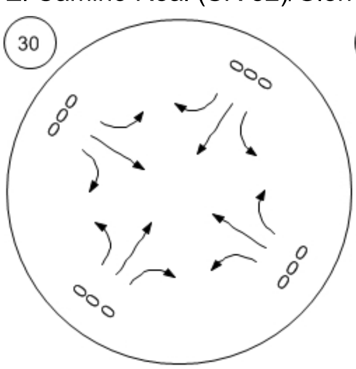
El Camino Real (SR 82)/Enci

29



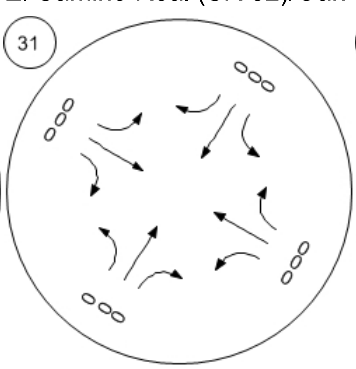
El Camino Real (SR 82)/Glen

30



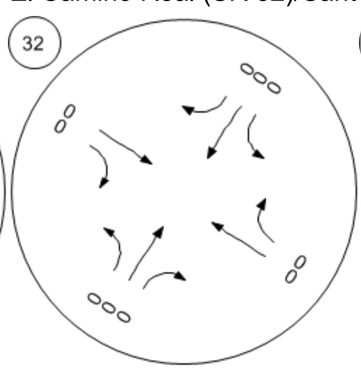
El Camino Real (SR 82)/Oak

31



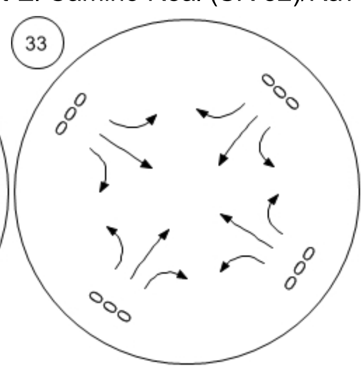
El Camino Real (SR 82)/Sant

32

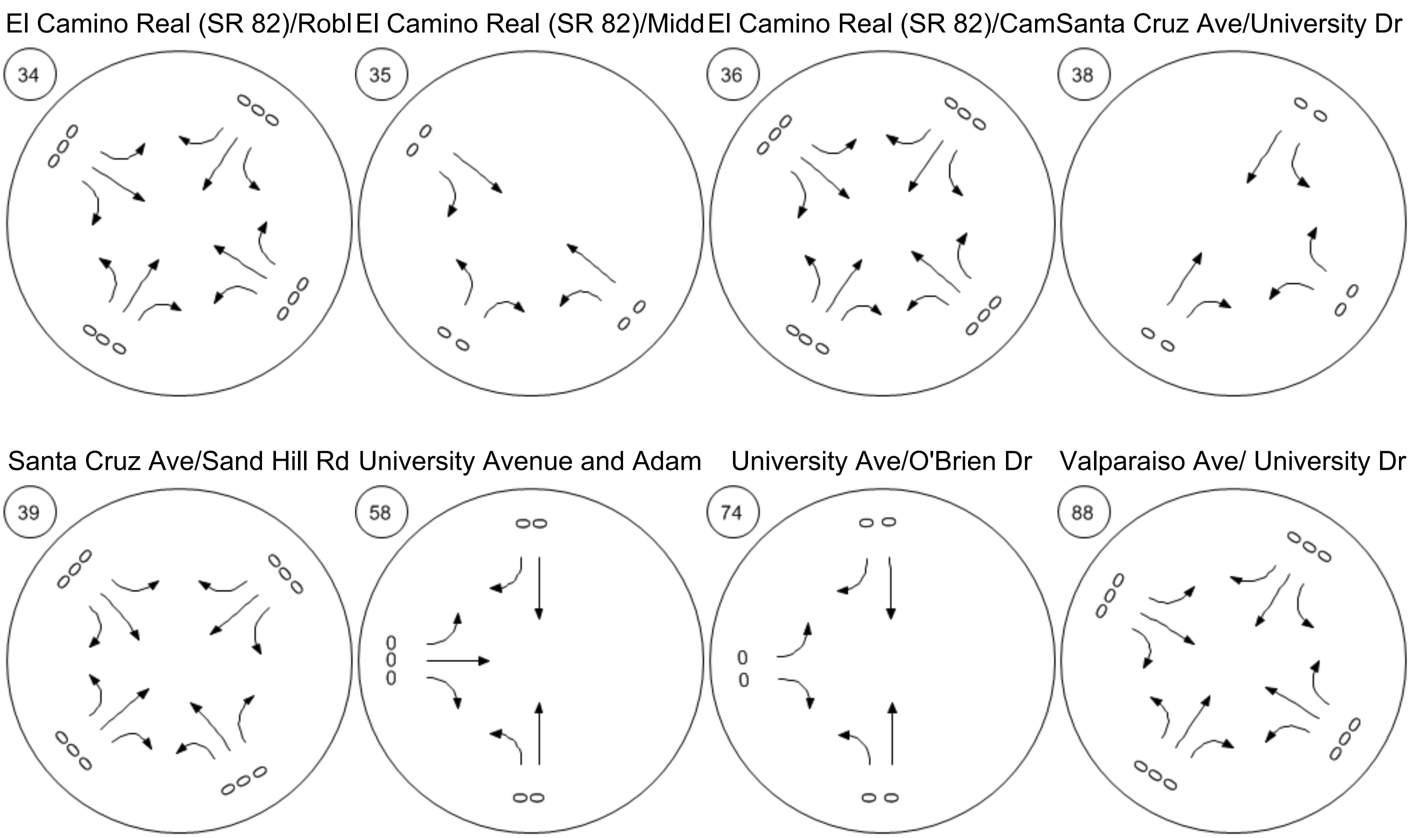


El Camino Real (SR 82)/Rav

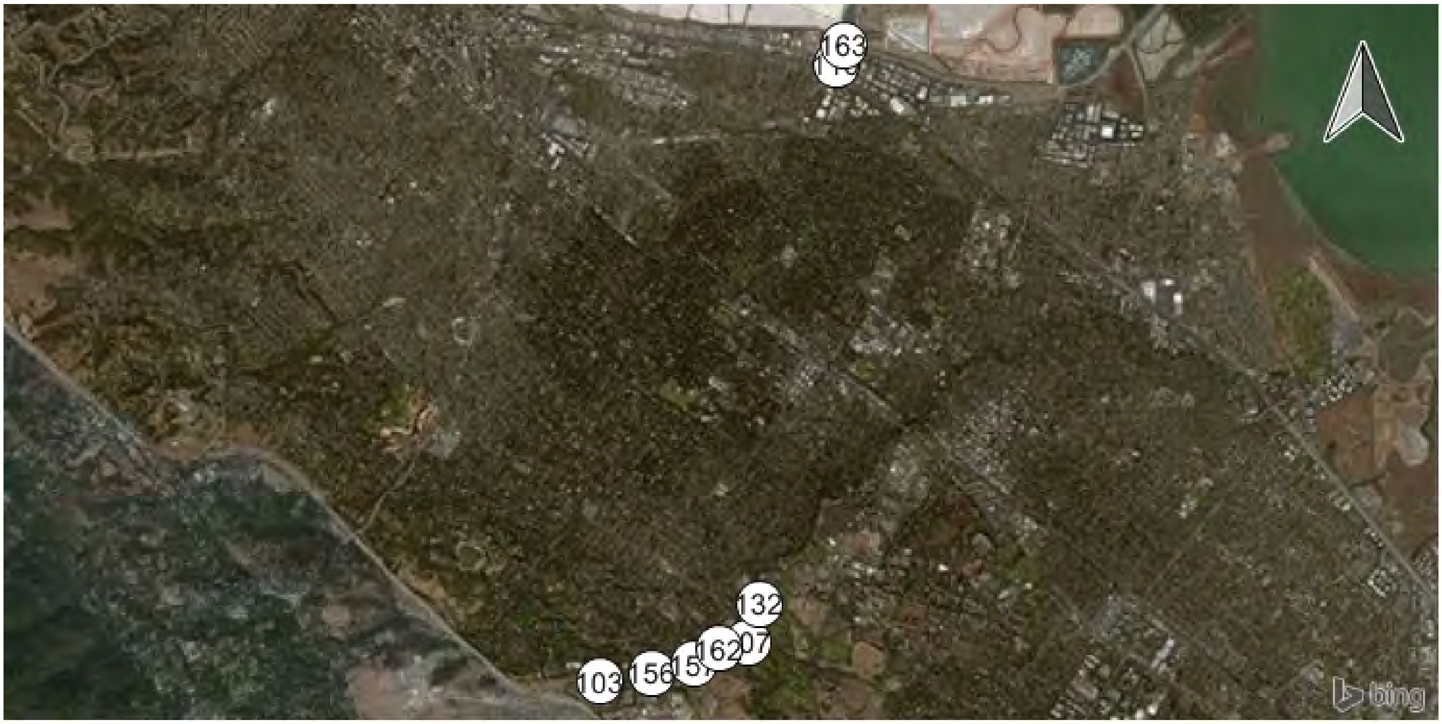
33



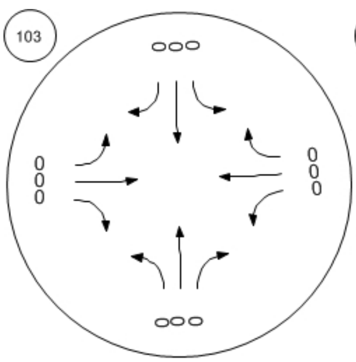
Traffic Volume - In-Process Volume



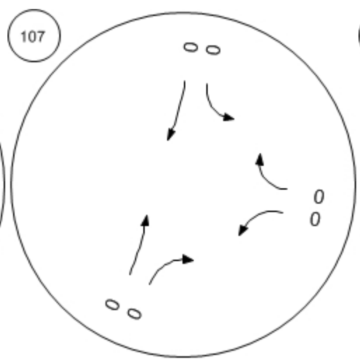
Traffic Volume - In-Process Volume



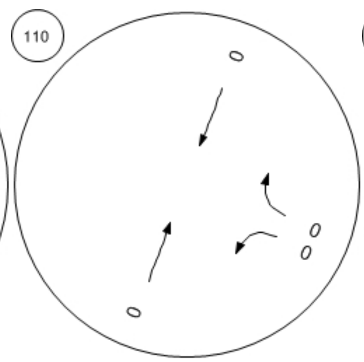
Addison Wesley/Sand Hill Rd



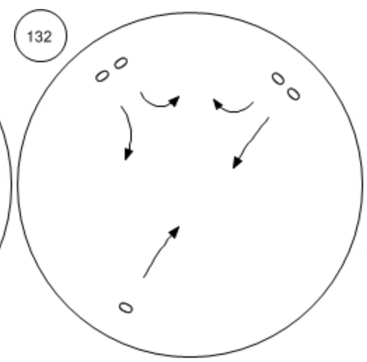
Alpine Rd/Santa Cruz Ave&J



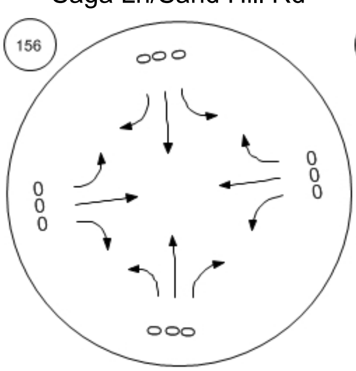
Marsh Road and US 101 NB



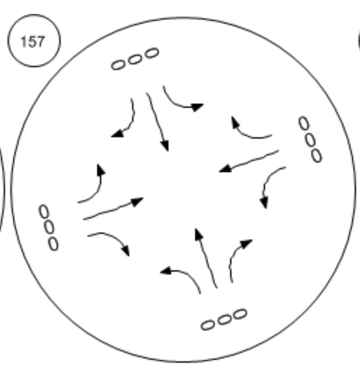
Oak Ave/Sand Hill Rd



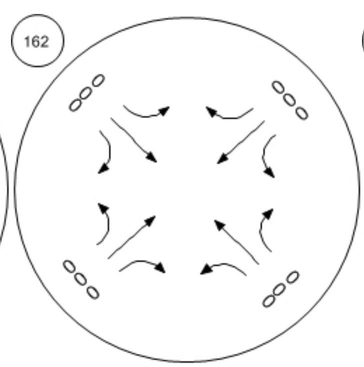
Saga Ln/Sand Hill Rd



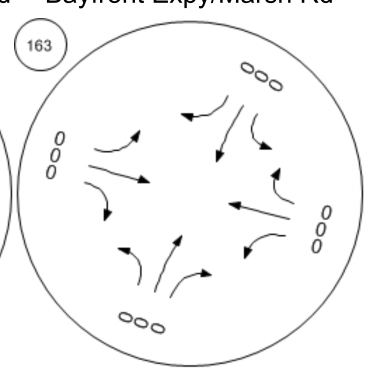
Branner Dr/Sand Hill Rd



Sharon Park Dr/ Sand Hill Rd

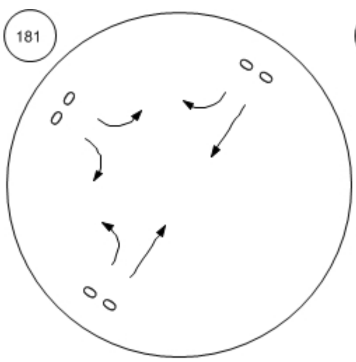


Bayfront Expy/Marsh Rd

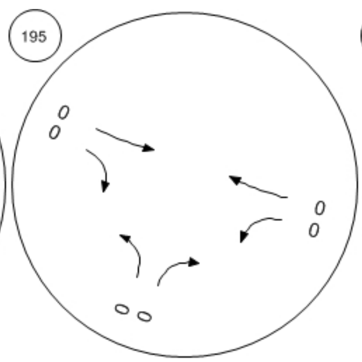


Traffic Volume - In-Process Volume

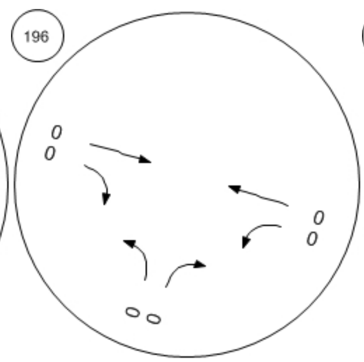
Santa Cruz Ave/Elder Ave



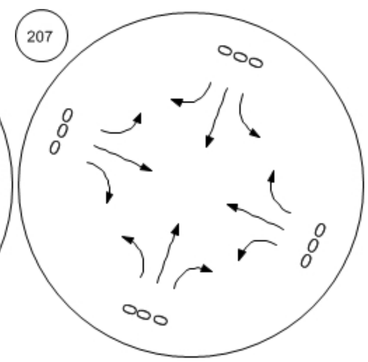
Bayfront Expy/Chilco St



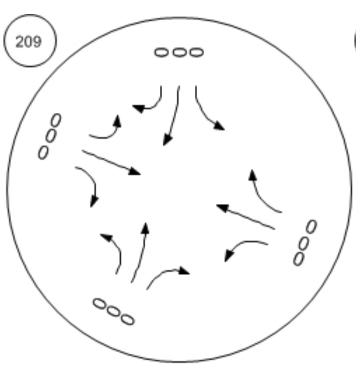
Bayfront Expy/Chrysler Drive



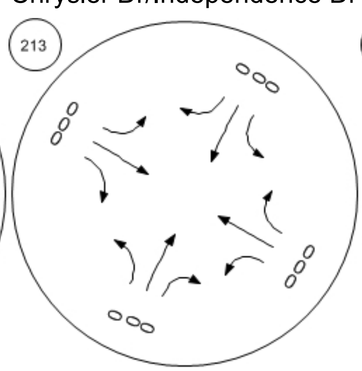
Chilco St/Constitution Dr



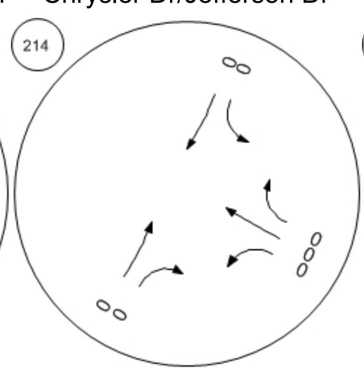
Jefferson Dr/Constitution Dr



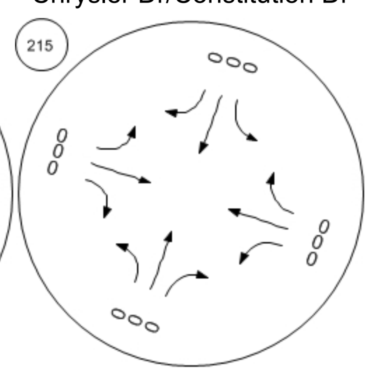
Chrysler Dr/Independence Dr



Chrysler Dr/Jefferson Dr

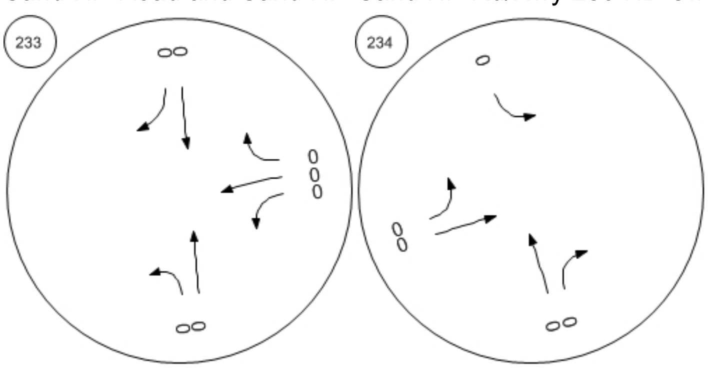


Chrysler Dr/Constitution Dr



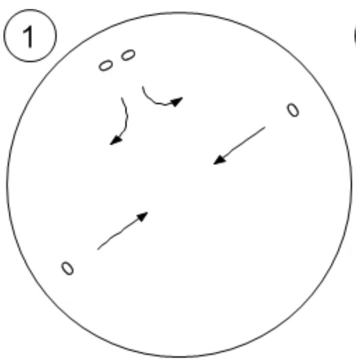
Traffic Volume - In-Process Volume

Sand Hill Road and Sand Hill Sand Hill Rd/Hwy 280 NB Off

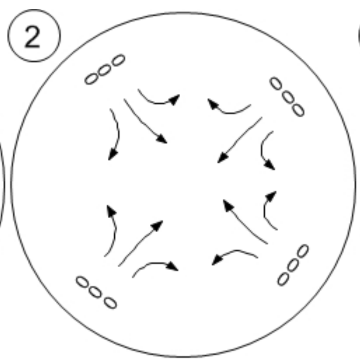


Traffic Volume - Net New Site Trips

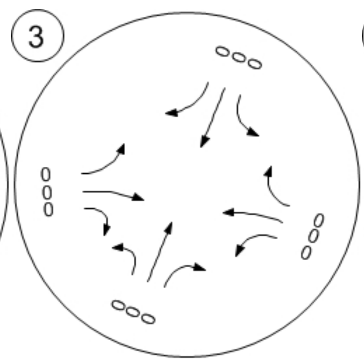
Marsh Rd (SR 84)/US 101 S



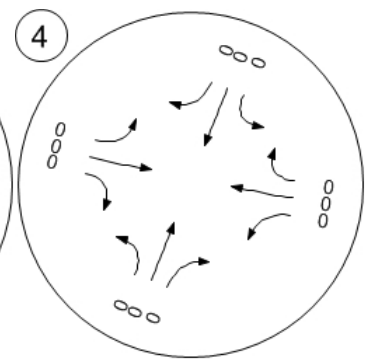
Marsh Rd/Rolison Rd-Scott D



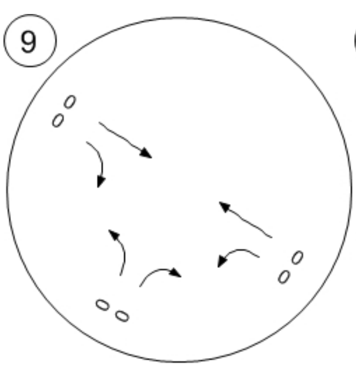
Marsh Rd/Florence St-Bohan



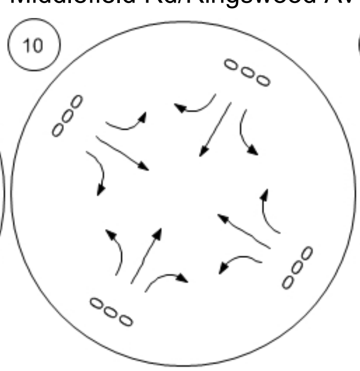
Marsh Rd/Bay Rd



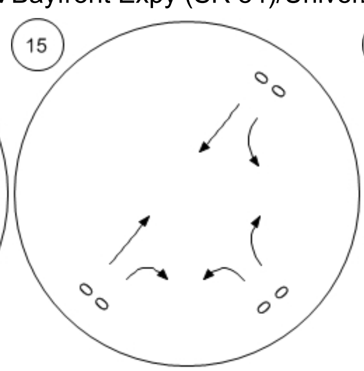
Middlefield Rd/Ravenswood



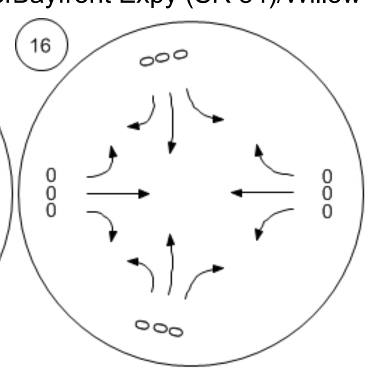
Middlefield Rd/Ringswood Av



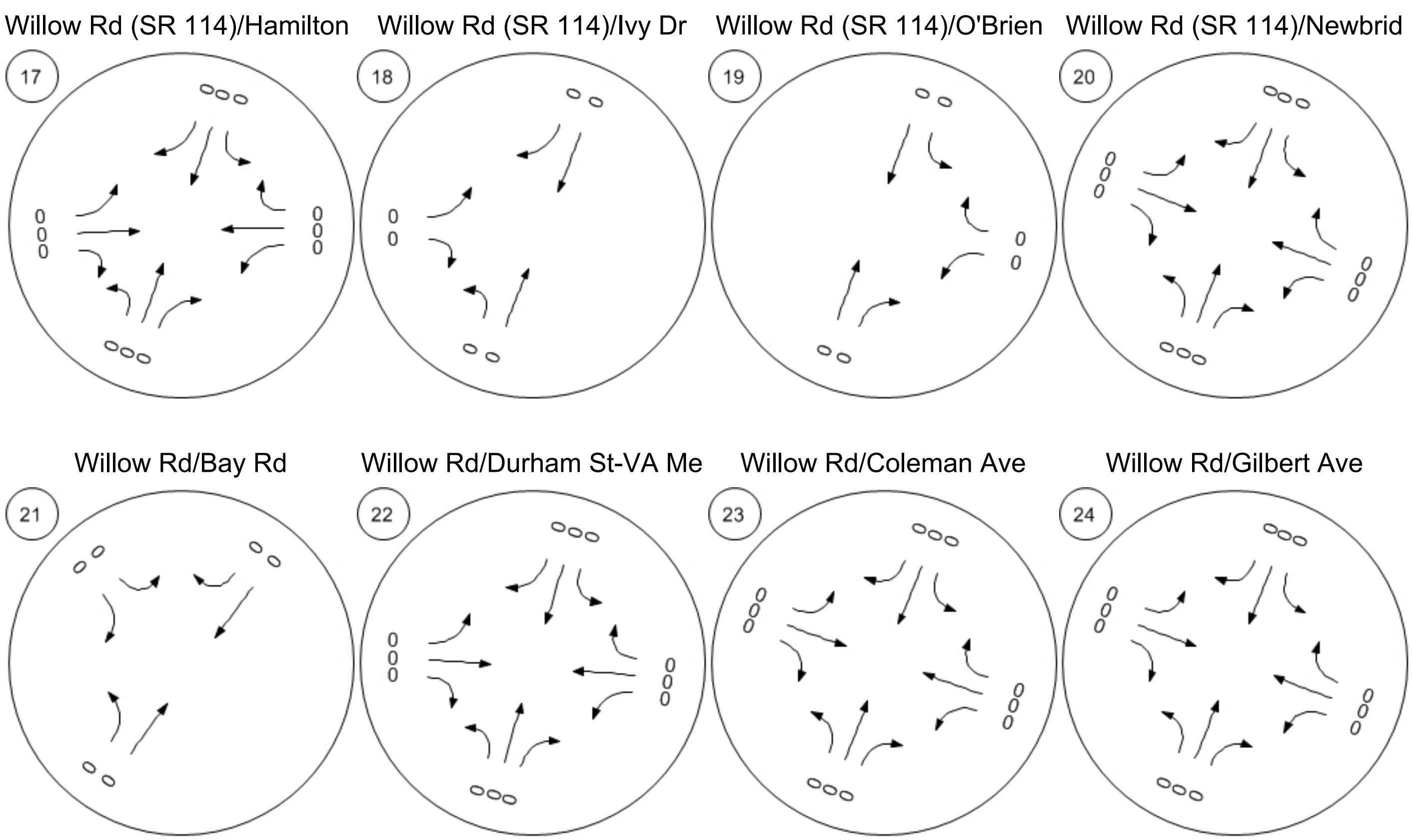
Bayfront Expy (SR 84)/Univer



Bayfront Expy (SR 84)/Willow

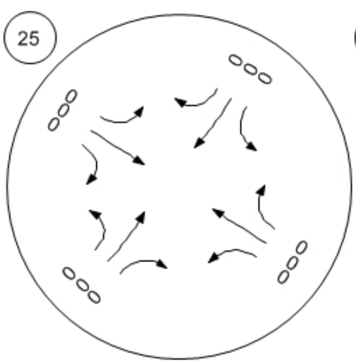


Traffic Volume - Net New Site Trips

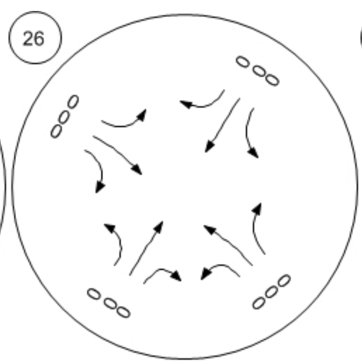


Traffic Volume - Net New Site Trips

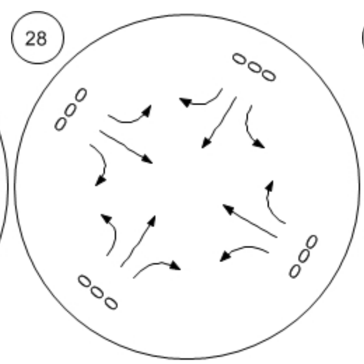
Middlefield Rd-Willow Rd



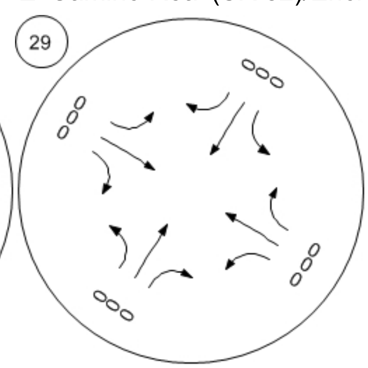
Ravenswood Ave/Laurel St



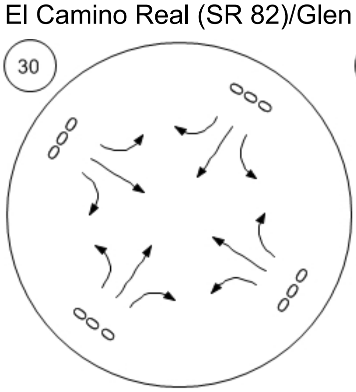
Oak Grove Ave/Laurel St



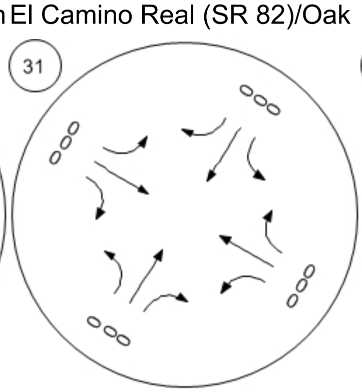
El Camino Real (SR 82)/Enci



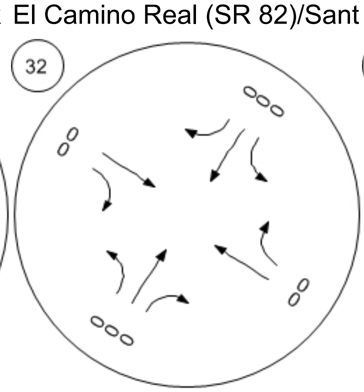
El Camino Real (SR 82)/Glen



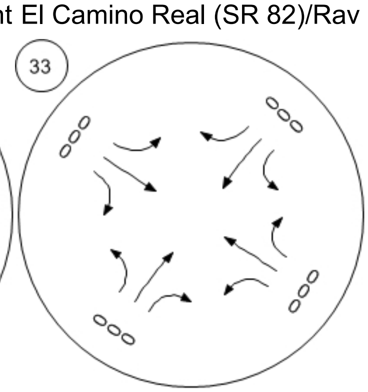
El Camino Real (SR 82)/Oak



El Camino Real (SR 82)/Sant

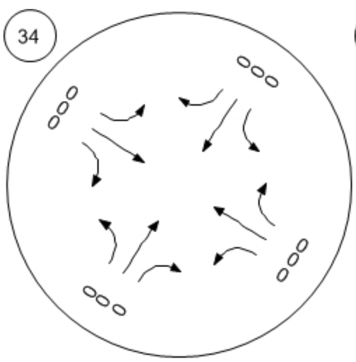


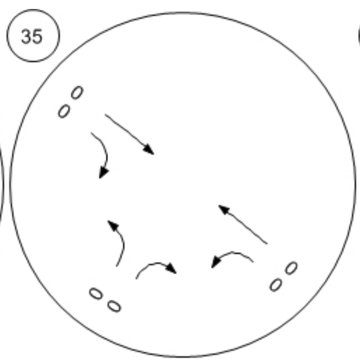
El Camino Real (SR 82)/Rav

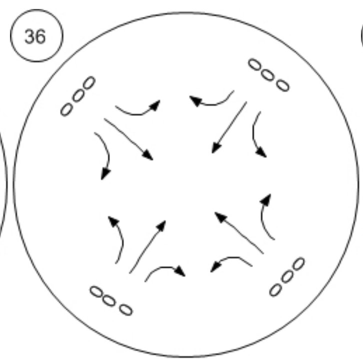


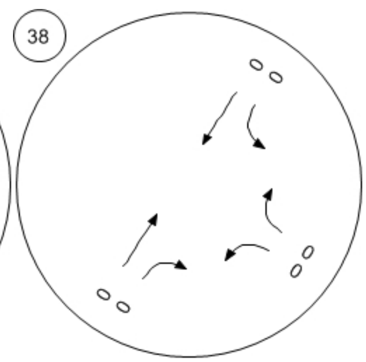
Traffic Volume - Net New Site Trips

El Camino Real (SR 82)/Robl | El Camino Real (SR 82)/Midd | El Camino Real (SR 82)/Cam | Santa Cruz Ave/University Dr

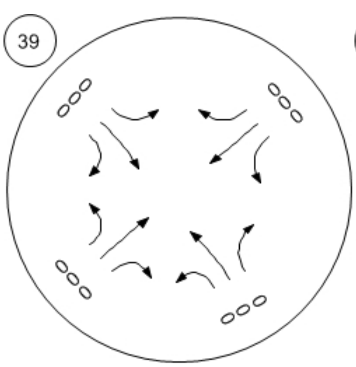


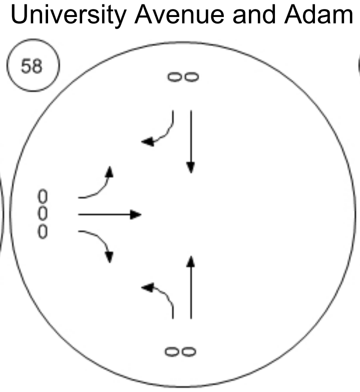


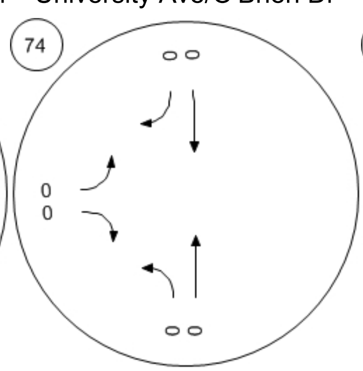


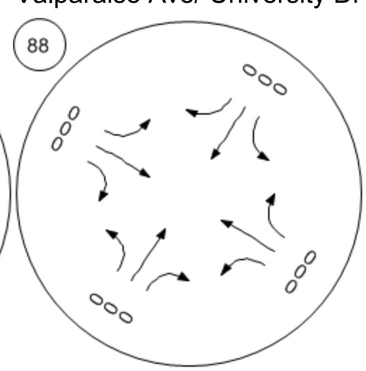


Santa Cruz Ave/Sand Hill Rd | University Avenue and Adam | University Ave/O'Brien Dr | Valparaiso Ave/ University Dr

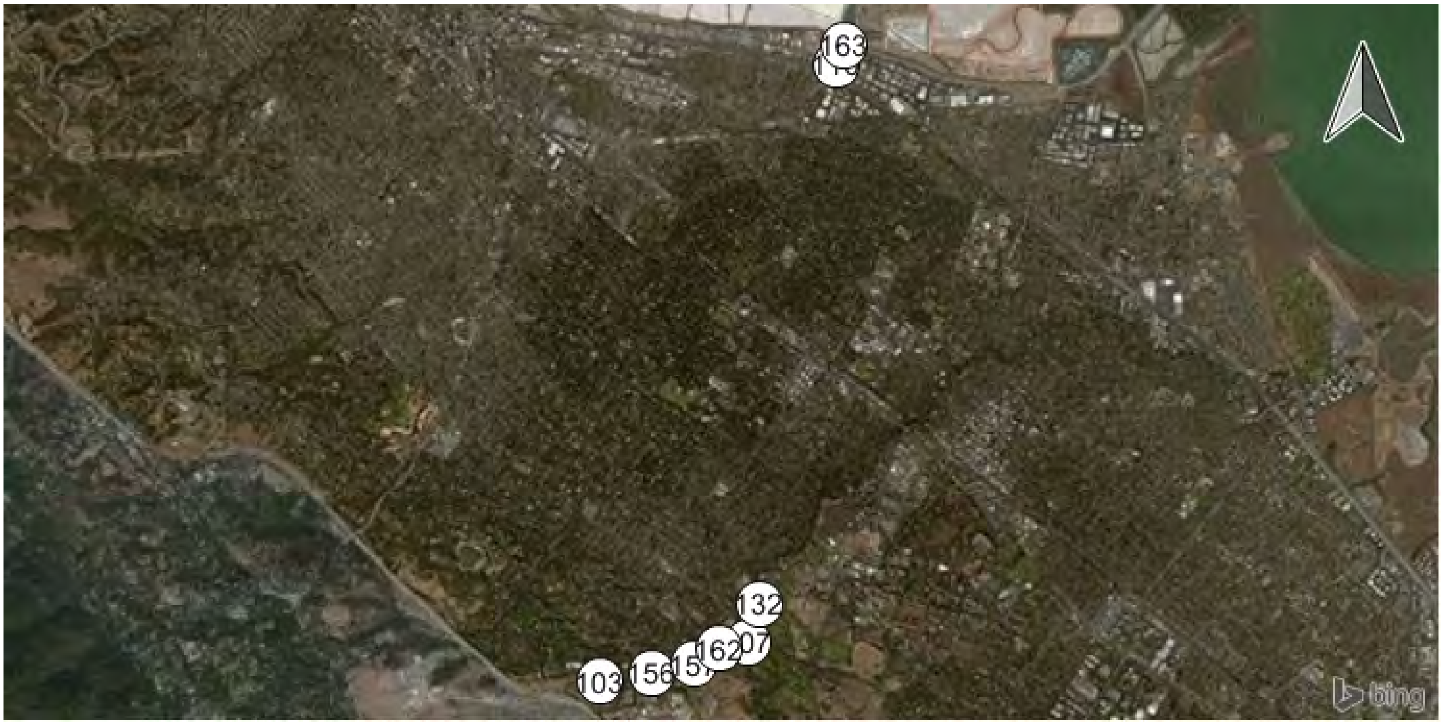




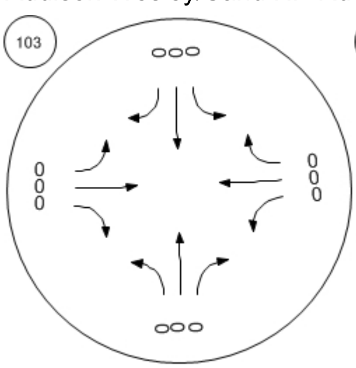




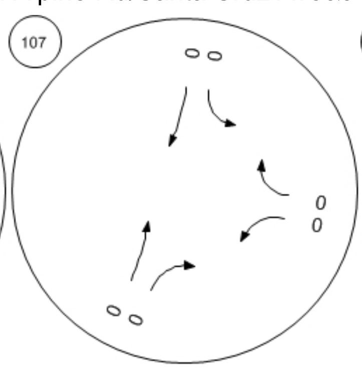
Traffic Volume - Net New Site Trips



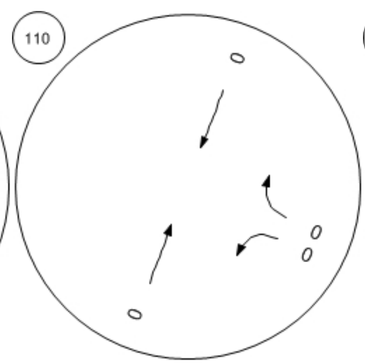
Addison Wesley/Sand Hill Rd



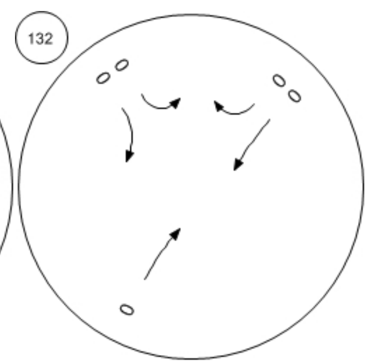
Alpine Rd/Santa Cruz Ave&J



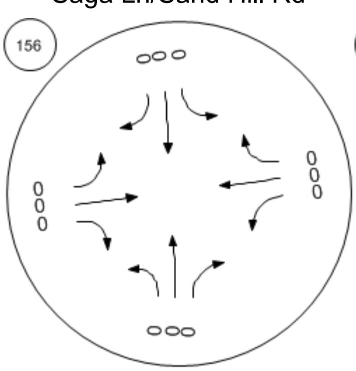
Marsh Road and US 101 NB



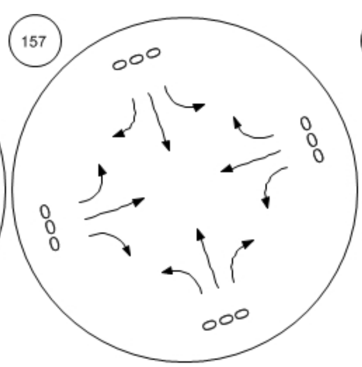
Oak Ave/Sand Hill Rd



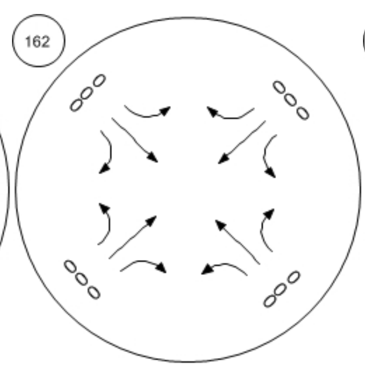
Saga Ln/Sand Hill Rd



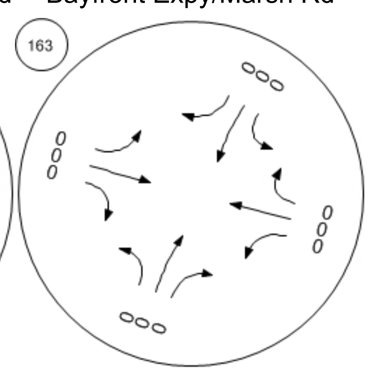
Branner Dr/Sand Hill Rd



Sharon Park Dr/ Sand Hill Rd

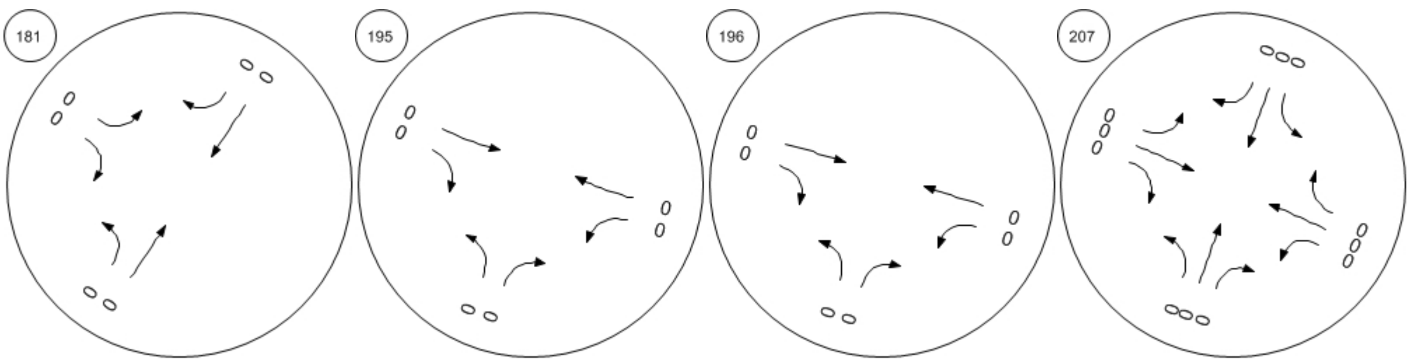


Bayfront Expy/Marsh Rd

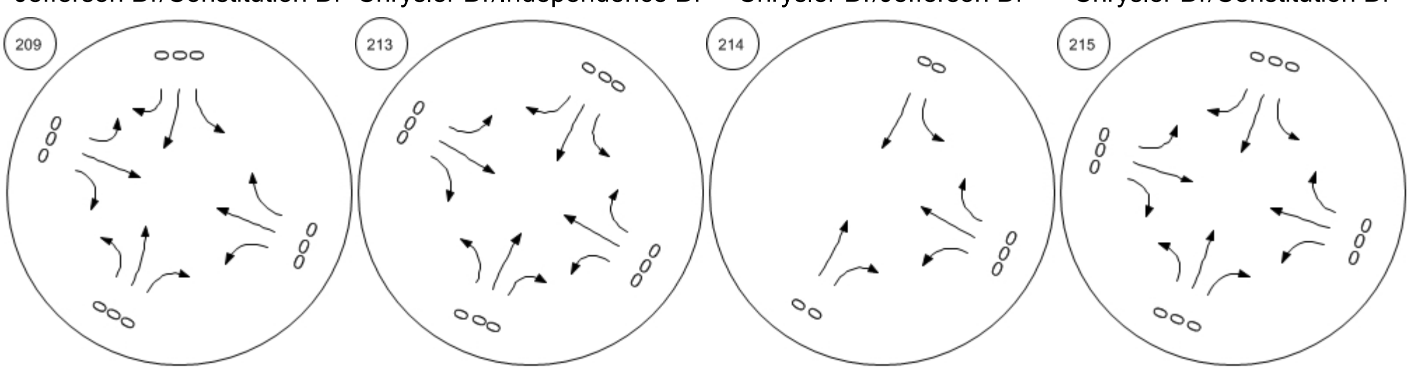


Traffic Volume - Net New Site Trips

Santa Cruz Ave/Elder Ave | Bayfront Expy/Chilco St | Bayfront Expy/Chrysler Drive | Chilco St/Constitution Dr

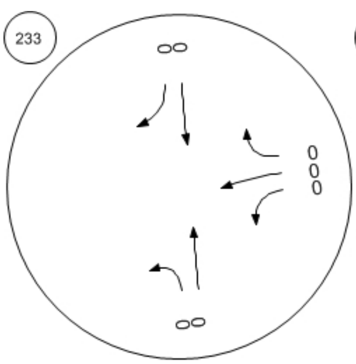


Jefferson Dr/Constitution Dr | Chrysler Dr/Independence Dr | Chrysler Dr/Jefferson Dr | Chrysler Dr/Constitution Dr

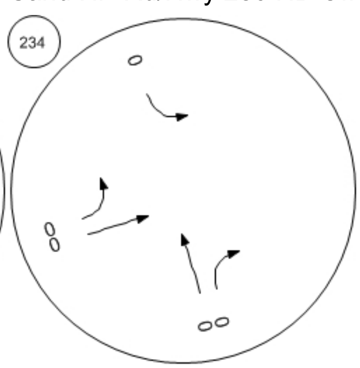


Traffic Volume - Net New Site Trips

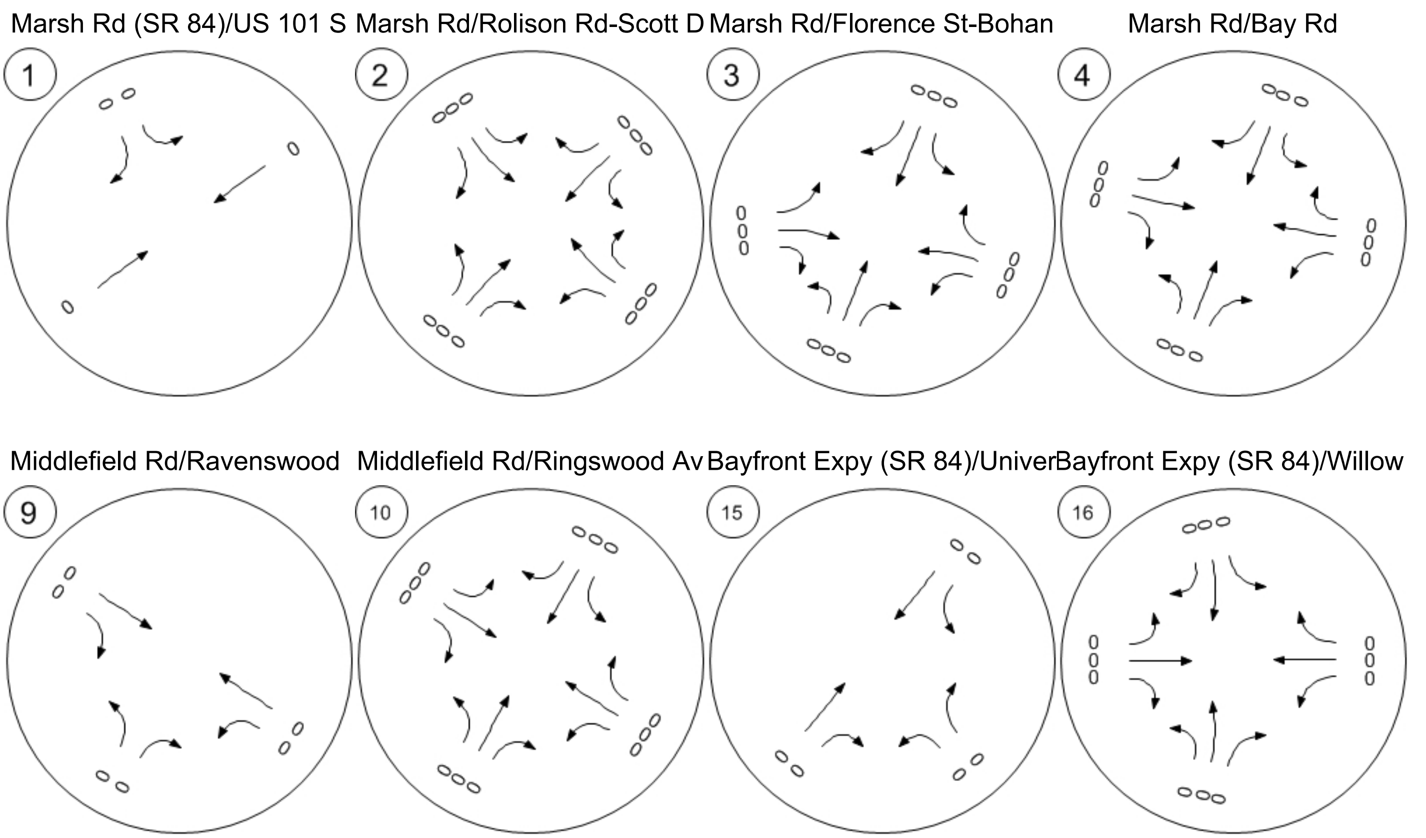
Sand Hill Road and Sand Hill



Sand Hill Rd/Hwy 280 NB Off

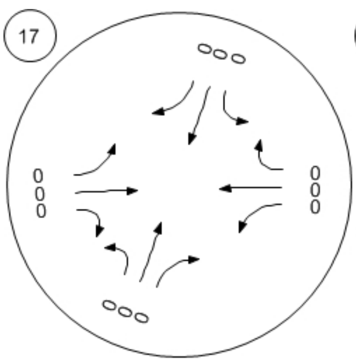


Traffic Volume - Other Volume

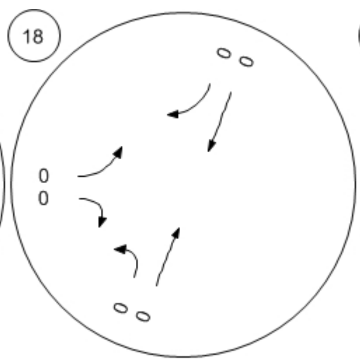


Traffic Volume - Other Volume

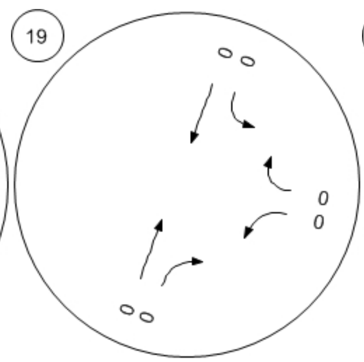
Willow Rd (SR 114)/Hamilton



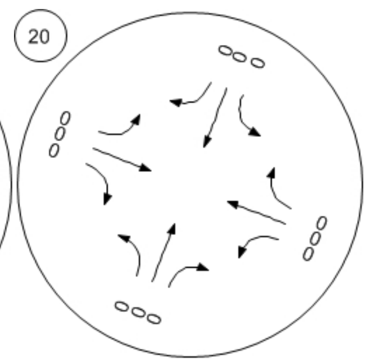
Willow Rd (SR 114)/Ivy Dr



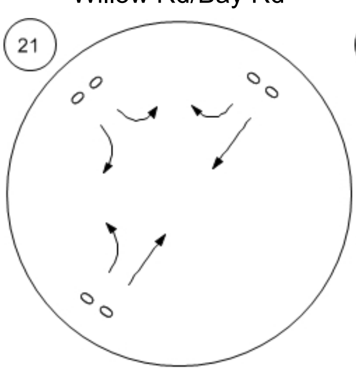
Willow Rd (SR 114)/O'Brien



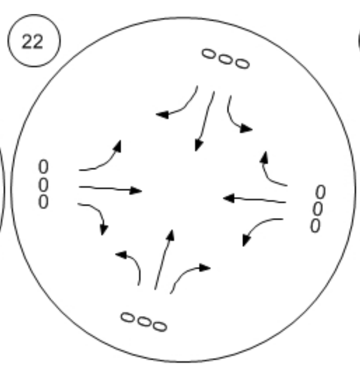
Willow Rd (SR 114)/Newbrid



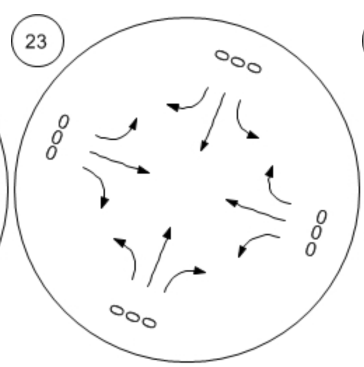
Willow Rd/Bay Rd



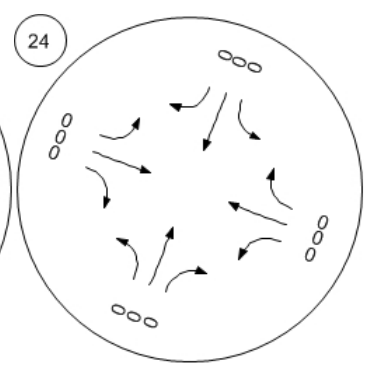
Willow Rd/Durham St-VA Me



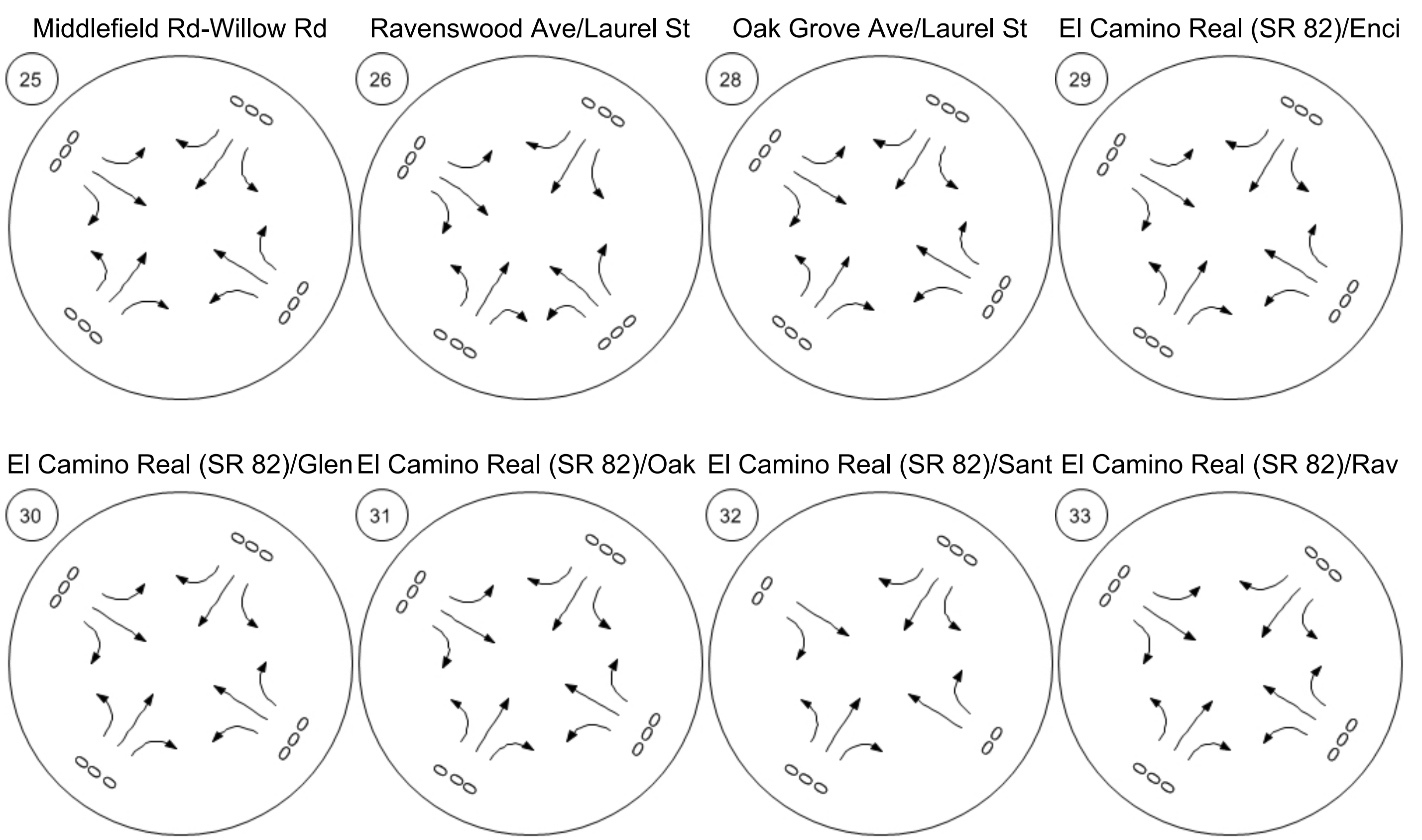
Willow Rd/Coleman Ave



Willow Rd/Gilbert Ave

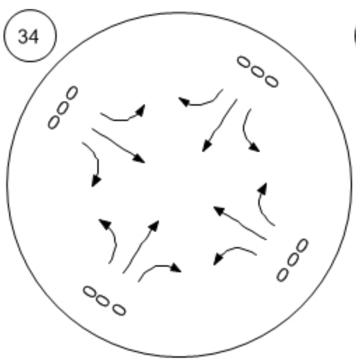


Traffic Volume - Other Volume

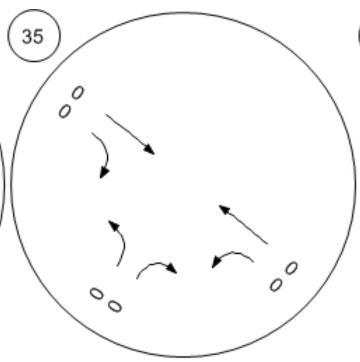


Traffic Volume - Other Volume

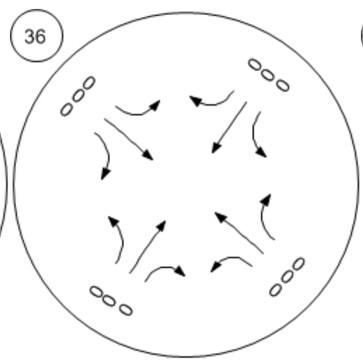
El Camino Real (SR 82)/Robl



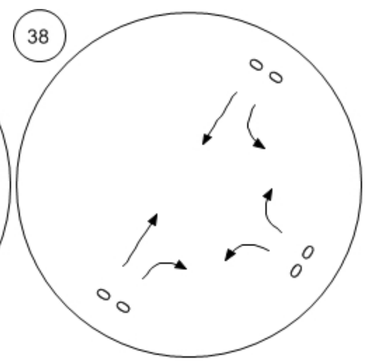
El Camino Real (SR 82)/Midd



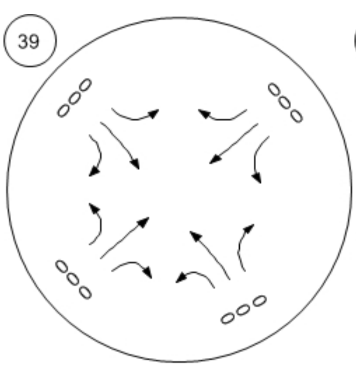
El Camino Real (SR 82)/Cam



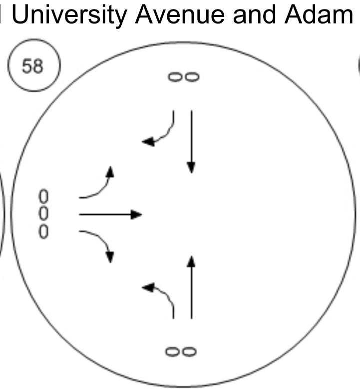
Santa Cruz Ave/University Dr



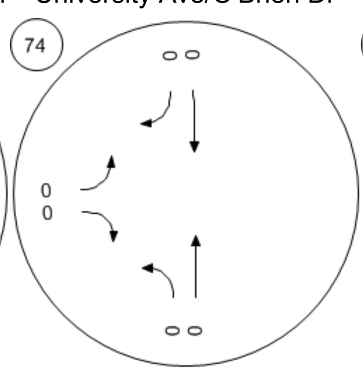
Santa Cruz Ave/Sand Hill Rd



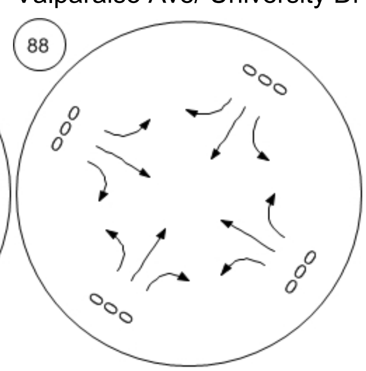
University Avenue and Adam



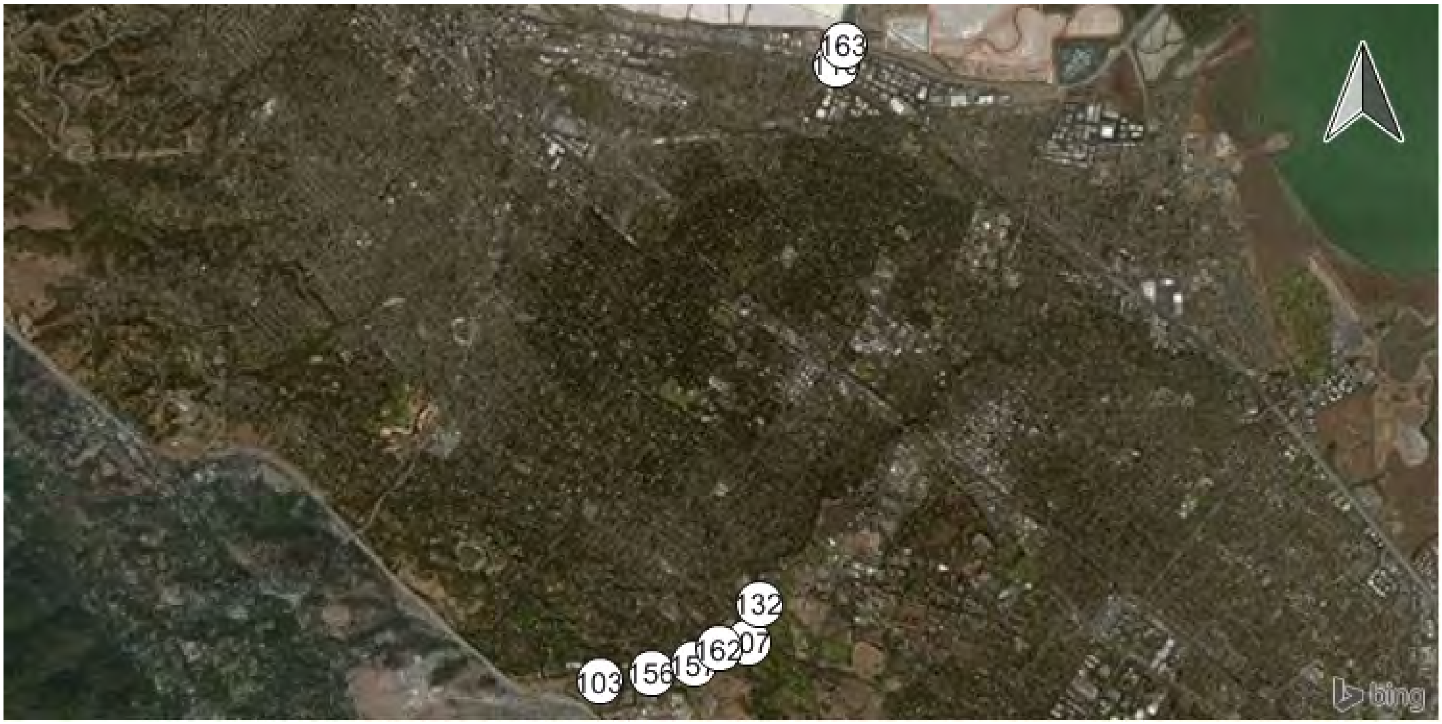
University Ave/O'Brien Dr



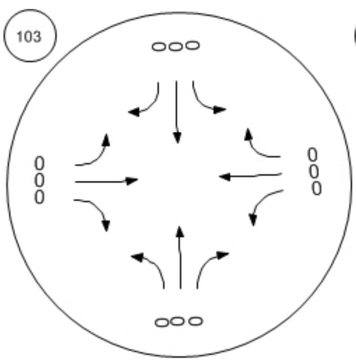
Valparaiso Ave/ University Dr



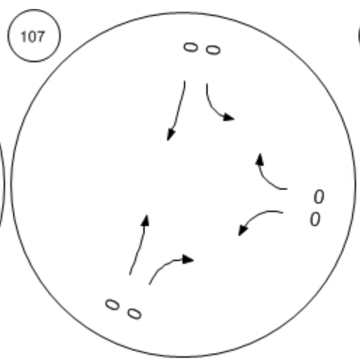
Traffic Volume - Other Volume



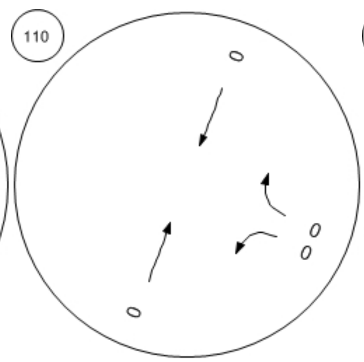
Addison Wesley/Sand Hill Rd



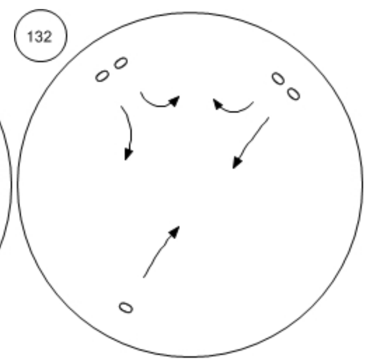
Alpine Rd/Santa Cruz Ave&J



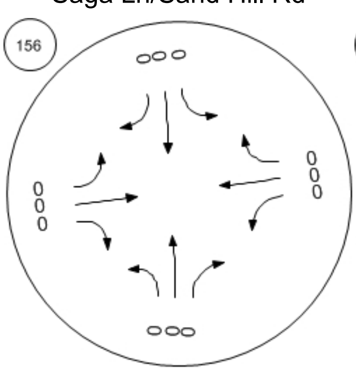
Marsh Road and US 101 NB



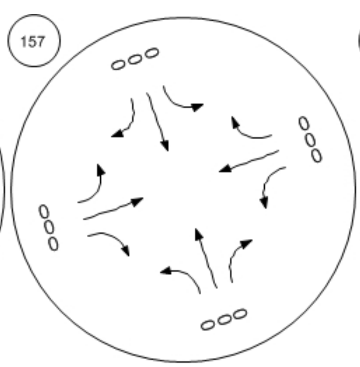
Oak Ave/Sand Hill Rd



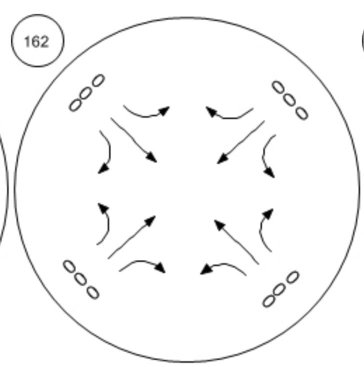
Saga Ln/Sand Hill Rd



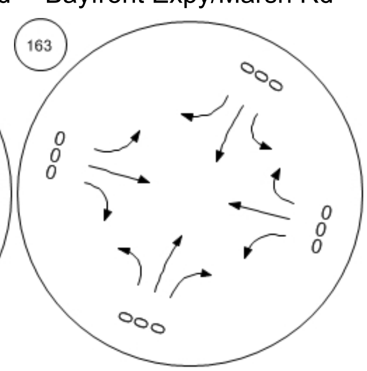
Branner Dr/Sand Hill Rd



Sharon Park Dr/ Sand Hill Rd

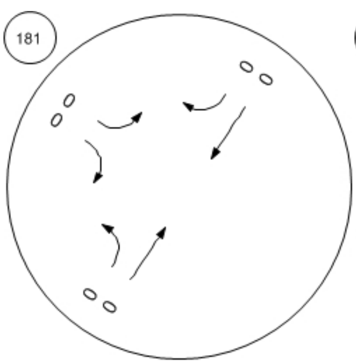


Bayfront Expy/Marsh Rd

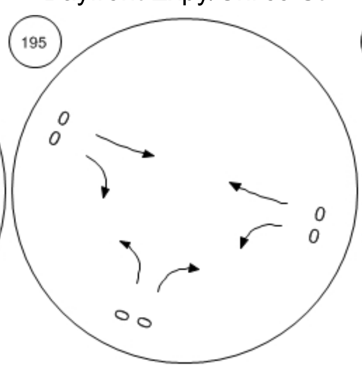


Traffic Volume - Other Volume

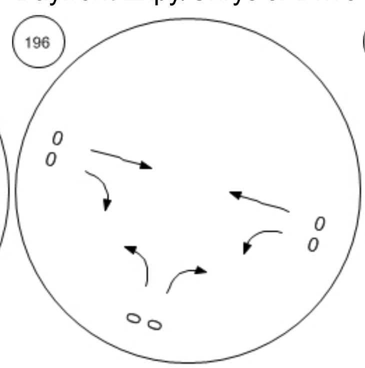
Santa Cruz Ave/Elder Ave



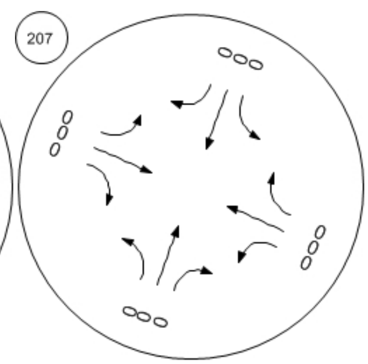
Bayfront Expy/Chilco St



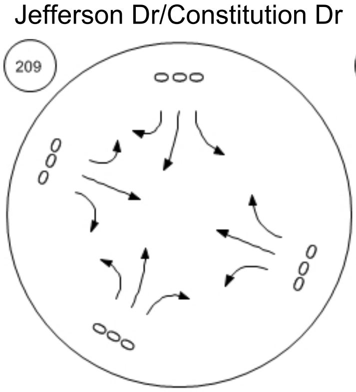
Bayfront Expy/Chrysler Drive



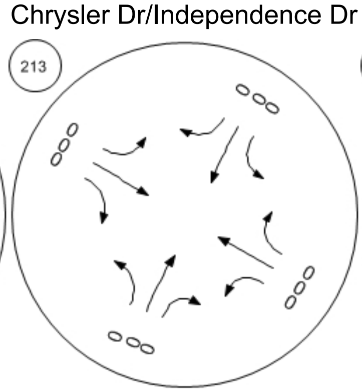
Chilco St/Constitution Dr



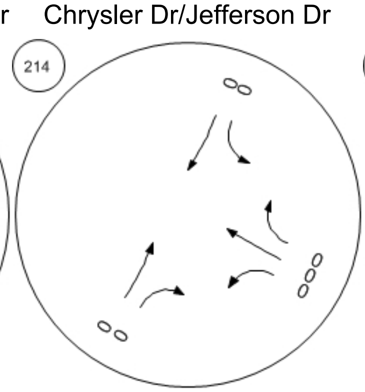
Jefferson Dr/Constitution Dr



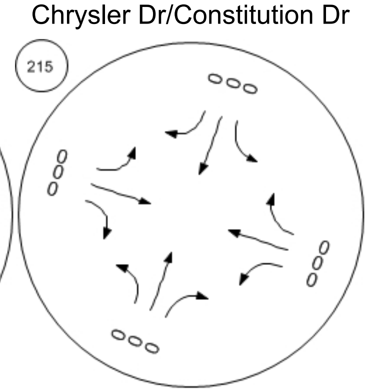
Chrysler Dr/Independence Dr



Chrysler Dr/Jefferson Dr

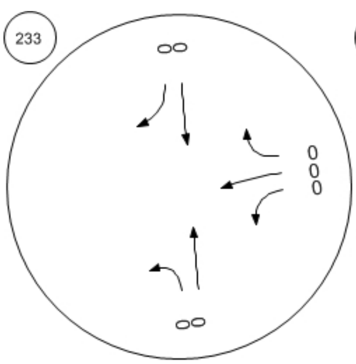


Chrysler Dr/Constitution Dr

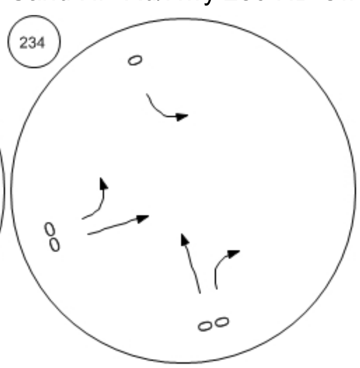


Traffic Volume - Other Volume

Sand Hill Road and Sand Hill

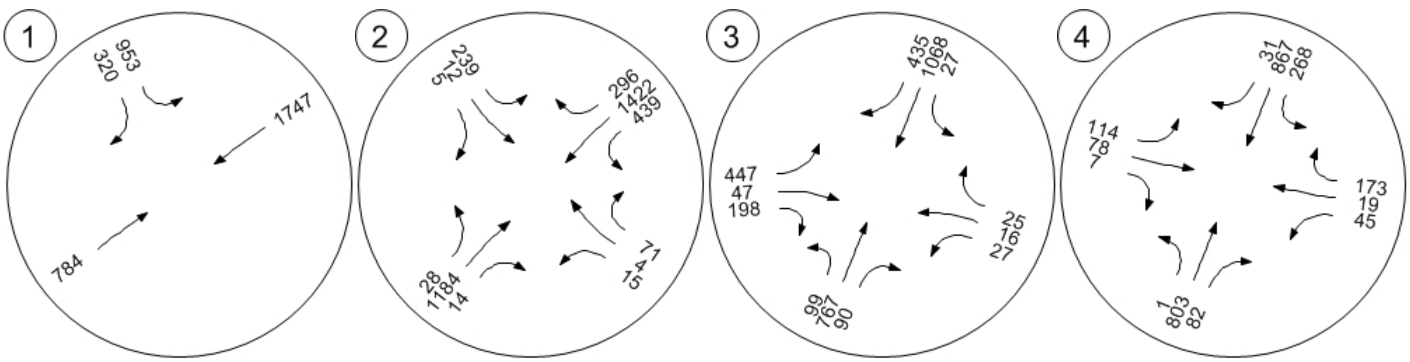


Sand Hill Rd/Hwy 280 NB Off

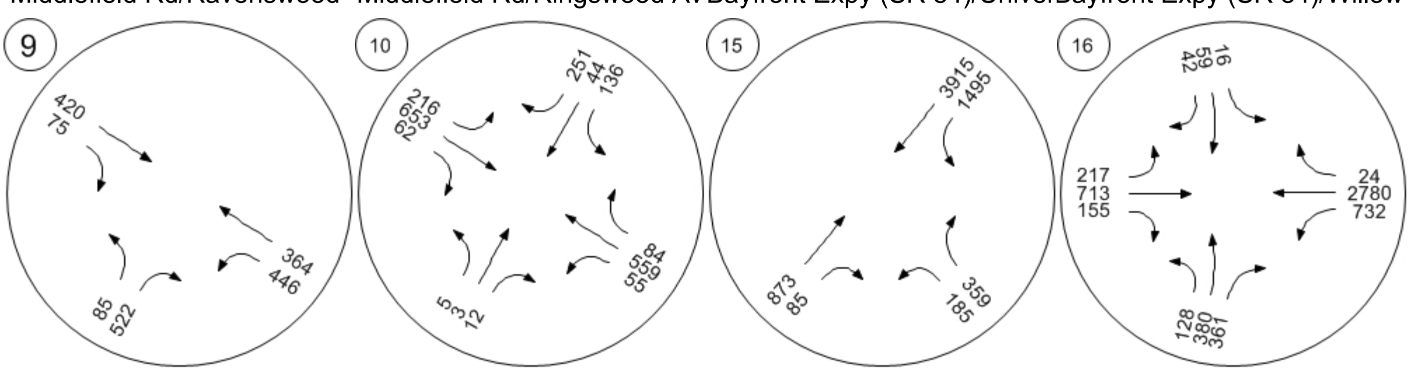


Traffic Volume - Future Total Volume

Marsh Rd (SR 84)/US 101 S | Marsh Rd/Rolison Rd-Scott D | Marsh Rd/Florence St-Bohan | Marsh Rd/Bay Rd

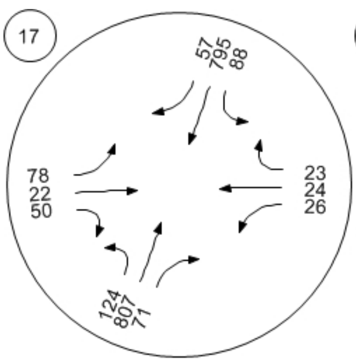


Middlefield Rd/Ravenswood | Middlefield Rd/Ringswood Av | Bayfront Expy (SR 84)/Univer | Bayfront Expy (SR 84)/Willow

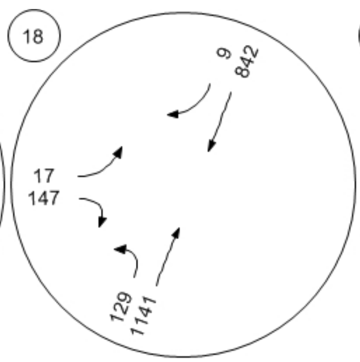


Traffic Volume - Future Total Volume

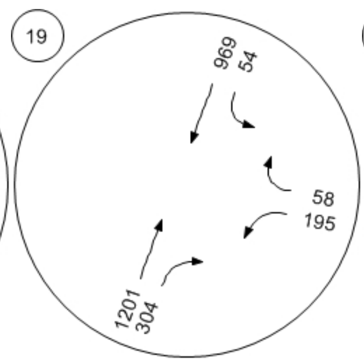
Willow Rd (SR 114)/Hamilton



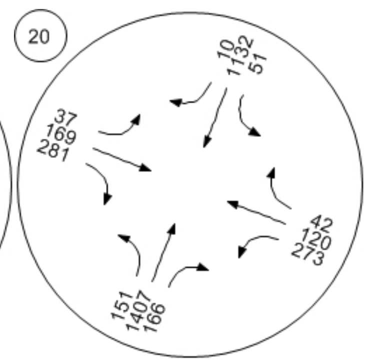
Willow Rd (SR 114)/Ivy Dr



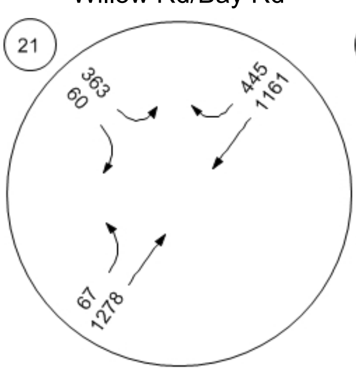
Willow Rd (SR 114)/O'Brien



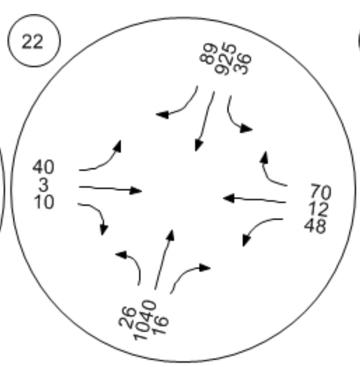
Willow Rd (SR 114)/Newbrid



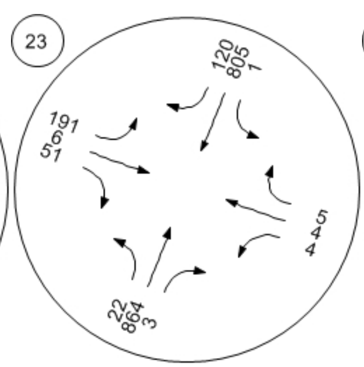
Willow Rd/Bay Rd



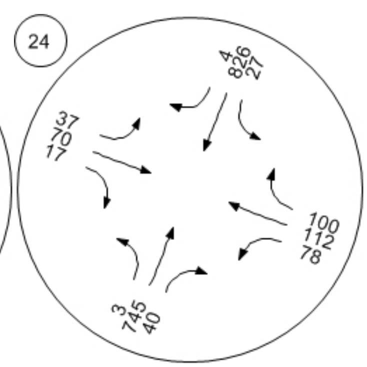
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

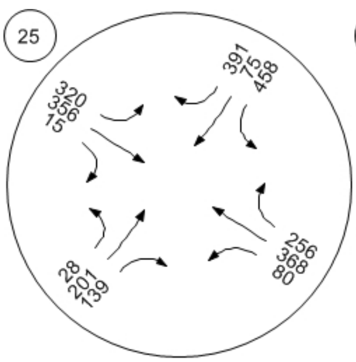


Willow Rd/Gilbert Ave

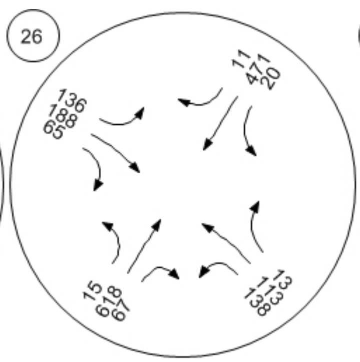


Traffic Volume - Future Total Volume

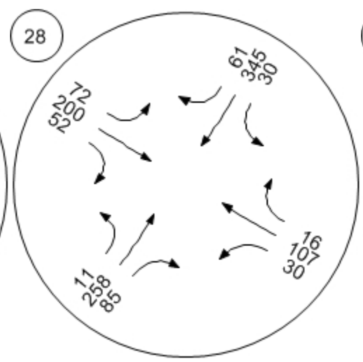
Middlefield Rd-Willow Rd



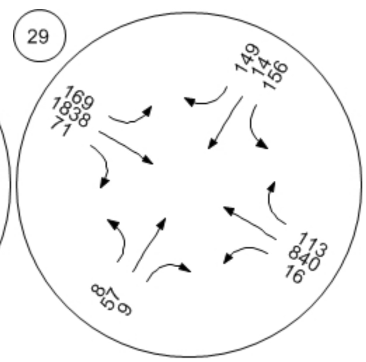
Ravenswood Ave/Laurel St



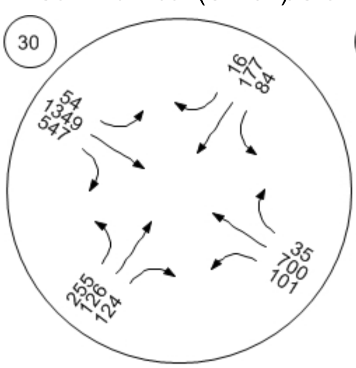
Oak Grove Ave/Laurel St



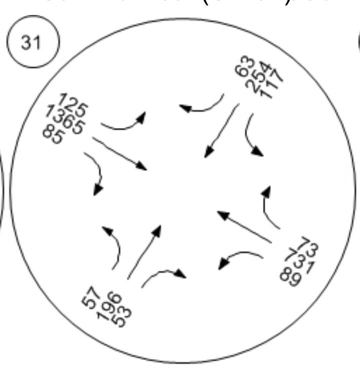
El Camino Real (SR 82)/Enci



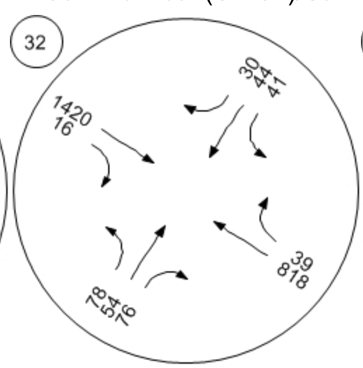
El Camino Real (SR 82)/Glen



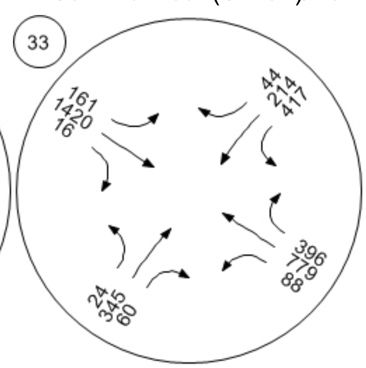
El Camino Real (SR 82)/Oak



El Camino Real (SR 82)/Sant

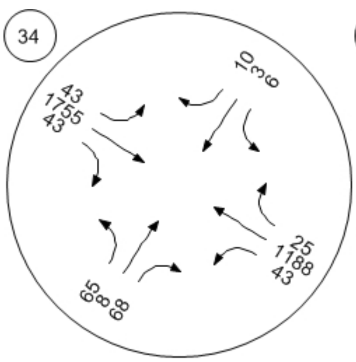


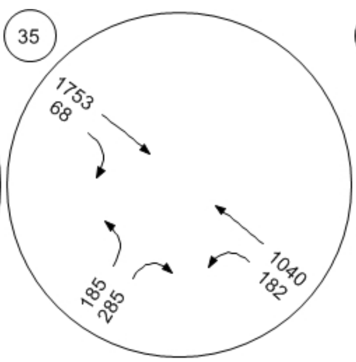
El Camino Real (SR 82)/Rav

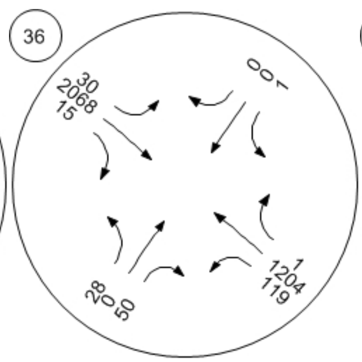


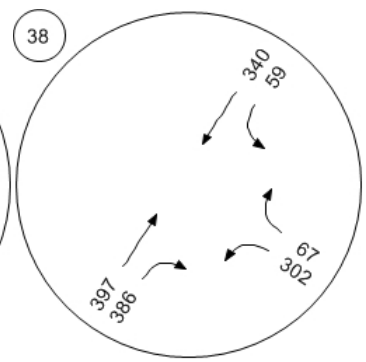
Traffic Volume - Future Total Volume

El Camino Real (SR 82)/Robl El Camino Real (SR 82)/Midd El Camino Real (SR 82)/Cam Santa Cruz Ave/University Dr

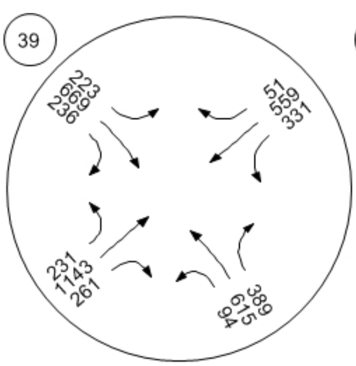


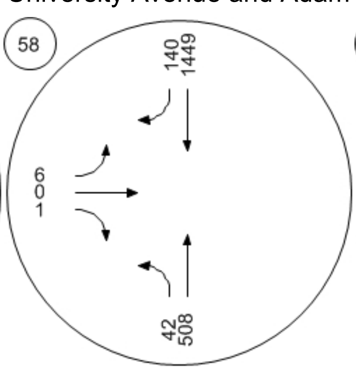


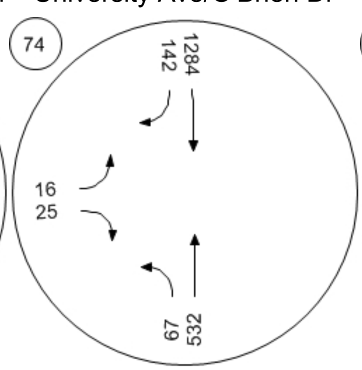


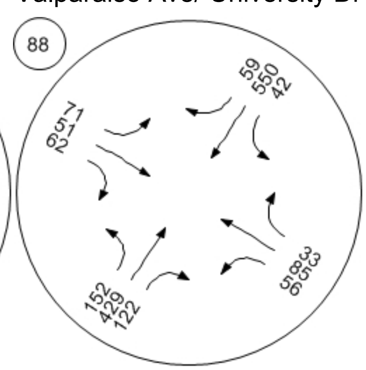


Santa Cruz Ave/Sand Hill Rd University Avenue and Adam University Ave/O'Brien Dr Valparaiso Ave/ University Dr

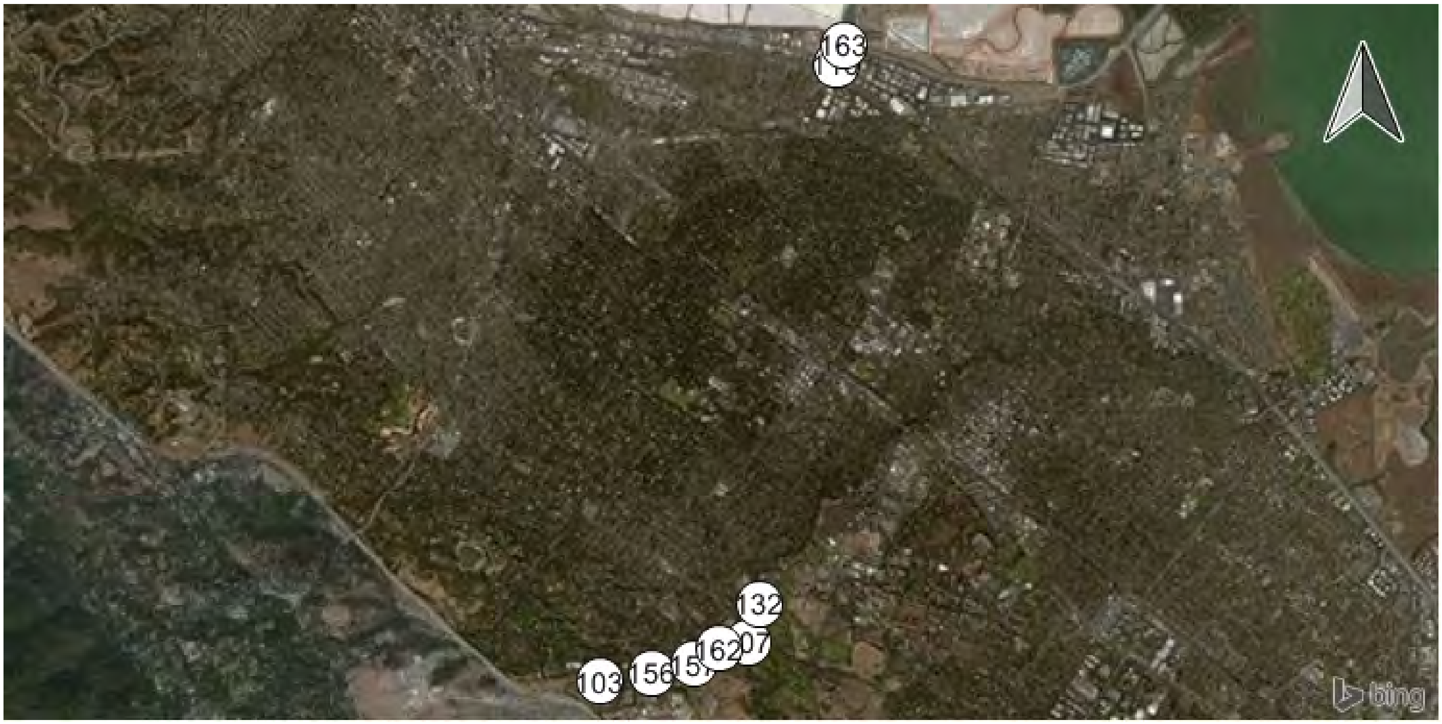


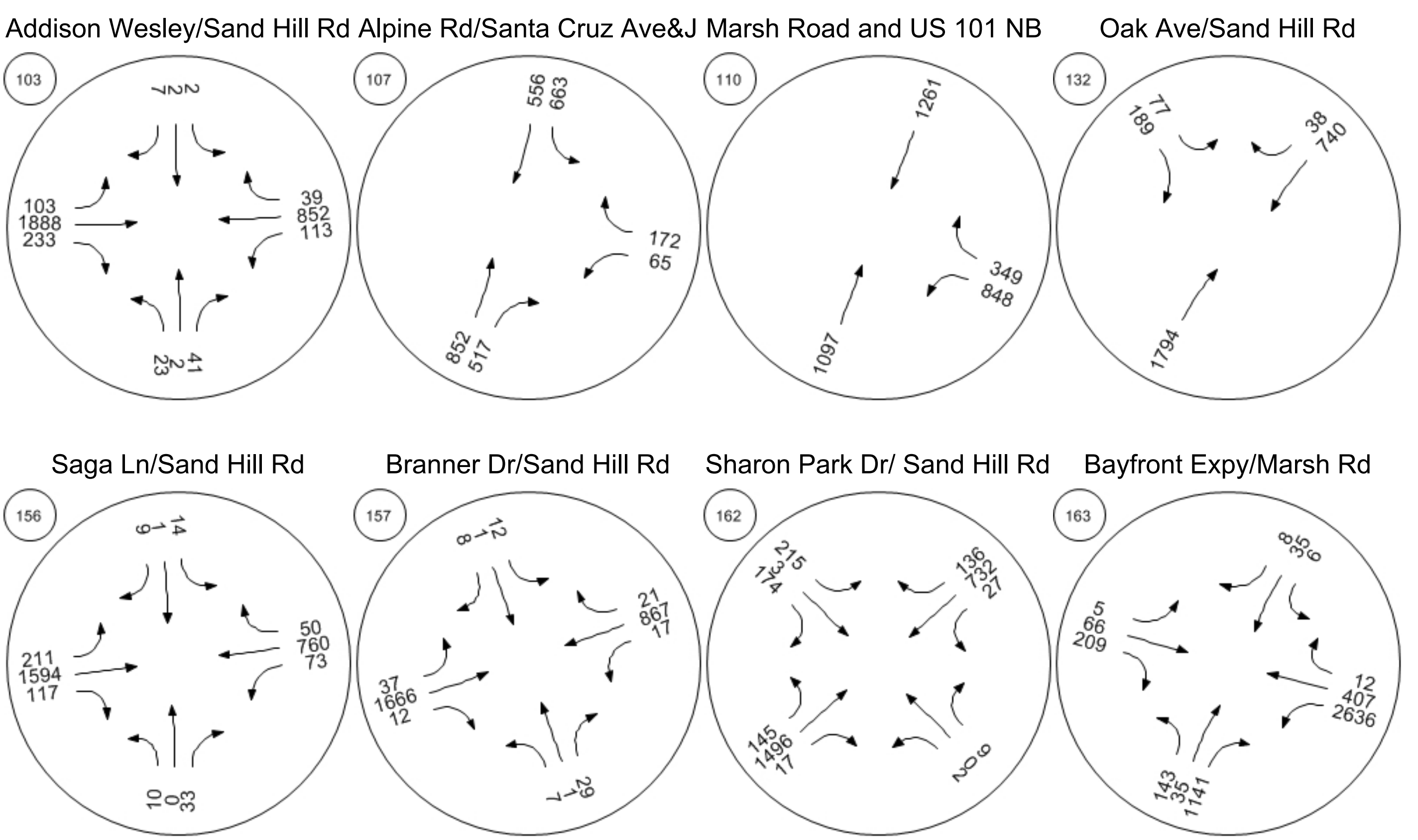






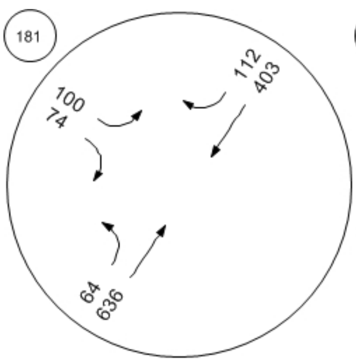
Traffic Volume - Future Total Volume



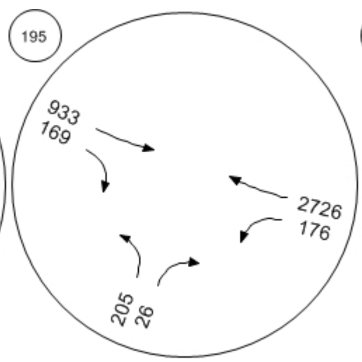


Traffic Volume - Future Total Volume

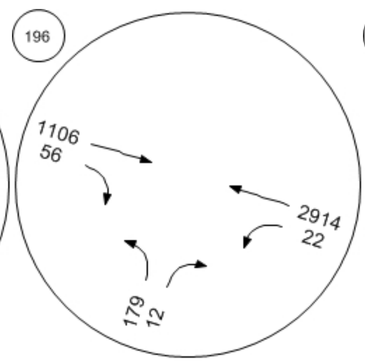
Santa Cruz Ave/Elder Ave



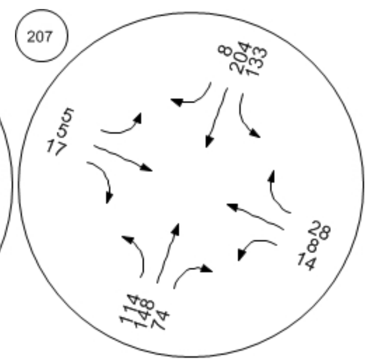
Bayfront Expy/Chilco St



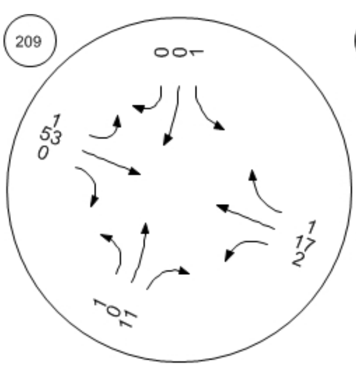
Bayfront Expy/Chrysler Drive



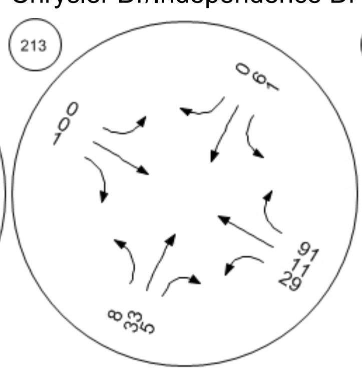
Chilco St/Constitution Dr



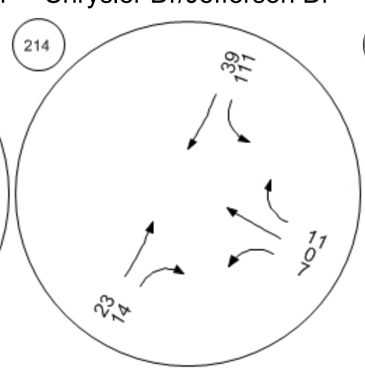
Jefferson Dr/Constitution Dr



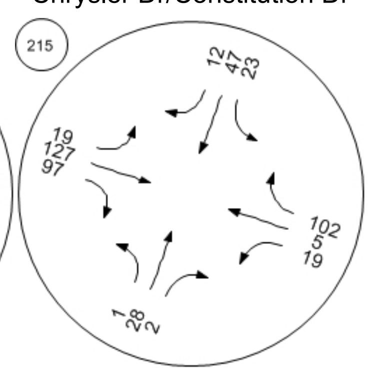
Chrysler Dr/Independence Dr



Chrysler Dr/Jefferson Dr

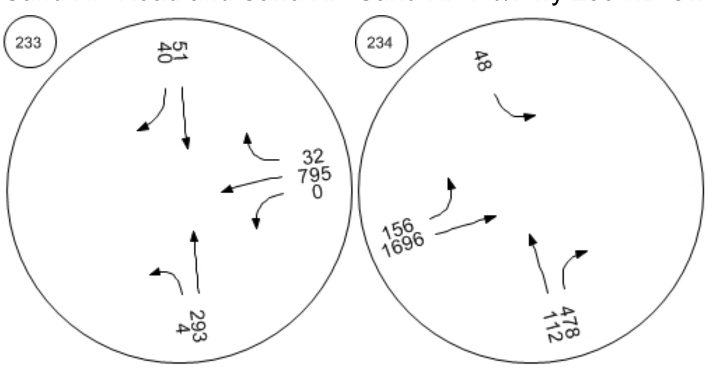


Chrysler Dr/Constitution Dr



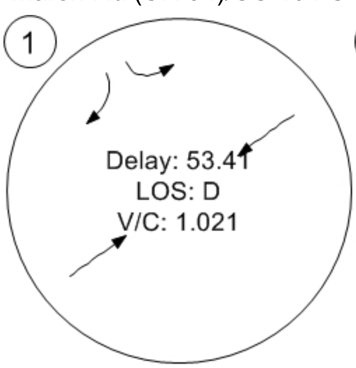
Traffic Volume - Future Total Volume

Sand Hill Road and Sand Hill Sand Hill Rd/Hwy 280 NB Off

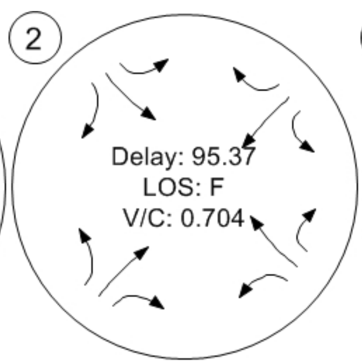


Traffic Conditions

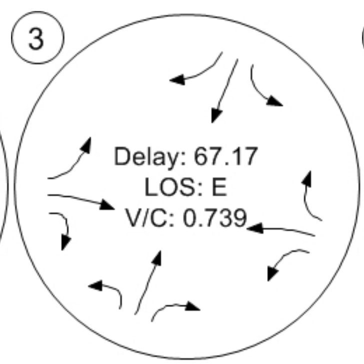
Marsh Rd (SR 84)/US 101 S



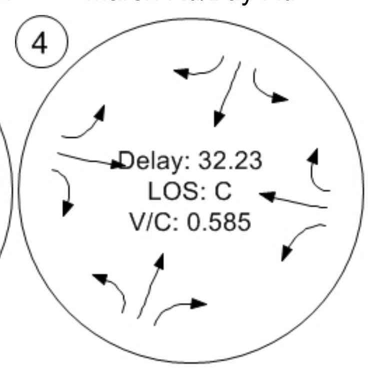
Marsh Rd/Rolison Rd-Scott D



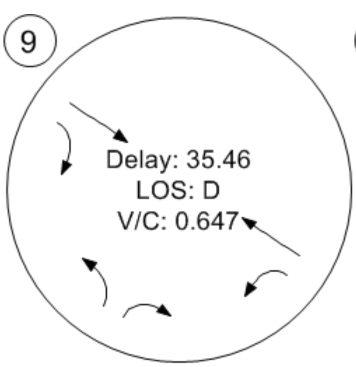
Marsh Rd/Florence St-Bohan



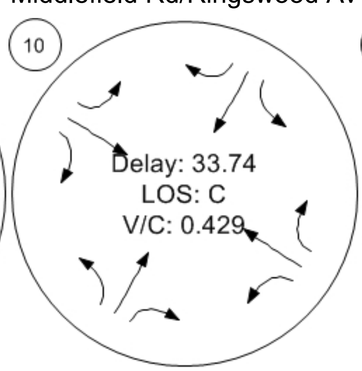
Marsh Rd/Bay Rd



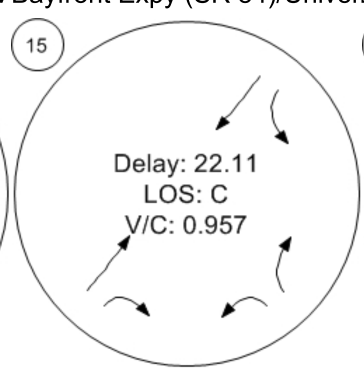
Middlefield Rd/Ravenswood



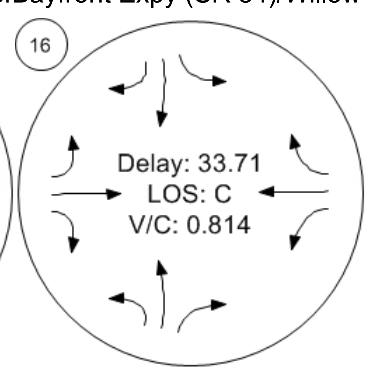
Middlefield Rd/Ringswood Av



Bayfront Expy (SR 84)/Univer

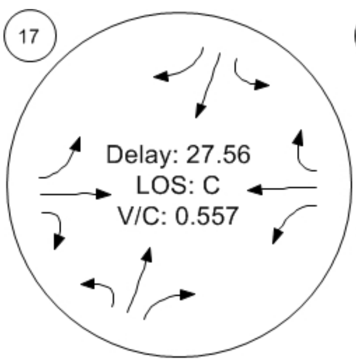


Bayfront Expy (SR 84)/Willow

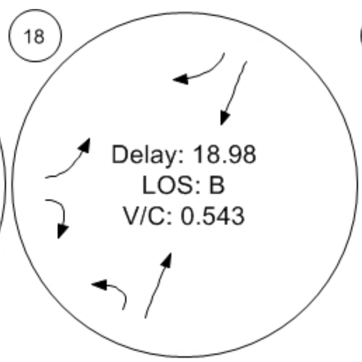


Traffic Conditions

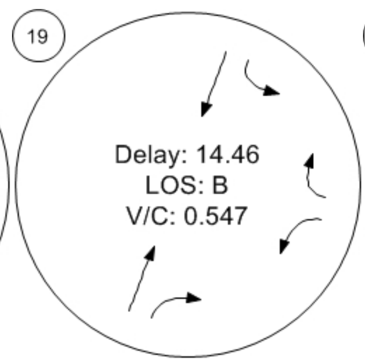
Willow Rd (SR 114)/Hamilton



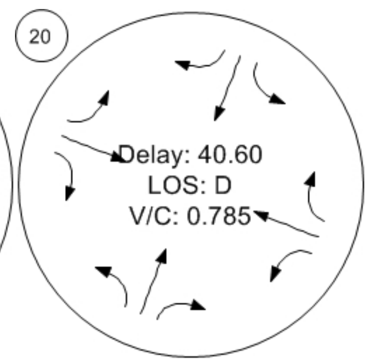
Willow Rd (SR 114)/Ivy Dr



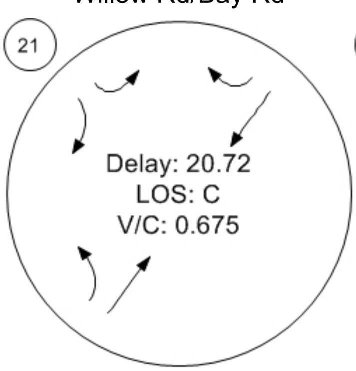
Willow Rd (SR 114)/O'Brien



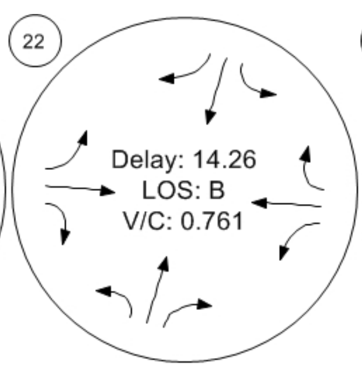
Willow Rd (SR 114)/Newbrid



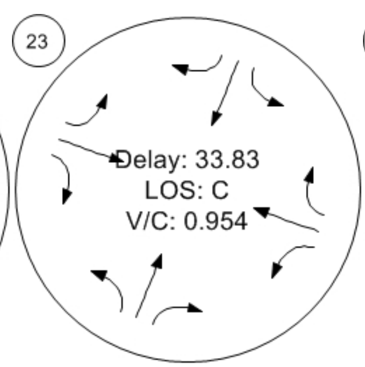
Willow Rd/Bay Rd



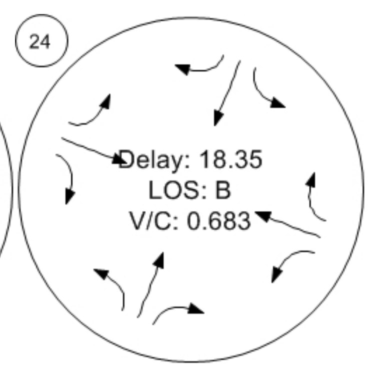
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

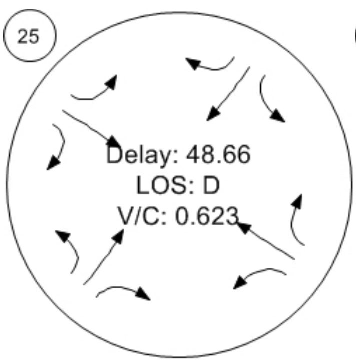


Willow Rd/Gilbert Ave

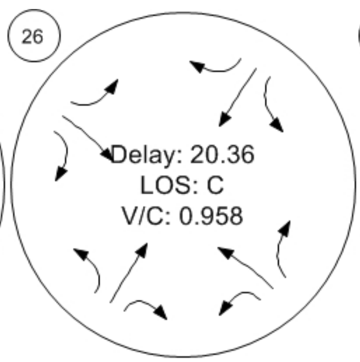


Traffic Conditions

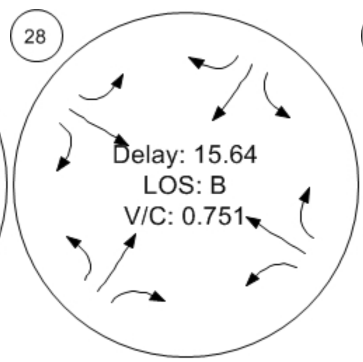
Middlefield Rd-Willow Rd



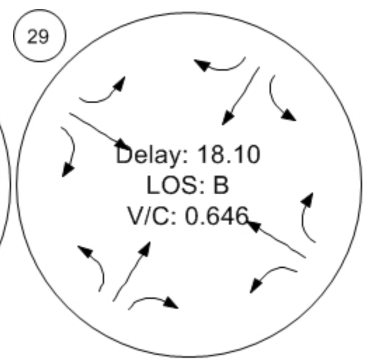
Ravenswood Ave/Laurel St



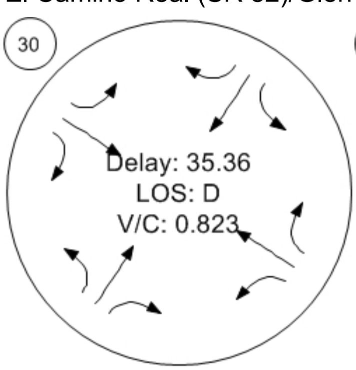
Oak Grove Ave/Laurel St



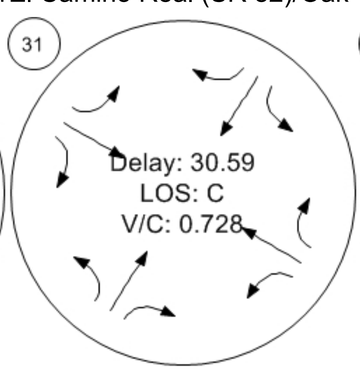
El Camino Real (SR 82)/Enci



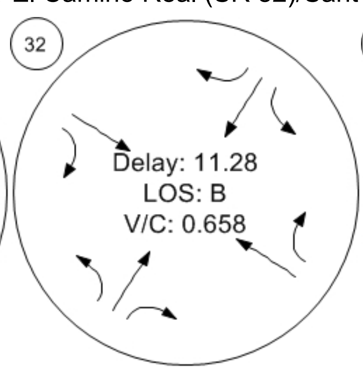
El Camino Real (SR 82)/Glen



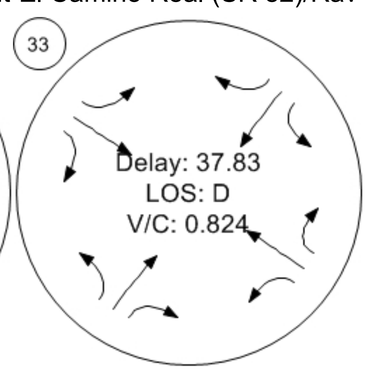
El Camino Real (SR 82)/Oak



El Camino Real (SR 82)/Sant

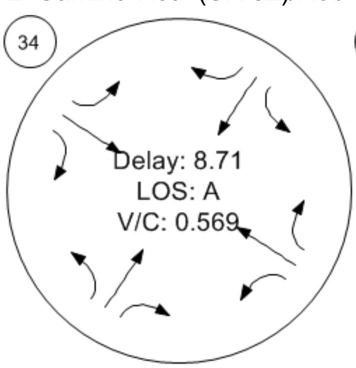


El Camino Real (SR 82)/Rav

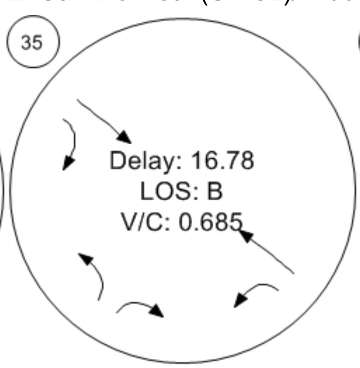


Traffic Conditions

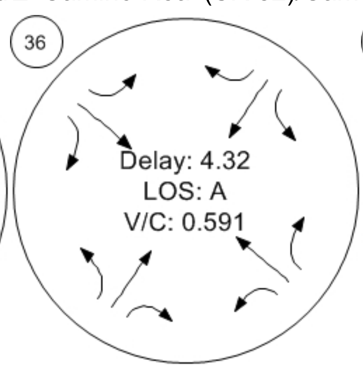
El Camino Real (SR 82)/Robl



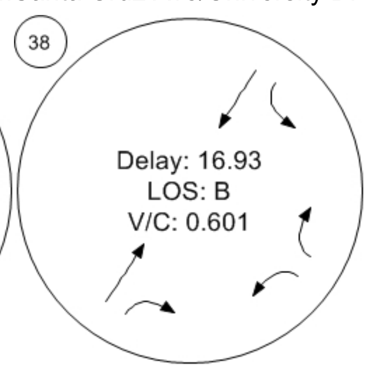
El Camino Real (SR 82)/Midd



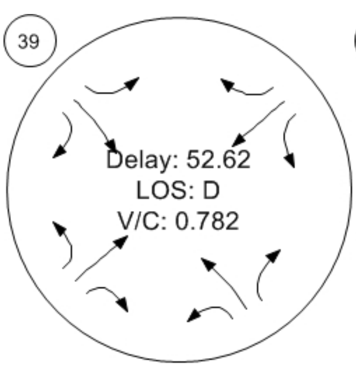
El Camino Real (SR 82)/Cam



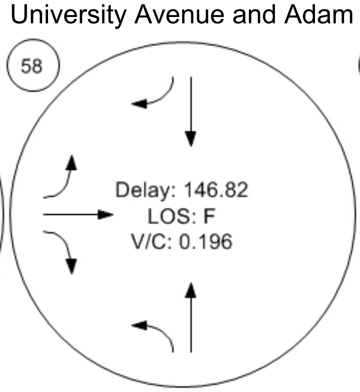
Santa Cruz Ave/University Dr



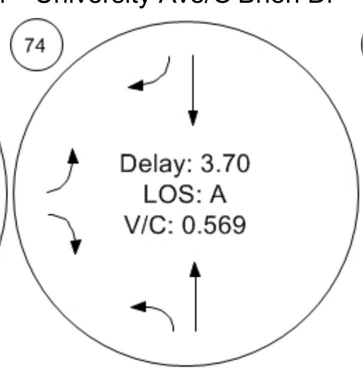
Santa Cruz Ave/Sand Hill Rd



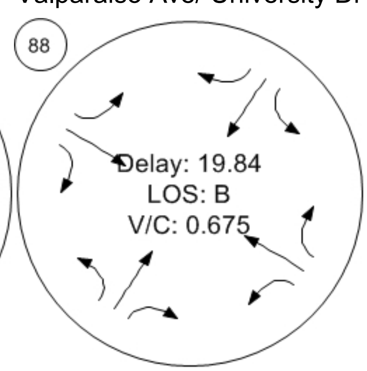
University Avenue and Adam



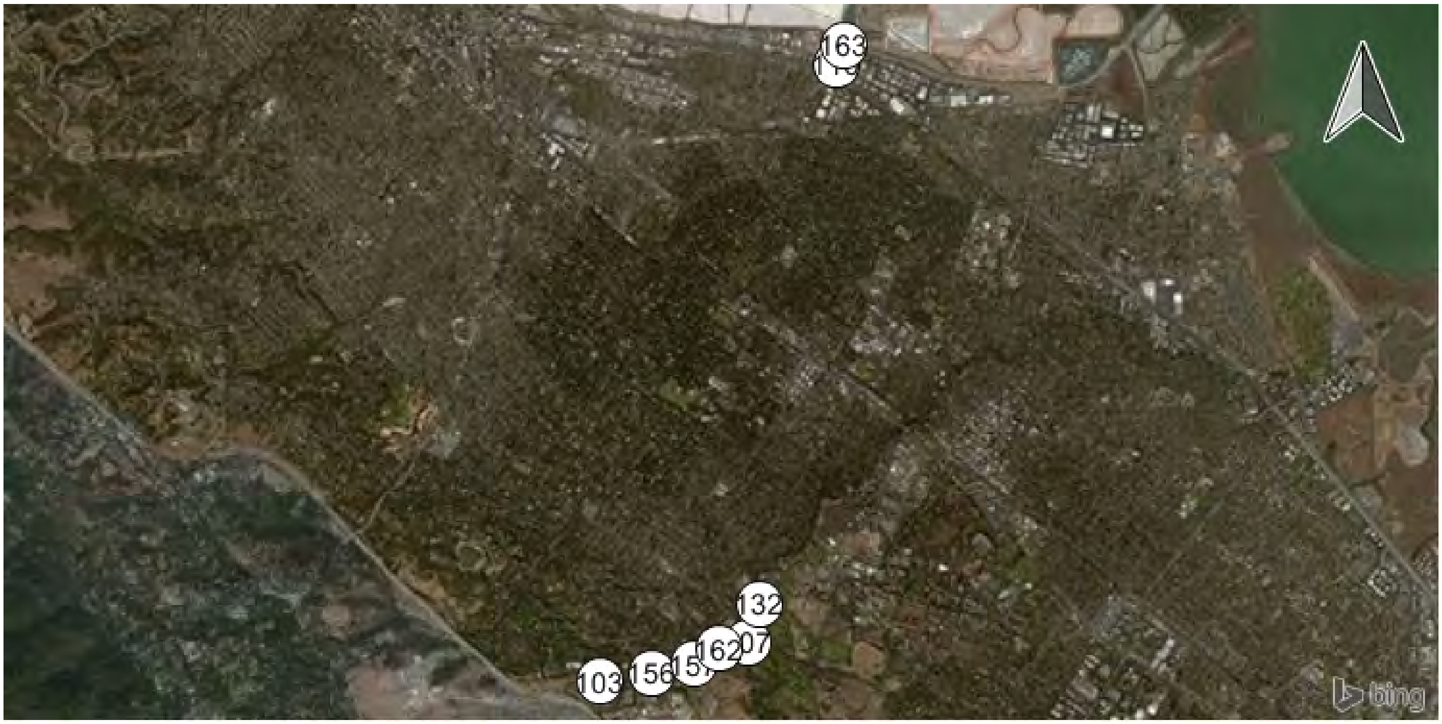
University Ave/O'Brien Dr



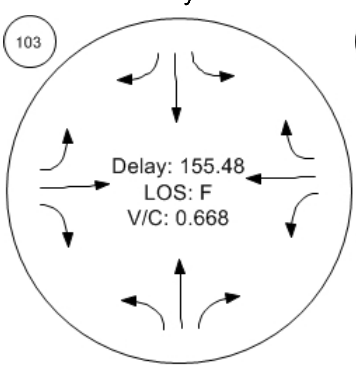
Valparaiso Ave/ University Dr



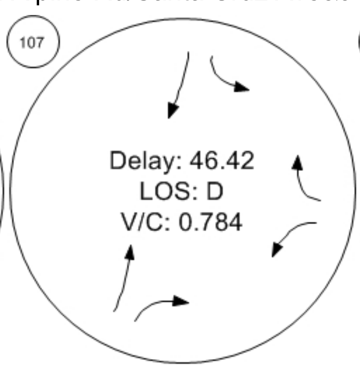
Traffic Conditions



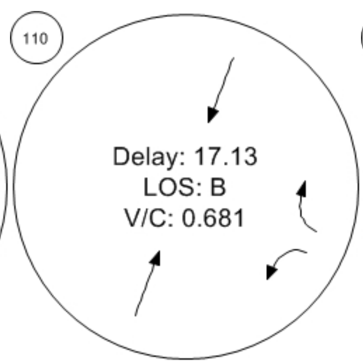
Addison Wesley/Sand Hill Rd



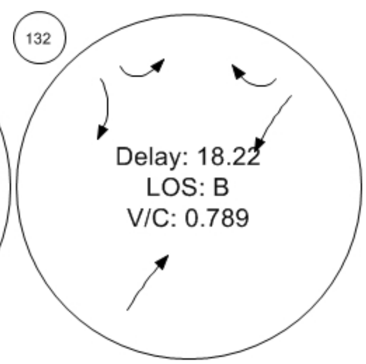
Alpine Rd/Santa Cruz Ave&J



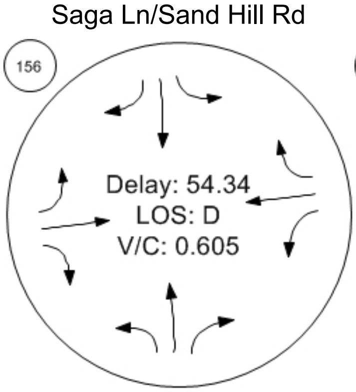
Marsh Road and US 101 NB



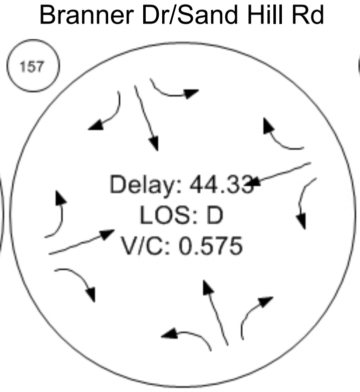
Oak Ave/Sand Hill Rd



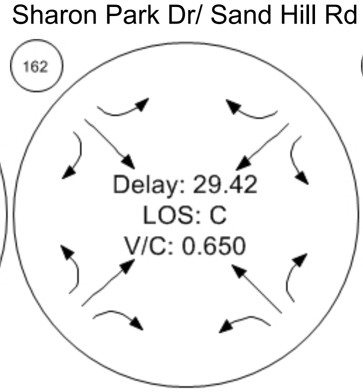
Saga Ln/Sand Hill Rd



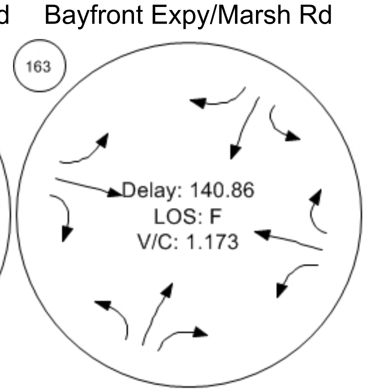
Branner Dr/Sand Hill Rd



Sharon Park Dr/ Sand Hill Rd

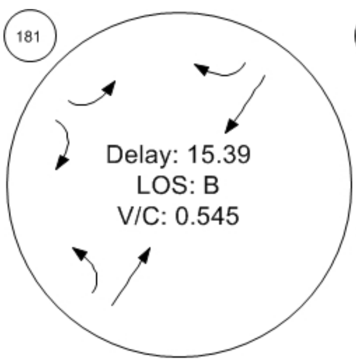


Bayfront Expy/Marsh Rd

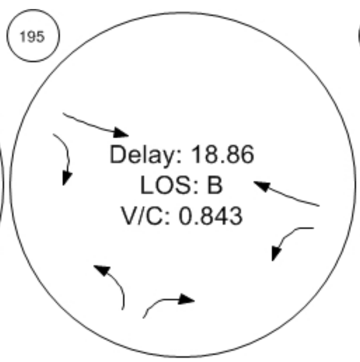


Traffic Conditions

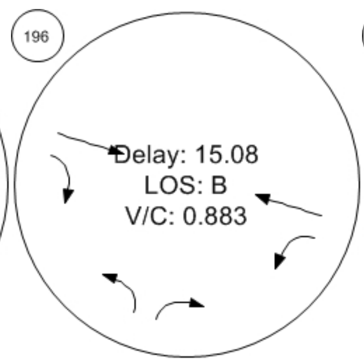
Santa Cruz Ave/Elder Ave



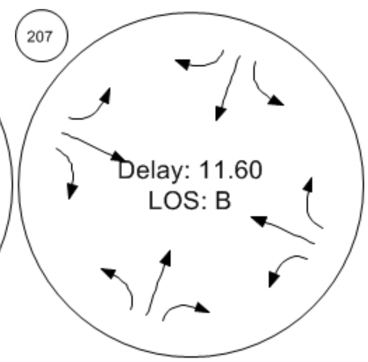
Bayfront Expy/Chilco St



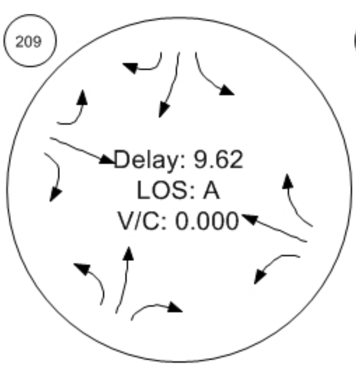
Bayfront Expy/Chrysler Drive



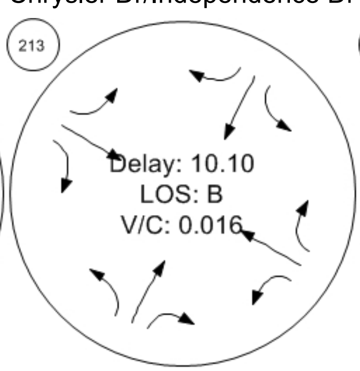
Chilco St/Constitution Dr



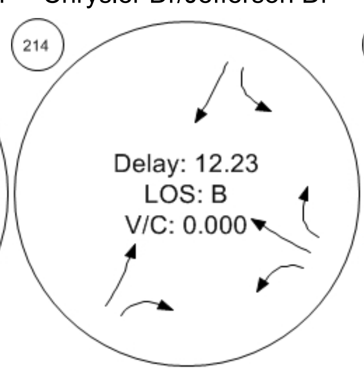
Jefferson Dr/Constitution Dr



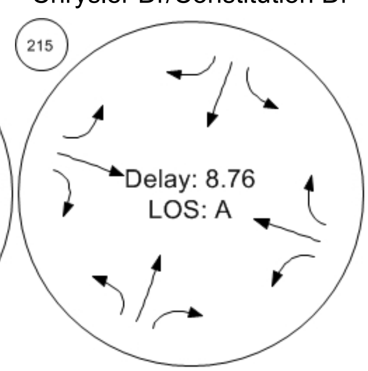
Chrysler Dr/Independence Dr



Chrysler Dr/Jefferson Dr

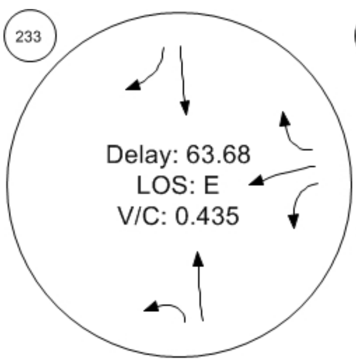


Chrysler Dr/Constitution Dr

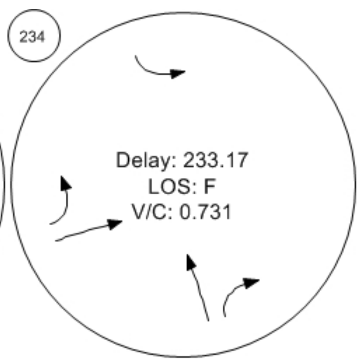


Traffic Conditions

Sand Hill Road and Sand Hill



Sand Hill Rd/Hwy 280 NB Off



Menlo Park GP Circulation Update

Vistro File: J:\...\Menlo Park PM_update.vistro | Scenario 1: Existing PM

Report File: J:\...\Menlo Park_PM Results.pdf | 1/9/2015

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM2000	SWBT	1.000	25.5	C
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM2000	SWBT	0.558	68.3	E
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM2000	SBR	0.699	79.4	E
4	Marsh Rd/Bay Rd	Signalized	HCM2000	WBR	0.584	26.2	C
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM2000	NWBL	0.628	139.1	F
10	Middlefield Rd/Ringwood Ave	Signalized	HCM2000	SEBL	0.637	110.3	F
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM2000	NEBT	1.217	119.7	F
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM2000	SBL	0.901	48.4	D
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM2000	EBL	0.665	29.2	C
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM2000	EBR	0.552	14.4	B
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM2000	SBL	0.568	16.1	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM2000	WBT	0.771	42.2	D
21	Willow Rd/Bay Rd	Signalized	HCM2000	SEBL	0.813	27.0	C
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM2000	EBL	0.686	22.3	C
23	Willow Rd/Coleman Ave	Signalized	HCM2000	EBL	0.644	14.1	B
24	Willow Rd/Gilbert Ave	Signalized	HCM2000	WBL	0.574	25.6	C
25	Middlefield Rd-Willow Rd	Signalized	HCM2000	NEBR	0.561	46.8	D
26	Ravenswood Ave/Laurel St	Signalized	HCM2000	NWBL	0.972	23.0	C
28	Oak Grove Ave/Laurel St	Signalized	HCM2000	NWBT	0.716	15.4	B
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM2000	SEBL	0.782	19.5	B
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM2000	SEBL	0.855	38.6	D

	Ave						
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM2000	SWBL	0.755	31.9	C
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM2000	SWBT	0.730	13.7	B
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM2000	SEBL	0.872	44.6	D
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM2000	NEBL	0.586	10.4	B
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM2000	NEBL	0.682	19.5	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM2000	NEBL	0.622	10.4	B
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM2000	SWBL	0.619	19.2	B
39	Sand Hill Rd/Santa Cruz Ave	Signalized	HCM2000	SEBL	0.709	49.9	D
58	University Avenue and Adams Drive	Two-way stop	HCM2000	EBT	0.000	87.6	F
74	University Ave/O'Brien Dr	Signalized	HCM2000	NBL	0.710	9.7	A
88	Valparaiso Ave/ University Dr	Signalized	HCM2000	NWBL	0.731	31.5	C
103	Addison Wesley/Sand Hill Rd	Signalized	HCM2000	WBT	0.650	81.9	F
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM2000	NEBT	0.732	51.3	D
110	Marsh Road/101 NB Ramps	Signalized	HCM2000	NBT	0.851	49.8	D
132	Oak Ave/Sand Hill Rd	Signalized	HCM2000	SEBR	0.556	6.2	A
156	Saga Ln/Sand Hill Rd	Signalized	HCM2000	WBT	0.516	35.2	D
157	Branner Dr/Sand Hill Rd	Signalized	HCM2000	EBL	0.451	21.0	C
162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM2000	SWBT	0.684	51.3	D
163	Bayfront Expy/Marsh Rd	Signalized	HCM2000	NBR	0.964	320.4	F
181	Santa Cruz Ave/Elder Ave	Signalized	HCM2000	SEBR	0.514	10.0	A
195	Bayfront Expy/Chilco St	Signalized	HCM2000	NBR	0.701	12.7	B
196	Bayfront Expy/Chrysler Drive	Signalized	HCM2000	WBL	0.795	21.6	C
207	Chilco St/Constitution Dr	All-way stop	HCM2000	NWBR		23.6	C
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM2000	SBL	0.037	15.5	C
213	Chrysler Dr/Independence Dr	Two-way stop	HCM2000	SEBT	0.004	10.0	A
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM2000	NWBL	0.002	10.4	B
215	Chrysler Dr/Constitution Dr	All-way stop	HCM2000	EBT		14.4	B

233	Sand Hill Circle/Sand Hill Road	Signalized	HCM2000	WBT	0.712	361.8	F
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM2000	NBR	0.360	31.3	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value; for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
#1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	25.5
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.000

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	no		yes		no	

Volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	980	893	279	1547	401
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.70	2.15	3.60	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	980	893	279	1547	401
Peak Hour Factor	1.0000	0.9600	0.9600	1.0000	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	255	233	70	403	104
Total Analysis Volume [veh/h]	0	1021	930	279	1611	418
Presence of On-Street Parking		no	no		no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	55.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal Group	0	2	6	0	4	1
Auxiliary Signal Groups						1,2,4
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	41	33	0	59	8
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	16	0	22	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		yes	yes		no	no
Maximum Recall		no	no		no	no
Pedestrian Recall		no	no		no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	39	31	57	97
g / C, Green / Cycle	0.39	0.31	0.57	0.97
(v / s)_i Volume / Saturation Flow Rate	0.26	0.26	0.48	0.26
Total Saturation Flow Adjustment	1.05	0.93	0.89	0.85
s, saturation flow rate [veh/h]	4000	3522	3384	1607
c, Capacity [veh/h]	1560	1092	1929	1559
d1, Uniform Delay [s]	24.98	32.34	17.65	0.06
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.16	8.41	4.47	0.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.65	0.85	0.84	0.27
d, Delay for Lane Group [s/veh]	27.14	40.75	22.11	0.48
Lane Group LOS	C	D	C	A
Critical Lane Group	no	yes	yes	yes
50th-Percentile Queue Length [veh]	14.12	16.30	23.90	1.08
50th-Percentile Queue Length [ft]	353.05	407.49	597.59	27.07
95th-Percentile Queue Length [veh]	23.43	26.70	38.45	2.60
95th-Percentile Queue Length [ft]	585.83	667.62	961.16	65.12

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	27.14	40.75	0.00	22.11	0.48
Movement LOS		C	D		C	A
d_A, Approach Delay [s/veh]	27.14		40.75		17.66	
Approach LOS	C		D		B	
d_I, Intersection Delay [s/veh]	25.49					
Intersection LOS	C					
Intersection V/C	1.000					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	68.3
Analysis Method:	HCM2000	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.558

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Base Volume Input [veh/h]	29	1083	4	66	1014	203	27	9	467	229	13	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	2.40	0.00	4.50	1.50	2.50	3.70	0.00	1.70	1.30	7.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	326	0	0	0
Total Hourly Volume [veh/h]	29	1083	4	66	1014	203	27	9	141	229	13	1
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	276	1	17	259	52	7	2	36	58	3	0
Total Analysis Volume [veh/h]	30	1105	4	67	1035	207	28	9	144	234	13	1
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	27.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal Group	5	2	0	1	6	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	4	10	0	0	6	0	0	4	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.2	0.0	0.0	3.2	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	14	50	0	12	48	0	0	41	0	0	37	0
Vehicle Extension [s]	2.5	3.5	0.0	2.0	3.5	0.0	0.0	2.5	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	21	0	0	21	0	0	28	0	0	24	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	yes		no	yes			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	12	48	10	46	39	39	35	35
g / C, Green / Cycle	0.09	0.34	0.07	0.33	0.28	0.28	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.02	0.22	0.02	0.36	0.02	0.05	0.13	0.01
Total Saturation Flow Adjustment	0.92	0.89	0.88	0.91	0.96	0.74	0.94	0.92
s, saturation flow rate [veh/h]	1746	5052	3354	3468	1831	2811	1782	1745
c, Capacity [veh/h]	150	1732	240	1140	510	783	445	436
d1, Uniform Delay [s]	59.54	38.73	61.59	47.00	37.18	38.40	45.33	39.69
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.99	1.83	2.89	54.65	0.28	0.52	4.38	0.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

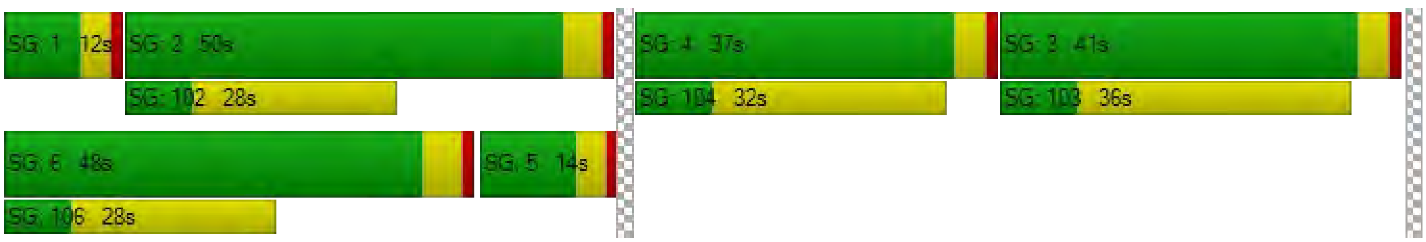
X, volume / capacity	0.20	0.64	0.28	1.09	0.07	0.18	0.53	0.03
d, Delay for Lane Group [s/veh]	62.53	40.56	64.48	101.65	37.46	38.92	49.71	39.83
Lane Group LOS	E	D	E	F	D	D	D	D
Critical Lane Group	yes	no	no	yes	no	yes	yes	no
50th-Percentile Queue Length [veh]	1.19	15.22	1.41	38.73	1.14	2.60	8.80	0.44
50th-Percentile Queue Length [ft]	29.70	380.58	35.23	968.16	28.38	65.08	220.02	11.01
95th-Percentile Queue Length [veh]	2.84	25.08	3.32	61.98	2.72	5.71	15.60	1.11
95th-Percentile Queue Length [ft]	70.93	627.05	82.94	1549.48	68.03	142.79	389.88	27.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.53	40.56	40.56	64.48	101.65	101.65	37.46	37.46	38.92	49.71	39.83	39.83
Movement LOS	E	D	D	E	F	F	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	41.14			99.74			38.62			49.15		
Approach LOS	D			F			D			D		
d_I, Intersection Delay [s/veh]	68.34											
Intersection LOS	E											
Intersection V/C	0.558											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

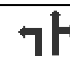


Intersection Level Of Service Report

#3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	79.4
Analysis Method:	HCM2000	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.699

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Base Volume Input [veh/h]	185	720	84	30	697	377	475	15	130	98	41	72
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	3.20	6.00	6.70	2.20	4.00	2.50	0.00	0.80	4.10	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	174	0	0	0
Total Hourly Volume [veh/h]	185	720	84	30	697	377	475	15	0	98	41	72
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	198	23	8	191	104	130	4	0	27	11	20
Total Analysis Volume [veh/h]	203	791	92	33	766	414	522	16	0	108	45	79
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	16			1			7			3		
Bicycle Volume [bicycles/h]	3			1			1			4		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	31.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal Group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	22	55	55	12	45	45	37	36	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	19	19	0	16	16	25	25	25	0	25	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	yes		no	yes			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	20	53	10	43	34	34	35	35
g / C, Green / Cycle	0.14	0.38	0.07	0.31	0.24	0.24	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.12	0.26	0.02	0.35	0.16	0.00	0.06	0.07
Total Saturation Flow Adjustment	0.93	0.91	0.89	0.88	0.91	0.84	0.91	0.90
s, saturation flow rate [veh/h]	1758	3446	1692	3329	3450	1602	1734	1703
c, Capacity [veh/h]	251	1304	121	1023	838	389	433	426
d1, Uniform Delay [s]	58.14	36.35	61.56	48.50	47.54	40.13	41.99	42.47
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	23.73	2.84	5.50	80.62	3.77	0.00	1.37	1.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

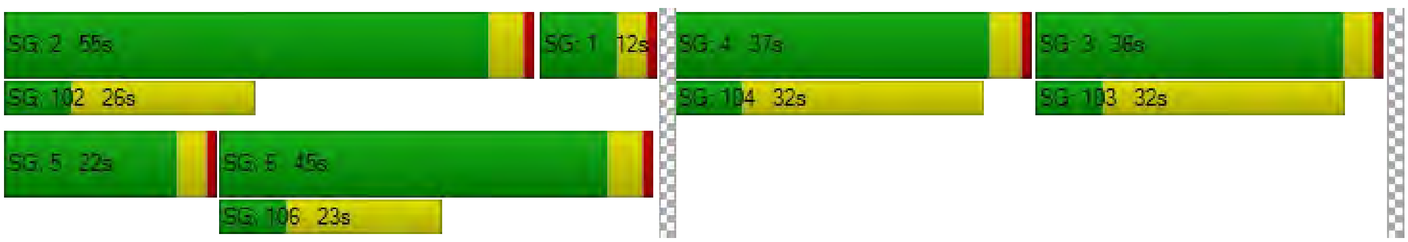
X, volume / capacity	0.81	0.68	0.27	1.15	0.64	0.00	0.25	0.29
d, Delay for Lane Group [s/veh]	81.88	39.18	67.06	129.12	51.31	40.13	43.36	44.20
Lane Group LOS	F	D	E	F	D	D	D	D
Critical Lane Group	yes	no	no	yes	yes	no	no	yes
50th-Percentile Queue Length [veh]	9.55	17.38	1.35	39.50	11.32	0.00	3.64	4.25
50th-Percentile Queue Length [ft]	238.71	434.47	33.67	987.57	282.99	0.00	91.12	106.23
95th-Percentile Queue Length [veh]	16.69	28.34	3.18	63.22	19.29	0.00	7.59	8.62
95th-Percentile Queue Length [ft]	417.29	708.59	79.60	1580.48	482.20	0.00	189.75	215.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	81.88	39.18	39.18	67.06	129.12	129.12	51.31	51.31	40.13	43.36	44.20	44.20
Movement LOS	F	D	D	E	F	F	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	47.16			127.43			51.31			43.81		
Approach LOS	D			F			D			D		
d_I, Intersection Delay [s/veh]	79.36											
Intersection LOS	E											
Intersection V/C	0.699											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	26.2
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.584

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	no			yes			yes			no		

Volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	2	681	108	194	841	54	45	29	6	84	18	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.30	0.90	1.00	1.00	0.00	2.20	6.90	0.00	1.20	0.00	2.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	681	108	194	841	54	45	29	6	84	18	143
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	193	31	55	239	15	13	8	2	24	5	41
Total Analysis Volume [veh/h]	2	774	123	220	956	61	51	33	7	95	20	163
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			7			7			0		
Bicycle Volume [bicycles/h]	1			7			7			11		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	33.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	107	74	107	33	107	74	33	33	33	0	33	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	3.6	3.6	3.6	0.0	3.6	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no		no	no			no			no	
Maximum Recall		yes		no	yes			no			no	
Pedestrian Recall		no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	72	31	105	31	31
g / C, Green / Cycle	0.51	0.22	0.75	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.27	0.12	0.29	0.08	0.19
Total Saturation Flow Adjustment	0.87	0.94	0.93	0.60	0.77
s, saturation flow rate [veh/h]	3304	1787	3548	1137	1472
c, Capacity [veh/h]	1699	396	2661	252	326
d1, Uniform Delay [s]	22.69	48.39	6.13	46.12	52.31
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.18	5.54	0.42	3.99	23.60
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

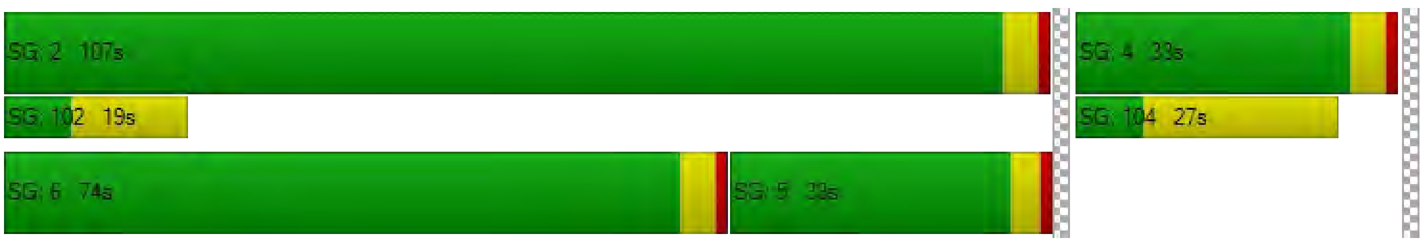
X, volume / capacity	0.53	0.56	0.38	0.36	0.85
d, Delay for Lane Group [s/veh]	23.87	53.93	6.55	50.11	75.91
Lane Group LOS	C	D	A	D	E
Critical Lane Group	yes	yes	no	no	yes
50th-Percentile Queue Length [veh]	13.82	8.57	8.48	3.32	13.18
50th-Percentile Queue Length [ft]	345.50	214.28	212.08	83.12	329.52
95th-Percentile Queue Length [veh]	22.98	15.26	15.13	7.03	22.03
95th-Percentile Queue Length [ft]	574.58	381.44	378.20	175.74	550.84

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	23.87	23.87	23.87	53.93	6.55	6.55	50.11	50.11	50.11	75.91	75.91	75.91
Movement LOS	C	C	C	D	A	A	D	D	D	E	E	E
d_A, Approach Delay [s/veh]	23.87			14.98			50.11			75.91		
Approach LOS	C			B			D			E		
d_I, Intersection Delay [s/veh]	26.21											
Intersection LOS	C											
Intersection V/C	0.584											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	139.1
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.628

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		no	

Volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	199	610	457	673	357	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.10	1.30	0.60	1.40	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	199	0	457	673	357	60
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	0	120	177	94	16
Total Analysis Volume [veh/h]	209	0	481	708	376	63
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6		13		0	
Bicycle Volume [bicycles/h]	9		26		13	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	10	10	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	80	53	27	80	53	0
Vehicle Extension [s]	2.5	3.6	3.0	3.6	3.6	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	12	12	0	12	12	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no		no	no	no	
Maximum Recall	no		no	yes	yes	
Pedestrian Recall	no		no	no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	78	78	25	78	51
g / C, Green / Cycle	0.49	0.49	0.16	0.49	0.32
(v / s)_i Volume / Saturation Flow Rate	0.12	0.00	0.27	0.37	0.24
Total Saturation Flow Adjustment	0.93	0.83	0.94	0.99	0.96
s, saturation flow rate [veh/h]	1770	1582	1782	1889	1832
c, Capacity [veh/h]	863	771	278	921	584
d1, Uniform Delay [s]	23.83	21.01	67.50	33.61	48.83
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.67	0.00	342.14	6.14	8.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

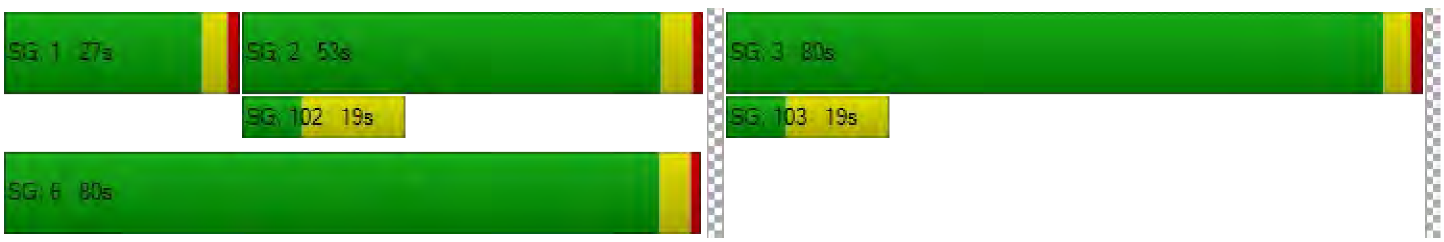
X, volume / capacity	0.24	0.00	1.73	0.77	0.75
d, Delay for Lane Group [s/veh]	24.49	21.01	409.64	39.76	57.49
Lane Group LOS	C	C	F	D	E
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	5.89	0.00	48.26	30.38	20.52
50th-Percentile Queue Length [ft]	147.20	0.00	1206.56	759.40	513.00
95th-Percentile Queue Length [veh]	11.23	0.00	77.22	48.67	33.17
95th-Percentile Queue Length [ft]	280.85	0.00	1930.58	1216.79	829.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.49	21.01	409.64	39.76	57.49	57.49
Movement LOS	C	C	F	D	E	E
d_A, Approach Delay [s/veh]	24.49		189.39		57.49	
Approach LOS	C		F		E	
d_I, Intersection Delay [s/veh]	139.11					
Intersection LOS	F					
Intersection V/C	0.628					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#10: Middlefield Rd/Ringwood Ave

Control Type:	Signalized	Delay (sec / veh):	110.3
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.637

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	58	70	38	63	1	272	10	775	97	379	568	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	0.00	0.00	0.00	0.00	2.20	0.00	1.70	0.00	2.10	1.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	8	0	0	57	0	0	0
Total Hourly Volume [veh/h]	58	70	38	63	1	264	10	775	40	379	568	5
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	18	10	17	0	69	3	204	11	100	149	1
Total Analysis Volume [veh/h]	61	74	40	66	1	278	11	816	42	399	598	5
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			14			5			0		
Bicycle Volume [bicycles/h]	14			14			17			16		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	58.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	2	8	2	6	8	6	5	2	8	1	6	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.5	3.6	3.2	3.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	53	25	53	80	25	80	55	53	25	27	80	0
Vehicle Extension [s]	3.6	2.9	3.6	3.6	2.9	3.6	3.0	3.6	2.9	3.0	3.6	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	21	12	12	21	12	0	12	21	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	yes		no	yes	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	23	23	23	23	53	51	51	25	78
g / C, Green / Cycle	0.14	0.14	0.14	0.14	0.33	0.31	0.31	0.15	0.48
(v / s)_i Volume / Saturation Flow Rate	0.05	0.06	0.07	0.18	0.01	0.23	0.03	0.23	0.17
Total Saturation Flow Adjustment	0.59	0.93	0.51	0.81	0.95	0.94	0.82	0.93	0.93
s, saturation flow rate [veh/h]	1115	1776	971	1531	1805	3557	1562	1768	3549
c, Capacity [veh/h]	157	251	137	216	587	1113	489	271	1698
d1, Uniform Delay [s]	63.60	64.25	64.58	70.00	37.34	49.93	39.54	69.00	26.70
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.06	5.86	11.97	159.32	0.06	4.29	0.35	231.20	0.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

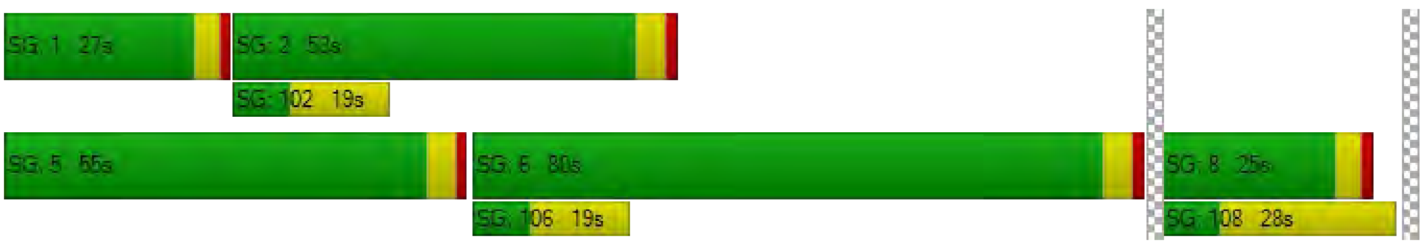
X, volume / capacity	0.39	0.46	0.49	1.29	0.02	0.73	0.09	1.47	0.36
d, Delay for Lane Group [s/veh]	70.66	70.11	76.55	229.32	37.40	54.22	39.89	300.20	27.28
Lane Group LOS	E	E	E	F	D	D	D	F	C
Critical Lane Group	no	no	no	yes	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	2.80	5.27	3.19	22.42	0.36	20.15	1.44	35.98	9.88
50th-Percentile Queue Length [ft]	70.07	131.73	79.83	560.59	9.02	503.81	36.03	899.51	246.93
95th-Percentile Queue Length [veh]	6.08	10.27	6.80	36.13	0.91	32.60	3.39	57.60	17.17
95th-Percentile Queue Length [ft]	152.11	256.70	169.88	903.27	22.83	815.04	84.65	1439.89	429.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.66	70.11	70.11	76.55	76.55	229.32	37.40	54.22	39.89	300.20	27.28	27.28
Movement LOS	E	E	E	E	E	F	D	D	D	F	C	C
d_A, Approach Delay [s/veh]	70.30			199.65			53.32			135.96		
Approach LOS	E			F			D			F		
d_I, Intersection Delay [s/veh]	110.31											
Intersection LOS	F											
Intersection V/C	0.637											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	119.7
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.217

Intersection Setup

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	no		yes		yes	

Volumes

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	3800	62	304	813	78	1577
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	16.10	4.90	3.80	9.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3800	62	304	813	78	1577
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	969	16	78	207	20	402
Total Analysis Volume [veh/h]	3878	63	310	830	80	1609
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal Group	2	2	1	6	4	1
Auxiliary Signal Groups						1,4
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	4	4	4	4	8	4
Maximum Green [s]	16	16	4	24	16	4
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	100	100	48	148	12	48
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no		no	no	no	no
Maximum Recall	no		no	no	no	no
Pedestrian Recall	no		no	no	no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	96	96	44	144	8	56
g / C, Green / Cycle	0.60	0.60	0.28	0.90	0.05	0.35
(v / s)_i Volume / Saturation Flow Rate	0.77	0.05	0.09	0.17	0.02	0.38
Total Saturation Flow Adjustment	0.89	0.73	0.88	0.87	0.85	0.74
s, saturation flow rate [veh/h]	5054	1391	3342	4986	3216	4224
c, Capacity [veh/h]	3033	835	919	4488	161	1479
d1, Uniform Delay [s]	32.00	13.41	46.35	0.96	74.04	52.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	128.12	0.18	0.99	0.09	10.59	51.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.28	0.08	0.34	0.18	0.50	1.09
d, Delay for Lane Group [s/veh]	160.12	13.58	47.34	1.05	84.63	103.32
Lane Group LOS	F	B	D	A	F	F
Critical Lane Group	yes	no	no	no	no	yes
50th-Percentile Queue Length [veh]	109.20	1.30	6.18	2.17	2.06	39.77
50th-Percentile Queue Length [ft]	2730.11	32.40	154.45	54.32	51.61	994.25
95th-Percentile Queue Length [veh]	174.73	3.07	11.68	4.88	4.67	63.65
95th-Percentile Queue Length [ft]	4368.18	76.84	292.02	122.09	116.73	1591.14

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	160.12	13.58	47.34	1.05	84.63	103.32
Movement LOS	F	B	D	A	F	F
d_A, Approach Delay [s/veh]	157.77		13.64		102.43	
Approach LOS	F		B		F	
d_I, Intersection Delay [s/veh]	119.70					
Intersection LOS	F					
Intersection V/C	1.217					

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	48.4
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.901

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			no			yes			no		

Volumes

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Base Volume Input [veh/h]	24	46	1404	116	191	116	35	2362	75	359	675	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	10.90	3.30	4.30	1.00	1.70	37.10	2.50	12.00	6.40	5.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	-300	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	70	0	0	45	0	0	1
Total Hourly Volume [veh/h]	24	46	1104	116	191	46	35	2362	30	359	675	9
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	12	282	30	49	12	9	603	8	92	172	2
Total Analysis Volume [veh/h]	24	47	1127	118	195	47	36	2410	31	366	689	9
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			7			0		
Bicycle Volume [bicycles/h]	0			7			0			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	8	8	1	4	4	4	5	2	2	1	6	6
Auxiliary Signal Groups			1,8									
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	4	16	16	16	4	16	16	4	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	19	19	32	21	21	21	15	58	58	32	75	75
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no	no		no		no	no		no	no	
Maximum Recall		no	no		no		no	no		no	no	
Pedestrian Recall		no	no		no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	0.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	15	47	17	17	17	11	54	54	28	71	71
g / C, Green / Cycle	0.12	0.12	0.36	0.13	0.13	0.13	0.08	0.42	0.42	0.22	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.01	0.02	0.34	0.07	0.05	0.03	0.01	0.41	0.02	0.11	0.12	0.01
Total Saturation Flow Adjustment	0.91	0.64	0.88	0.91	0.94	0.84	0.67	1.03	0.76	0.87	1.03	0.85
s, saturation flow rate [veh/h]	1732	2432	3343	1731	3582	1588	2557	5846	1442	3294	5846	1615
c, Capacity [veh/h]	200	281	1209	226	468	208	216	2428	599	710	3193	882
d1, Uniform Delay [s]	51.58	51.87	39.97	52.71	51.94	50.61	55.24	37.80	22.70	45.02	15.18	13.46
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.23	1.29	14.06	8.34	2.71	2.52	1.65	16.57	0.16	2.67	0.16	0.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.12	0.17	0.93	0.52	0.42	0.23	0.17	0.99	0.05	0.52	0.22	0.01
d, Delay for Lane Group [s/veh]	52.81	53.15	54.03	61.05	54.65	53.13	56.90	54.37	22.87	47.69	15.33	13.48
Lane Group LOS	D	D	D	E	D	D	E	D	C	D	B	B
Critical Lane Group	no	no	yes	yes	no	no	no	yes	no	no	no	no
50th-Percentile Queue Length [veh]	0.84	0.88	29.18	4.52	3.79	1.66	0.68	43.64	0.73	6.76	5.15	0.16
50th-Percentile Queue Length [ft]	21.06	22.04	729.51	113.04	94.66	41.58	17.12	1091.08	18.13	168.99	128.79	4.06
95th-Percentile Queue Length [veh]	2.06	2.15	46.77	9.07	7.83	3.85	1.69	69.84	1.79	12.56	10.08	0.42
95th-Percentile Queue Length [ft]	51.50	53.74	1169.35	226.63	195.84	96.34	42.31	1745.91	44.68	314.11	252.04	10.42

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.81	53.15	54.03	61.05	54.65	53.13	56.90	54.37	22.87	47.69	15.33	13.48
Movement LOS	D	D	D	E	D	D	E	D	C	D	B	B
d_A, Approach Delay [s/veh]	53.97			56.55			54.01			26.45		
Approach LOS	D			E			D			C		
d_I, Intersection Delay [s/veh]	48.43											
Intersection LOS	D											
Intersection V/C	0.901											

Sequence

Ring 1	1	2	-	4	-	8	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	29.2
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.665

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	50	1299	3	13	623	30	163	15	39	139	17	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	3.50	33.30	7.70	3.50	0.00	0.60	26.70	5.10	0.70	5.90	1.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	1299	3	13	623	30	163	15	39	139	17	61
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	335	1	3	161	8	42	4	10	36	4	16
Total Analysis Volume [veh/h]	52	1339	3	13	642	31	168	15	40	143	18	63
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			1			5			3		
Bicycle Volume [bicycles/h]	4			12			3			3		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	4	16	16	4	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	26	88	88	8	70	70	34	34	34	34	34	34
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	no		no	no			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	84	4	66	30	30
g / C, Green / Cycle	0.17	0.65	0.03	0.51	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.03	0.38	0.01	0.19	0.23	0.17
Total Saturation Flow Adjustment	0.93	0.92	0.88	0.91	0.52	0.68
s, saturation flow rate [veh/h]	1770	3494	1676	3471	981	1295
c, Capacity [veh/h]	299	2258	52	1762	226	299
d1, Uniform Delay [s]	46.22	13.21	61.54	19.54	49.78	46.51
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.26	1.16	11.38	0.63	56.19	15.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.17	0.59	0.25	0.38	0.99	0.75
d, Delay for Lane Group [s/veh]	47.48	14.37	72.92	20.17	105.97	62.34
Lane Group LOS	D	B	E	C	F	E
Critical Lane Group	no	yes	yes	no	yes	no
50th-Percentile Queue Length [veh]	1.74	16.97	0.52	8.65	11.63	9.14
50th-Percentile Queue Length [ft]	43.50	424.25	13.01	216.24	290.79	228.60
95th-Percentile Queue Length [veh]	4.01	27.72	1.30	15.37	19.75	16.10
95th-Percentile Queue Length [ft]	100.32	693.05	32.53	384.33	493.66	402.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.48	14.37	14.37	72.92	20.17	20.17	105.97	105.97	105.97	62.34	62.34	62.34
Movement LOS	D	B	B	E	C	C	F	F	F	E	E	E
d_A, Approach Delay [s/veh]	15.61			21.17			105.97			62.34		
Approach LOS	B			C			F			E		
d_I, Intersection Delay [s/veh]	29.24											
Intersection LOS	C											
Intersection V/C	0.665											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	14.4
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.552

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	68	1339	885	15	33	141
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	3.30	2.80	0.00	0.00	2.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	68	1339	885	15	33	141
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	352	233	4	9	37
Total Analysis Volume [veh/h]	72	1409	932	16	35	148
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12		23		13	
Bicycle Volume [bicycles/h]	7		6		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	4	4	4	4	4
Maximum Green [s]	4	24	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	21	109	88	88	21	21
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no	no		no	
Maximum Recall	no	no	no		no	
Pedestrian Recall	no	no	no		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	17	105	84	17
g / C, Green / Cycle	0.13	0.81	0.65	0.13
(v / s)_i Volume / Saturation Flow Rate	0.04	0.40	0.27	0.11
Total Saturation Flow Adjustment	0.94	0.92	0.92	0.86
s, saturation flow rate [veh/h]	1778	3502	3510	1642
c, Capacity [veh/h]	233	2829	2268	215
d1, Uniform Delay [s]	51.18	4.02	11.15	55.27
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.43	0.63	0.57	32.48
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.31	0.50	0.42	0.85
d, Delay for Lane Group [s/veh]	54.62	4.65	11.72	87.75
Lane Group LOS	D	A	B	F
Critical Lane Group	no	yes	no	yes
50th-Percentile Queue Length [veh]	2.59	10.49	9.90	8.41
50th-Percentile Queue Length [ft]	64.78	262.37	247.48	210.29
95th-Percentile Queue Length [veh]	5.69	18.08	17.21	15.02
95th-Percentile Queue Length [ft]	142.23	451.95	430.14	375.57

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.62	4.65	11.72	11.72	87.75	87.75
Movement LOS	D	A	B	B	F	F
d_A, Approach Delay [s/veh]	7.08		11.72		87.75	
Approach LOS	A		B		F	
d_I, Intersection Delay [s/veh]	14.42					
Intersection LOS	B					
Intersection V/C	0.552					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	16.1
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.568

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	no		no		yes	

Volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1368	217	72	966	218	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.90	6.50	2.80	2.70	1.80	6.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1368	217	72	966	218	44
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	353	56	19	249	56	11
Total Analysis Volume [veh/h]	1410	224	74	996	225	45
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		3	
Bicycle Volume [bicycles/h]	6		9		3	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal Group	2	2	1	6	8	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	4	4	4	4	4	4
Maximum Green [s]	16	16	4	24	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	100	100	9	109	21	21
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no		no	no	no	
Maximum Recall	no		no	no	no	
Pedestrian Recall	no		no	no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	96	96	5	105	17
g / C, Green / Cycle	0.74	0.74	0.04	0.81	0.13
(v / s)_i Volume / Saturation Flow Rate	0.40	0.15	0.04	0.28	0.09
Total Saturation Flow Adjustment	0.93	0.80	0.92	0.93	0.83
s, saturation flow rate [veh/h]	3516	1516	1756	3522	3170
c, Capacity [veh/h]	2596	1120	68	2845	415
d1, Uniform Delay [s]	7.42	5.22	62.50	3.35	53.68
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.82	0.40	138.20	0.34	7.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.54	0.20	1.10	0.35	0.65
d, Delay for Lane Group [s/veh]	8.24	5.62	200.70	3.69	61.41
Lane Group LOS	A	A	F	A	E
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	13.80	2.88	4.57	6.11	5.73
50th-Percentile Queue Length [ft]	345.04	72.02	114.29	152.75	143.37
95th-Percentile Queue Length [veh]	22.96	6.23	9.15	11.58	11.00
95th-Percentile Queue Length [ft]	573.89	155.71	228.67	289.41	274.93

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	8.24	5.62	200.70	3.69	61.41	61.41
Movement LOS	A	A	F	A	E	E
d_A, Approach Delay [s/veh]	7.88		17.32		61.41	
Approach LOS	A		B		E	
d_I, Intersection Delay [s/veh]	16.14					
Intersection LOS	B					
Intersection V/C	0.568					

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	42.2
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.771

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	301	1484	263	74	1016	22	28	137	210	210	249	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.30	4.40	5.30	0.00	3.40	0.00	0.00	4.40	0.50	3.80	4.40	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	175	0	0	45
Total Hourly Volume [veh/h]	301	1484	263	74	1016	22	28	137	35	210	249	31
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	78	382	68	19	262	6	7	35	9	54	64	8
Total Analysis Volume [veh/h]	310	1530	271	76	1047	23	29	141	36	216	257	32
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	28			47			11			1		
Bicycle Volume [bicycles/h]	0			4			1			2		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal Group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	4	16	16	4	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	32	79	79	13	60	60	18	18	18	20	20	20
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	no		no	no			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	6.0	6.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	75	9	56	14	14	14	16	16	16
g / C, Green / Cycle	0.22	0.58	0.07	0.43	0.11	0.11	0.11	0.12	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.17	0.37	0.04	0.31	0.02	0.08	0.02	0.06	0.14	0.02
Total Saturation Flow Adjustment	0.94	0.85	0.95	0.92	0.95	0.96	0.85	0.89	0.96	0.84
s, saturation flow rate [veh/h]	1782	4846	1805	3487	1805	1820	1607	3377	1820	1594
c, Capacity [veh/h]	384	2796	125	1502	194	196	173	416	224	196
d1, Uniform Delay [s]	48.44	18.52	58.79	30.38	52.60	56.10	52.94	53.40	57.00	51.01
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	16.54	1.16	20.07	2.90	1.62	20.29	2.71	4.59	105.61	1.78
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.64	0.61	0.71	0.15	0.72	0.21	0.52	1.15	0.16
d, Delay for Lane Group [s/veh]	64.99	19.67	78.86	33.29	54.22	76.39	55.65	57.99	162.61	52.79
Lane Group LOS	E	B	E	C	D	E	E	E	F	D
Critical Lane Group	yes	no	no	yes	no	yes	no	no	yes	no
50th-Percentile Queue Length [veh]	13.13	18.66	3.16	19.48	1.03	5.98	1.30	4.28	15.92	1.13
50th-Percentile Queue Length [ft]	328.30	466.38	79.04	487.08	25.79	149.38	32.49	107.12	397.91	28.14
95th-Percentile Queue Length [veh]	21.96	30.30	6.74	31.57	2.49	11.37	3.08	8.67	26.13	2.70
95th-Percentile Queue Length [ft]	549.02	757.38	168.46	789.22	62.25	284.22	77.03	216.87	653.15	67.50

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	64.99	19.67	19.67	78.86	33.29	33.29	54.22	76.39	55.65	57.99	162.61	52.79
Movement LOS	E	B	B	E	C	C	D	E	E	E	F	D
d_A, Approach Delay [s/veh]	26.33			36.31			69.64			110.90		
Approach LOS	C			D			E			F		
d_I, Intersection Delay [s/veh]	42.22											
Intersection LOS	D											
Intersection V/C	0.771											

Sequence

Ring 1	1	2	-	4	-	8	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	27.0
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.813

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	80.00	100.00	100.00	100.00	175.00	100.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	no		no		yes	

Volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	35	1276	922	261	504	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.20	0.00	1.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	223	0	47
Total Hourly Volume [veh/h]	35	1276	922	38	504	21
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	354	256	11	140	6
Total Analysis Volume [veh/h]	39	1418	1024	42	560	23
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		7	
Bicycle Volume [bicycles/h]	8		7		3	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	4	4	4	4	4
Maximum Green [s]	4	24	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	9	65	56	56	35	35
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no	no		no	
Maximum Recall	no	no	no		no	
Pedestrian Recall	no	no	no		no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	61	52	52	31	31
g / C, Green / Cycle	0.05	0.61	0.52	0.52	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.02	0.40	0.29	0.03	0.31	0.01
Total Saturation Flow Adjustment	0.95	0.93	0.93	0.85	0.94	0.84
s, saturation flow rate [veh/h]	1805	3526	3540	1615	1787	1591
c, Capacity [veh/h]	90	2151	1841	840	554	493
d1, Uniform Delay [s]	46.12	12.72	16.21	11.83	34.50	24.15
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.37	1.60	1.22	0.11	40.95	0.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.43	0.66	0.56	0.05	1.01	0.05
d, Delay for Lane Group [s/veh]	60.49	14.32	17.43	11.94	75.45	24.33
Lane Group LOS	E	B	B	B	E	C
Critical Lane Group	no	yes	no	no	yes	no
50th-Percentile Queue Length [veh]	1.22	15.96	11.56	0.63	23.48	0.48
50th-Percentile Queue Length [ft]	30.53	399.01	288.88	15.81	587.11	12.10
95th-Percentile Queue Length [veh]	2.91	26.19	19.63	1.57	37.79	1.21
95th-Percentile Queue Length [ft]	72.76	654.81	490.86	39.22	944.73	30.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.49	14.32	17.43	11.94	75.45	24.33
Movement LOS	E	B	B	B	E	C
d_A, Approach Delay [s/veh]	15.56		17.21		73.44	
Approach LOS	B		B		E	
d_I, Intersection Delay [s/veh]	26.99					
Intersection LOS	C					
Intersection V/C	0.813					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	22.3
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.686

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	8	935	10	54	719	29	117	2	28	21	2	97
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	2.10	0.00	0.00	2.60	27.60	4.30	0.00	17.90	0.00	0.00	6.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	18	0	0	0
Total Hourly Volume [veh/h]	8	935	10	54	719	29	117	2	10	21	2	97
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	254	3	15	195	8	32	1	3	6	1	26
Total Analysis Volume [veh/h]	9	1016	11	59	782	32	127	2	11	23	2	105
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			17			10			19		
Bicycle Volume [bicycles/h]	5			3			1			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	5	4	4	5	4	4	4	4	4	4	4	4
Maximum Green [s]	30	16	16	30	16	16	16	16	16	16	16	16
Amber [s]	3.0	3.5	3.5	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	0.5	0.5	1.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	9	74	74	11	76	76	15	15	15	15	15	15
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	no		no	no			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	70	7	72	11	11	11	11
g / C, Green / Cycle	0.05	0.70	0.07	0.72	0.11	0.11	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.01	0.29	0.03	0.44	0.13	0.01	0.03	0.07
Total Saturation Flow Adjustment	0.63	0.93	0.95	0.97	0.54	0.72	0.47	0.85
s, saturation flow rate [veh/h]	1203	3538	1805	1841	1017	1370	898	1620
c, Capacity [veh/h]	60	2476	126	1325	112	151	99	178
d1, Uniform Delay [s]	45.47	6.34	44.71	7.03	44.50	39.93	40.65	42.41
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.19	0.51	11.89	2.14	132.25	0.94	5.45	14.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.15	0.41	0.47	0.61	1.15	0.07	0.23	0.60
d, Delay for Lane Group [s/veh]	50.66	6.85	56.60	9.16	176.75	40.86	46.09	56.47
Lane Group LOS	D	A	E	A	F	D	D	E
Critical Lane Group	yes	no	no	yes	yes	no	no	no
50th-Percentile Queue Length [veh]	0.27	7.37	1.82	13.65	6.99	0.30	0.66	3.35
50th-Percentile Queue Length [ft]	6.73	184.24	45.54	341.26	174.66	7.50	16.42	83.85
95th-Percentile Queue Length [veh]	0.69	13.48	4.18	22.73	12.91	0.76	1.63	7.08
95th-Percentile Queue Length [ft]	17.16	336.99	104.50	568.27	322.65	19.05	40.67	177.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	50.66	6.85	6.85	56.60	9.16	9.16	176.75	176.75	40.86	46.09	56.47	56.47
Movement LOS	D	A	A	E	A	A	F	F	D	D	E	E
d_A, Approach Delay [s/veh]	7.24			12.37			166.08			54.64		
Approach LOS	A			B			F			D		
d_I, Intersection Delay [s/veh]	22.33											
Intersection LOS	C											
Intersection V/C	0.686											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	14.1
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			Coleman Avenue					
Base Volume Input [veh/h]	11	738	3	5	680	84	102	4	31	1	1	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.10	0.00	0.00	3.70	2.40	3.90	0.00	3.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	738	3	5	680	84	102	4	31	1	1	4
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	196	1	1	181	22	27	1	8	0	0	1
Total Analysis Volume [veh/h]	12	785	3	5	723	89	109	4	33	1	1	4
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12			3			1			9		
Bicycle Volume [bicycles/h]	16			10			7			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	126
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	107	107	107	107	107	107	19	19	19	19	19	19
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	103	103	103	103	15	15
g / C, Green / Cycle	0.82	0.82	0.82	0.82	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.02	0.43	0.01	0.45	0.11	0.00
Total Saturation Flow Adjustment	0.31	0.97	0.32	0.95	0.69	0.88
s, saturation flow rate [veh/h]	584	1842	604	1802	1311	1680
c, Capacity [veh/h]	477	1506	494	1473	156	200
d1, Uniform Delay [s]	2.14	3.67	2.12	3.82	55.02	49.07
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.10	1.30	0.04	1.49	56.57	0.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.03	0.52	0.01	0.55	0.94	0.03
d, Delay for Lane Group [s/veh]	2.24	4.97	2.15	5.31	111.59	49.35
Lane Group LOS	A	A	A	A	F	D
Critical Lane Group	no	no	no	yes	yes	no
50th-Percentile Queue Length [veh]	0.10	10.87	0.04	11.71	7.19	0.20
50th-Percentile Queue Length [ft]	2.51	271.63	1.03	292.72	179.69	5.00
95th-Percentile Queue Length [veh]	0.26	18.62	0.11	19.86	13.21	0.51
95th-Percentile Queue Length [ft]	6.48	465.53	2.67	496.50	330.19	12.81

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	2.24	4.97	4.97	2.15	5.31	5.31	111.59	111.59	111.59	49.35	49.35	49.35
Movement LOS	A	A	A	A	A	A	F	F	F	D	D	D
d_A, Approach Delay [s/veh]	4.93			5.29			111.59			49.35		
Approach LOS	A			A			F			D		
d_I, Intersection Delay [s/veh]	14.05											
Intersection LOS	B											
Intersection V/C	0.644											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	25.6
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.574

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┐╞			┐╞			┐╞			┐╞		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	30	671	13	26	597	6	61	51	69	56	43	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	0.00	2.70	0.00	3.30	2.00	10.10	0.00	2.30	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	671	13	26	597	6	61	51	69	56	43	28
Peak Hour Factor	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	188	4	7	168	2	17	14	19	16	12	8
Total Analysis Volume [veh/h]	34	754	15	29	671	7	69	57	78	63	48	31
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			4			3			3		
Bicycle Volume [bicycles/h]	15			12			5			4		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	126
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	112	112	112	112	112	112	14	14	14	14	14	14
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	108	108	108	108	10	10	10	10
g / C, Green / Cycle	0.86	0.86	0.86	0.86	0.08	0.08	0.08	0.08
(v / s)_i Volume / Saturation Flow Rate	0.05	0.42	0.04	0.37	0.06	0.08	0.08	0.05
Total Saturation Flow Adjustment	0.38	0.97	0.34	0.97	0.59	0.90	0.40	0.92
s, saturation flow rate [veh/h]	724	1839	649	1847	1126	1701	760	1748
c, Capacity [veh/h]	621	1577	556	1583	89	135	60	139
d1, Uniform Delay [s]	1.35	2.21	1.35	2.03	56.88	58.00	58.00	55.92
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.17	1.08	0.18	0.85	46.85	77.41	128.86	15.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.49	0.05	0.43	0.77	1.00	1.04	0.57
d, Delay for Lane Group [s/veh]	1.52	3.29	1.52	2.88	103.74	135.40	186.86	71.79
Lane Group LOS	A	A	A	A	F	F	F	E
Critical Lane Group	no	yes	no	no	no	no	yes	no
50th-Percentile Queue Length [veh]	0.24	8.47	0.20	6.83	3.08	7.17	3.65	3.12
50th-Percentile Queue Length [ft]	5.96	211.67	5.11	170.75	76.89	179.35	91.16	77.96
95th-Percentile Queue Length [veh]	0.61	15.10	0.52	12.67	6.58	13.19	7.59	6.66
95th-Percentile Queue Length [ft]	15.21	377.59	13.09	316.76	164.58	329.68	189.82	166.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	1.52	3.29	3.29	1.52	2.88	2.88	103.74	135.40	135.40	186.86	71.79	71.79
Movement LOS	A	A	A	A	A	A	F	F	F	F	E	E
d_A, Approach Delay [s/veh]	3.22			2.82			124.69			122.84		
Approach LOS	A			A			F			F		
d_I, Intersection Delay [s/veh]	25.57											
Intersection LOS	C											
Intersection V/C	0.574											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	46.8
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.561

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	46	94	256	356	93	332	92	429	216	236	453	29
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	1.10	0.00	1.70	0.00	2.40	1.10	0.50	2.30	6.40	0.00	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	120	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	46	94	136	356	93	0	92	429	0	236	453	29
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	24	35	93	24	0	24	112	0	61	118	8
Total Analysis Volume [veh/h]	48	98	142	371	97	0	96	447	0	246	472	30
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			0			0			6		
Bicycle Volume [bicycles/h]	51			1			5			16		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal Group	8	8	8	4	7	4	6	6	6	2	5	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	4	4	0	5	0	4	4	4	0	5	0
Maximum Green [s]	16	16	16	0	30	0	16	16	16	0	30	0
Amber [s]	3.5	3.5	3.5	0.0	3.0	0.0	3.5	3.5	3.5	0.0	3.0	0.0
All red [s]	0.5	0.5	0.5	0.0	1.0	0.0	0.5	0.5	0.5	0.0	1.0	0.0
Split [s]	25	25	25	0	32	0	32	32	32	0	41	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	1	1	1	0	1	0	1	1	1	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	C	R	L	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	21	28	28	28	28	28	37	37
g / C, Green / Cycle	0.16	0.16	0.16	0.22	0.22	0.22	0.22	0.22	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.03	0.05	0.09	0.13	0.00	0.05	0.12	0.00	0.15	0.14
Total Saturation Flow Adjustment	0.93	0.99	0.85	0.92	0.83	0.94	0.95	0.83	0.89	0.94
s, saturation flow rate [veh/h]	1766	1879	1615	3480	1577	1785	3600	1579	1696	3585
c, Capacity [veh/h]	285	304	261	749	340	385	775	340	483	1020
d1, Uniform Delay [s]	46.97	48.21	50.10	46.23	40.02	42.29	45.69	40.02	38.91	38.68
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.27	2.80	7.93	3.90	0.00	1.55	3.11	0.00	3.81	1.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

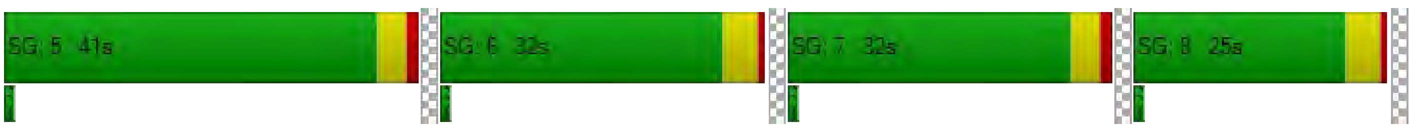
X, volume / capacity	0.17	0.32	0.54	0.62	0.00	0.25	0.58	0.00	0.51	0.49
d, Delay for Lane Group [s/veh]	48.24	51.01	58.04	50.14	40.02	43.84	48.80	40.02	42.71	40.38
Lane Group LOS	D	D	E	D	D	D	D	D	D	D
Critical Lane Group	no	no	yes	yes	no	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	1.62	3.43	5.37	9.25	0.00	3.12	8.62	0.00	8.33	8.82
50th-Percentile Queue Length [ft]	40.44	85.82	134.34	231.19	0.00	78.12	215.47	0.00	208.19	220.52
95th-Percentile Queue Length [veh]	3.76	7.22	10.43	16.25	0.00	6.67	15.33	0.00	14.90	15.62
95th-Percentile Queue Length [ft]	93.97	180.50	260.81	406.27	0.00	166.80	383.19	0.00	372.47	390.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.24	51.01	58.04	50.14	50.14	40.02	43.84	48.80	40.02	42.71	40.38	40.38
Movement LOS	D	D	E	D	D	D	D	D	D	D	D	D
d_A, Approach Delay [s/veh]		54.01			50.14			47.92			41.15	
Approach LOS		D			D			D			D	
d_I, Intersection Delay [s/veh]	46.81											
Intersection LOS	D											
Intersection V/C	0.561											

Sequence

Ring 1	-	5	-	6	-	7	-	8	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	23.0
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.972

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	57	596	125	32	523	24	267	215	64	52	135	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.00	0.00	0.00	2.10	4.20	0.40	0.50	0.00	13.50	0.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	57	596	125	32	523	24	267	215	64	52	135	26
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	160	34	9	141	6	72	58	17	14	36	7
Total Analysis Volume [veh/h]	61	641	134	34	562	26	287	231	69	56	145	28
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	35			40			67			58		
Bicycle Volume [bicycles/h]	1			5			20			7		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	8	8	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	39	39	39	39	39	39	21	21	21	21	21	21
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no		no	no			no	
Maximum Recall		no			no		no	no			no	
Pedestrian Recall		no			no		no	no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	35	35	35	35	17	17	17
g / C, Green / Cycle	0.58	0.58	0.58	0.58	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.09	0.42	0.08	0.32	0.29	0.16	0.16
Total Saturation Flow Adjustment	0.34	0.96	0.21	0.97	0.52	0.96	0.76
s, saturation flow rate [veh/h]	646	1832	406	1849	991	1825	1438
c, Capacity [veh/h]	377	1069	237	1078	281	517	407
d1, Uniform Delay [s]	5.75	9.03	5.68	7.64	21.50	18.44	18.33
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.92	4.29	1.27	1.98	59.53	4.69	5.52
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

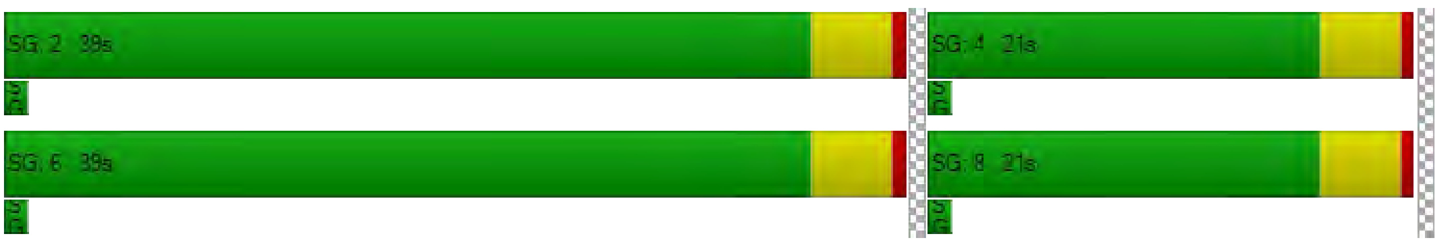
X, volume / capacity	0.16	0.73	0.14	0.55	1.02	0.58	0.56
d, Delay for Lane Group [s/veh]	6.67	13.32	6.96	9.62	81.03	23.13	23.84
Lane Group LOS	A	B	A	A	F	C	C
Critical Lane Group	no	yes	no	no	yes	no	no
50th-Percentile Queue Length [veh]	0.55	11.57	0.31	7.06	8.76	5.02	3.83
50th-Percentile Queue Length [ft]	13.79	289.15	7.75	176.41	218.88	125.43	95.68
95th-Percentile Queue Length [veh]	1.38	19.65	0.79	13.01	15.53	9.87	7.90
95th-Percentile Queue Length [ft]	34.41	491.25	19.70	325.28	388.20	246.68	197.60

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.67	13.32	13.32	6.96	9.62	9.62	81.03	23.13	23.13	23.84	23.84	23.84
Movement LOS	A	B	B	A	A	A	F	C	C	C	C	C
d_A, Approach Delay [s/veh]	12.83			9.47			51.44			23.84		
Approach LOS	B			A			D			C		
d_I, Intersection Delay [s/veh]	22.99											
Intersection LOS	C											
Intersection V/C	0.972											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	15.4
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.716

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	13	335	94	30	262	48	78	232	38	28	116	29
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	7.40	0.00	0.80	0.00	0.00	0.40	2.60	0.00	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	335	94	30	262	48	78	232	38	28	116	29
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	95	27	9	74	14	22	66	11	8	33	8
Total Analysis Volume [veh/h]	15	381	107	34	298	55	89	264	43	32	132	33
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			1			18			5		
Bicycle Volume [bicycles/h]	16			12			20			5		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	2	2	2	6	6	6	8	8	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	16	16	16	16	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	36	36	36	36	36	36	24	24	24	24	24	24
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	1	1	1	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32	20	20
g / C, Green / Cycle	0.53	0.53	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.29	0.22	0.24	0.12
Total Saturation Flow Adjustment	0.93	0.92	0.87	0.89
s, saturation flow rate [veh/h]	1763	1739	1653	1691
c, Capacity [veh/h]	940	927	551	564
d1, Uniform Delay [s]	9.14	8.40	17.54	15.09
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.18	1.38	7.87	1.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

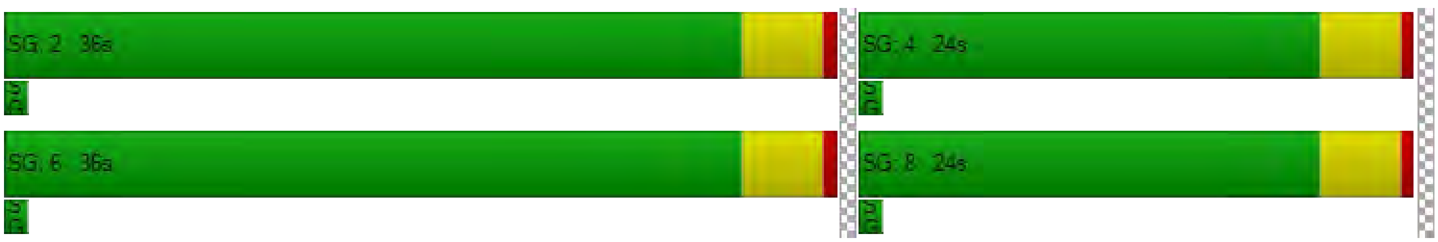
X, volume / capacity	0.53	0.42	0.72	0.35
d, Delay for Lane Group [s/veh]	11.32	9.79	25.40	16.80
Lane Group LOS	B	A	C	B
Critical Lane Group	yes	no	yes	no
50th-Percentile Queue Length [veh]	6.41	4.45	7.14	2.78
50th-Percentile Queue Length [ft]	160.13	111.27	178.52	69.62
95th-Percentile Queue Length [veh]	12.03	8.95	13.14	6.05
95th-Percentile Queue Length [ft]	300.68	223.72	328.43	151.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.32	11.32	11.32	9.79	9.79	9.79	25.40	25.40	25.40	16.80	16.80	16.80
Movement LOS	B	B	B	A	A	A	C	C	C	B	B	B
d_A, Approach Delay [s/veh]	11.32			9.79			25.40			16.80		
Approach LOS	B			A			C			B		
d_I, Intersection Delay [s/veh]	15.41											
Intersection LOS	B											
Intersection V/C	0.716											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	19.5
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.782

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			no			yes		

Volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	19	15	31	107	9	238	24	1750	100	65	1215	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	1.30	0.00	1.40	0.00	1.50	1.20	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	101	0	0	0
Total Hourly Volume [veh/h]	19	15	31	107	9	238	24	1750	0	65	1215	13
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	4	8	27	2	61	6	446	0	17	310	3
Total Analysis Volume [veh/h]	19	15	32	109	9	243	24	1786	0	66	1240	13
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			12			0			17		
Bicycle Volume [bicycles/h]	3			3			14			3		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	40	0	0	40	0	10	85	0	11	86	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	50.0	50.0	0.0	50.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	C	R	L	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	36	36	36	36	6	81	81	7	82
g / C, Green / Cycle	0.26	0.26	0.26	0.26	0.04	0.60	0.60	0.05	0.60
(v / s)_i Volume / Saturation Flow Rate	0.02	0.02	0.09	0.15	0.01	0.50	0.00	0.04	0.25
Total Saturation Flow Adjustment	0.85	0.85	0.72	0.84	0.95	0.94	0.85	0.94	0.90
s, saturation flow rate [veh/h]	1619	1615	1367	1594	1805	3568	1615	1778	5106
c, Capacity [veh/h]	429	427	362	422	80	2125	962	92	3079
d1, Uniform Delay [s]	37.55	37.51	40.24	43.38	62.97	22.27	11.12	63.54	14.21
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.36	0.34	2.39	5.62	9.47	4.22	0.00	38.83	0.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.59	0.59	1.00	0.57

Lane Group Results

X, volume / capacity	0.08	0.07	0.33	0.58	0.30	0.84	0.00	0.72	0.41
d, Delay for Lane Group [s/veh]	37.92	37.85	42.62	49.00	72.44	17.27	6.52	102.36	8.48
Lane Group LOS	D	D	D	D	E	B	A	F	A
Critical Lane Group	no	no	no	yes	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	1.04	0.97	3.95	9.04	0.98	28.63	0.00	3.06	6.19
50th-Percentile Queue Length [ft]	25.93	24.37	98.63	226.08	24.47	715.67	0.00	76.56	154.85
95th-Percentile Queue Length [veh]	2.50	2.36	8.10	15.95	2.37	45.90	0.00	6.56	11.70
95th-Percentile Queue Length [ft]	62.56	59.05	202.62	398.78	59.28	1147.40	0.00	163.99	292.62

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	37.92	37.92	37.85	42.62	42.62	49.00	72.44	17.27	6.52	102.36	8.48	8.48
Movement LOS	D	D	D	D	D	D	E	B	A	F	A	A
d_A, Approach Delay [s/veh]	37.88			46.92			18.00			13.17		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	19.51											
Intersection LOS	B											
Intersection V/C	0.782											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	38.6
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.855

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	363	144	79	59	171	41	98	1525	46	56	992	304
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.60	0.00	0.00	0.60	0.00	1.00	0.50	0.00	1.80	1.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	59	0	0	0	0	0	45	0	0	274
Total Hourly Volume [veh/h]	363	144	20	59	171	41	98	1525	1	56	992	30
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	38	5	15	45	11	26	397	0	15	258	8
Total Analysis Volume [veh/h]	378	150	21	61	178	43	102	1589	1	58	1033	31
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			9			17			3		
Bicycle Volume [bicycles/h]	6			5			4			9		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	121.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	28	0	0	22	0	17	76	0	10	69	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	24	24	18	18	13	72	72	6	65	65
g / C, Green / Cycle	0.18	0.18	0.13	0.13	0.10	0.53	0.53	0.04	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.16	0.01	0.03	0.12	0.06	0.44	0.00	0.03	0.29	0.02
Total Saturation Flow Adjustment	0.87	0.85	0.95	0.97	0.94	0.95	0.85	0.93	0.94	0.85
s, saturation flow rate [veh/h]	3307	1615	1805	1834	1787	3600	1615	1773	3557	1615
c, Capacity [veh/h]	584	285	239	243	171	1906	855	78	1700	772
d1, Uniform Delay [s]	54.88	46.73	52.98	58.21	58.99	26.96	15.07	64.23	26.12	18.90
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.97	0.50	2.56	38.59	14.46	4.47	0.00	47.00	1.62	0.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.72	0.72	1.00	0.80	0.80

Lane Group Results

X, volume / capacity	0.90	0.07	0.26	0.91	0.60	0.83	0.00	0.74	0.61	0.04
d, Delay for Lane Group [s/veh]	74.85	47.23	55.55	96.79	73.45	23.86	10.84	111.24	22.50	15.20
Lane Group LOS	E	D	E	F	E	C	B	F	C	B
Critical Lane Group	yes	no	no	yes	no	yes	no	yes	no	no
50th-Percentile Queue Length [veh]	13.58	0.71	2.26	11.06	4.25	28.50	0.01	2.75	14.22	0.49
50th-Percentile Queue Length [ft]	339.54	17.81	56.49	276.54	106.29	712.42	0.32	68.78	355.46	12.23
95th-Percentile Queue Length [veh]	22.63	1.76	5.05	18.91	8.62	45.69	0.03	5.99	23.58	1.23
95th-Percentile Queue Length [ft]	565.71	43.93	126.34	472.73	215.48	1142.25	0.83	149.72	589.43	30.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	74.85	74.85	47.23	55.55	96.79	96.79	73.45	23.86	10.84	111.24	22.50	15.20
Movement LOS	E	E	D	E	F	F	E	C	B	F	C	B
d_A, Approach Delay [s/veh]	73.79			87.87			26.84			26.89		
Approach LOS	E			F			C			C		
d_I, Intersection Delay [s/veh]	38.65											
Intersection LOS	D											
Intersection V/C	0.855											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	31.9
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	118	202	133	129	215	77	87	1426	94	114	1047	97
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.00	1.60	1.40	1.30	0.00	1.70	0.00	2.60	1.20	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	77	0	0	82	0	0	77	0	0	116
Total Hourly Volume [veh/h]	118	202	56	129	215	0	87	1426	17	114	1047	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	52	14	33	55	0	22	368	4	29	270	0
Total Analysis Volume [veh/h]	122	208	58	133	222	0	90	1470	18	118	1079	0
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			7			37			17		
Bicycle Volume [bicycles/h]	10			10			4			6		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	98.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	7	4	0	3	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	0	5	5	0	5	5	0	5	5	0
Maximum Green [s]	30	30	0	30	30	0	30	30	0	30	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	19	30	0	13	24	0	16	77	0	16	77	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	no	no		no	no		no	no		no	no	
Maximum Recall	no	no		no	no		no	no		no	no	
Pedestrian Recall	no	no		no	no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	50.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	26	26	9	20	20	12	73	73	12	73	73
g / C, Green / Cycle	0.11	0.19	0.19	0.07	0.15	0.15	0.09	0.54	0.54	0.09	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.07	0.11	0.04	0.07	0.12	0.00	0.05	0.41	0.01	0.07	0.30	0.00
Total Saturation Flow Adjustment	0.95	0.99	0.85	0.94	0.99	0.84	0.95	0.94	0.85	0.93	0.94	0.84
s, saturation flow rate [veh/h]	1805	1872	1615	1777	1874	1594	1805	3557	1615	1759	3575	1599
c, Capacity [veh/h]	199	358	309	118	276	234	159	1909	867	155	1919	858
d1, Uniform Delay [s]	57.73	50.05	46.14	63.50	56.12	49.47	59.50	24.87	14.76	60.59	20.90	14.59
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.30	6.74	1.34	122.63	21.70	0.00	13.72	3.06	0.04	28.97	1.20	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.23	0.23	1.00	0.71	0.71

Lane Group Results

X, volume / capacity	0.61	0.58	0.19	1.13	0.81	0.00	0.57	0.77	0.02	0.76	0.56	0.00
d, Delay for Lane Group [s/veh]	71.03	56.79	47.49	186.13	77.82	49.47	69.38	8.71	3.40	89.57	15.96	10.31
Lane Group LOS	E	E	D	F	E	D	E	A	A	F	B	B
Critical Lane Group	yes	no	no	no	yes	no	no	yes	no	yes	no	no
50th-Percentile Queue Length [veh]	5.12	8.13	1.99	8.56	10.09	0.00	3.68	14.30	0.10	5.39	12.10	0.00
50th-Percentile Queue Length [ft]	128.08	203.24	49.81	213.93	252.35	0.00	91.99	357.38	2.55	134.67	302.38	0.00
95th-Percentile Queue Length [veh]	10.04	14.61	4.53	15.24	17.49	0.00	7.65	23.69	0.26	10.45	20.43	0.00
95th-Percentile Queue Length [ft]	250.89	365.17	113.14	380.92	437.27	0.00	191.25	592.30	6.59	261.33	510.72	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.03	56.79	47.49	186.13	77.82	49.47	69.38	8.71	3.40	89.57	15.96	10.31
Movement LOS	E	E	D	F	E	D	E	A	A	F	B	B
d_A, Approach Delay [s/veh]	59.87			118.39			12.11			23.22		
Approach LOS	E			F			B			C		
d_I, Intersection Delay [s/veh]	31.88											
Intersection LOS	C											
Intersection V/C	0.755											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	13.7
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.730

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	172	50	137	50	58	43	0	1406	41	0	1451	87
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	10.00	0.70	2.00	5.20	7.00	0.00	1.40	2.40	0.00	1.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	73	0	0	99
Total Hourly Volume [veh/h]	172	50	137	50	58	43	0	1406	0	0	1451	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	1.0000	0.9700	0.9700	1.0000	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	44	13	35	13	15	11	0	362	0	0	374	0
Total Analysis Volume [veh/h]	177	52	141	52	60	44	0	1449	0	0	1496	0
Presence of On-Street Parking	no		no	no		no			no			no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	20			27			66			41		
Bicycle Volume [bicycles/h]	14			12			4			0		

Intersection Settings

Located in CBD	yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	92.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	0	4	0	0	8	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	25	0	0	17	0	0	94	0	0	94	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		no			no			no			no	
Maximum Recall		no			no			no			no	
Pedestrian Recall		no			no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	21	21	13	13	90	90	90	90
g / C, Green / Cycle	0.15	0.15	0.15	0.10	0.10	0.66	0.66	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.11	0.03	0.10	0.03	0.07	0.45	0.00	0.46	0.00
Total Saturation Flow Adjustment	0.84	0.82	0.76	0.84	0.80	0.84	0.75	0.85	0.75
s, saturation flow rate [veh/h]	1597	1555	1443	1593	1522	3211	1419	3217	1429
c, Capacity [veh/h]	247	240	223	152	146	2125	939	2129	946
d1, Uniform Delay [s]	54.68	50.30	53.89	57.50	59.70	14.18	7.78	14.54	7.78
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	16.42	2.06	12.90	6.01	25.80	1.79	0.00	1.97	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.45	1.45	1.45	1.45
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.12	0.12	0.12	0.12

Lane Group Results

X, volume / capacity	0.72	0.22	0.63	0.34	0.71	0.68	0.00	0.70	0.00
d, Delay for Lane Group [s/veh]	71.10	52.37	66.79	63.51	85.50	3.46	0.91	3.68	0.91
Lane Group LOS	E	D	E	E	F	A	A	A	A
Critical Lane Group	yes	no	no	no	yes	no	no	yes	no
50th-Percentile Queue Length [veh]	7.63	1.87	5.84	2.04	4.67	6.59	0.00	7.21	0.00
50th-Percentile Queue Length [ft]	190.71	46.82	145.99	51.12	116.63	164.86	0.00	180.27	0.00
95th-Percentile Queue Length [veh]	13.86	4.28	11.16	4.63	9.30	12.31	0.00	13.24	0.00
95th-Percentile Queue Length [ft]	346.61	107.11	279.00	115.76	232.49	307.86	0.00	331.05	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.10	52.37	66.79	63.51	85.50	85.50	0.00	3.46	0.91	0.00	3.68	0.91
Movement LOS	E	D	E	E	F	F		A	A		A	A
d_A, Approach Delay [s/veh]	66.83			78.17			3.46			3.68		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	13.66											
Intersection LOS	B											
Intersection V/C	0.730											

Sequence

Ring 1	-	2	-	-	4	-	8	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	44.6
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.872

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			no			yes		

Volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	44	348	108	451	249	80	113	1339	590	180	1154	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	1.10	0.00	0.40	0.40	1.30	0.90	1.80	1.70	0.60	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	80	0	0	454	0	0	33
Total Hourly Volume [veh/h]	44	348	108	451	249	0	113	1339	136	180	1154	6
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	89	28	115	64	0	29	342	35	46	294	2
Total Analysis Volume [veh/h]	45	355	110	460	254	0	115	1366	139	184	1178	6
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	31			12			0			37		
Bicycle Volume [bicycles/h]	13			14			5			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	109.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	8	8	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	4	16	16	4	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	25	25	25	27	27	27	17	64	64	20	67	67
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	21	23	23	23	13	60	60	16	63	63
g / C, Green / Cycle	0.15	0.17	0.17	0.17	0.10	0.44	0.44	0.12	0.46	0.46
(v / s)_i Volume / Saturation Flow Rate	0.15	0.13	0.13	0.00	0.06	0.38	0.09	0.10	0.33	0.00
Total Saturation Flow Adjustment	0.91	0.92	1.00	0.84	0.94	0.94	0.84	0.94	0.94	0.85
s, saturation flow rate [veh/h]	3447	3491	1892	1594	1789	3554	1588	1794	3568	1615
c, Capacity [veh/h]	532	590	320	270	171	1568	701	211	1653	748
d1, Uniform Delay [s]	57.06	54.07	54.22	46.94	59.44	34.50	23.27	58.99	29.25	19.66
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	29.90	9.79	18.10	0.00	19.13	6.94	0.63	35.77	2.65	0.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.91	0.42	0.42

Lane Group Results

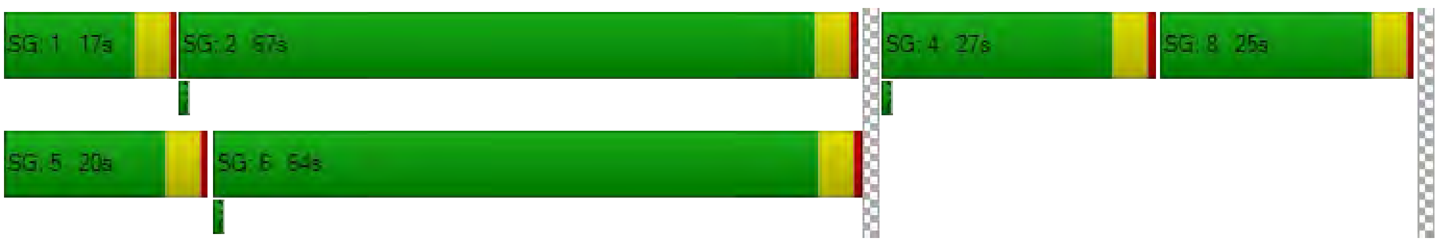
X, volume / capacity	0.96	0.78	0.79	0.00	0.67	0.87	0.20	0.87	0.71	0.01
d, Delay for Lane Group [s/veh]	86.97	63.86	72.32	46.94	78.58	36.18	20.36	89.51	15.06	8.36
Lane Group LOS	F	E	E	D	E	D	C	F	B	A
Critical Lane Group	yes	no	yes	no	no	yes	no	yes	no	no
50th-Percentile Queue Length [veh]	13.94	10.47	11.31	0.00	4.96	29.05	2.74	8.88	14.96	0.06
50th-Percentile Queue Length [ft]	348.56	261.70	282.84	0.00	124.02	726.22	68.54	221.94	373.96	1.55
95th-Percentile Queue Length [veh]	23.17	18.04	19.28	0.00	9.78	46.57	5.97	15.71	24.68	0.16
95th-Percentile Queue Length [ft]	579.14	450.97	481.99	0.00	244.42	1164.13	149.28	392.70	617.11	4.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	86.97	86.97	86.97	63.86	72.32	46.94	78.58	36.18	20.36	89.51	15.06	8.36
Movement LOS	F	F	F	E	E	D	E	D	C	F	B	A
d_A, Approach Delay [s/veh]	86.97			66.87			37.83			25.05		
Approach LOS	F			E			D			C		
d_I, Intersection Delay [s/veh]	44.55											
Intersection LOS	D											
Intersection V/C	0.872											

Sequence

Ring 1	1	2	-	4	-	8	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	10.4
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.586

Intersection Setup

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			no		

Volumes

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	66	6	36	58	45	48	72	1845	20	68	1586	54
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	39	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	6	36	58	45	9	72	1845	20	68	1586	54
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	2	9	15	12	2	19	476	5	18	409	14
Total Analysis Volume [veh/h]	68	6	37	60	46	9	74	1902	21	70	1635	56
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			16			0		
Bicycle Volume [bicycles/h]	9			16			5			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	65.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	8	8	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	4	4	4	4	4	4	4	4	4	4
Maximum Green [s]	16	16	16	16	16	16	4	16	16	4	16	16
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Split [s]	23	23	23	23	23	23	19	98	98	15	94	94
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	1	1	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	6.0	6.0	6.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	19	19	19	15	94	11	90
g / C, Green / Cycle	0.14	0.14	0.14	0.11	0.69	0.08	0.66
(v / s)_i Volume / Saturation Flow Rate	0.10	0.07	0.01	0.04	0.38	0.04	0.33
Total Saturation Flow Adjustment	0.58	0.76	0.85	0.95	0.90	0.95	0.89
s, saturation flow rate [veh/h]	1093	1441	1615	1805	5106	1805	5099
c, Capacity [veh/h]	153	201	226	199	3529	146	3374
d1, Uniform Delay [s]	56.01	54.32	50.61	56.13	10.40	59.76	11.64
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	25.89	9.52	0.33	5.25	0.61	10.85	0.53
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	0.29	1.00	0.40

Lane Group Results

X, volume / capacity	0.73	0.53	0.04	0.37	0.54	0.48	0.50
d, Delay for Lane Group [s/veh]	81.91	63.85	50.94	61.38	3.66	70.62	5.20
Lane Group LOS	F	E	D	E	A	E	A
Critical Lane Group	yes	no	no	no	yes	yes	no
50th-Percentile Queue Length [veh]	4.94	4.25	0.32	2.81	6.34	2.84	6.69
50th-Percentile Queue Length [ft]	123.49	106.19	7.91	70.22	158.50	71.00	167.37
95th-Percentile Queue Length [veh]	9.74	8.61	0.80	6.10	11.93	6.15	12.47
95th-Percentile Queue Length [ft]	243.57	215.31	20.08	152.38	298.21	153.84	311.66

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	81.91	81.91	81.91	63.85	63.85	50.94	61.38	3.66	3.66	70.62	5.20	5.20
Movement LOS	F	F	F	E	E	D	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	81.91			62.84			5.80			7.80		
Approach LOS	F			E			A			A		
d_I, Intersection Delay [s/veh]	10.45											
Intersection LOS	B											
Intersection V/C	0.586											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	19.5
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.682

Intersection Setup

Name	Middle Avenue		El Camino Real (SR 82)		El Camino Real (SR 82)	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	0
Pocket Length [ft]	100.00	55.00	275.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		no		yes	

Volumes

Name	Middle Avenue		El Camino Real (SR 82)		El Camino Real (SR 82)	
Base Volume Input [veh/h]	249	182	323	1917	1334	86
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	1.60	0.90	1.70	1.60	1.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	211	0	0	0	0
Total Hourly Volume [veh/h]	249	0	323	1917	1334	86
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	64	0	83	494	344	22
Total Analysis Volume [veh/h]	257	0	333	1976	1375	89
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27		0		17	
Bicycle Volume [bicycles/h]	2		7		4	

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	76.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal Group	4	0	1	6	2	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	5	0	5	5	5	0
Maximum Green [s]	30	0	30	30	30	0
Amber [s]	3.0	0.0	3.0	3.0	3.0	0.0
All red [s]	1.0	0.0	1.0	1.0	1.0	0.0
Split [s]	32	0	43	104	61	0
Vehicle Extension [s]	3.0	0.0	3.0	3.0	3.0	0.0
Walk [s]	5	0	0	1	1	0
Pedestrian Clearance [s]	10	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
Minimum Recall	no		no	no	no	
Maximum Recall	no		no	no	no	
Pedestrian Recall	no		no	no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	50.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	28	39	100	57
g / C, Green / Cycle	0.21	0.21	0.29	0.74	0.42
(v / s)_i Volume / Saturation Flow Rate	0.15	0.00	0.19	0.39	0.29
Total Saturation Flow Adjustment	0.93	0.84	0.94	0.89	0.89
s, saturation flow rate [veh/h]	1763	1590	1789	5089	5048
c, Capacity [veh/h]	363	327	513	3742	2116
d1, Uniform Delay [s]	50.20	42.88	42.50	7.79	32.32
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.10	0.00	6.24	0.54	1.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	0.09	0.87

Lane Group Results

X, volume / capacity	0.71	0.00	0.65	0.53	0.69
d, Delay for Lane Group [s/veh]	61.30	42.88	48.58	1.21	30.12
Lane Group LOS	E	D	D	A	C
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	10.65	0.00	11.98	3.21	17.25
50th-Percentile Queue Length [ft]	266.19	0.00	299.58	80.14	431.15
95th-Percentile Queue Length [veh]	18.30	0.00	20.26	6.82	28.14
95th-Percentile Queue Length [ft]	457.55	0.00	506.60	170.43	703.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.30	42.88	48.58	1.21	30.12	30.12
Movement LOS	E	D	D	A	C	C
d_A, Approach Delay [s/veh]	61.30		8.04		30.12	
Approach LOS	E		A		C	
d_I, Intersection Delay [s/veh]	19.46					
Intersection LOS	B					
Intersection V/C	0.682					

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	10.4
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			no			yes		

Volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	26	0	39	4	3	0	310	2332	6	30	1660	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	2.85	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.90	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	35	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	0	4	4	3	0	310	2332	6	30	1660	4
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	1	1	1	0	82	620	2	8	441	1
Total Analysis Volume [veh/h]	28	0	4	4	3	0	330	2481	6	32	1766	4
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			2			0			3		
Bicycle Volume [bicycles/h]	0			0			17			1		

Intersection Settings

Located in CBD	no
Signal Coordination Group	1 - ECR
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	111.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	5	0	0	5	0	5	5	0	5	5	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	9	0	0	9	0	45	118	0	9	82	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	5	5	5	41	114	5	78
g / C, Green / Cycle	0.04	0.04	0.04	0.30	0.84	0.04	0.57
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.00	0.18	0.49	0.02	0.35
Total Saturation Flow Adjustment	0.70	0.83	0.82	0.95	0.90	0.95	0.90
s, saturation flow rate [veh/h]	1336	1570	1564	1805	5112	1805	5128
c, Capacity [veh/h]	53	58	57	544	4285	66	2941
d1, Uniform Delay [s]	64.34	63.25	63.38	40.60	3.47	64.23	18.89
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	33.03	2.31	4.29	4.96	0.58	22.99	0.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.13	1.33	1.33
PF, progression factor	1.00	1.00	1.00	0.98	0.36	1.00	0.63

Lane Group Results

X, volume / capacity	0.53	0.07	0.12	0.61	0.58	0.48	0.60
d, Delay for Lane Group [s/veh]	97.37	65.56	67.67	44.94	1.82	87.22	12.91
Lane Group LOS	F	E	E	D	A	F	B
Critical Lane Group	yes	no	no	yes	no	no	yes
50th-Percentile Queue Length [veh]	1.23	0.16	0.28	11.32	6.67	1.38	13.04
50th-Percentile Queue Length [ft]	30.86	4.03	7.11	282.88	166.64	34.51	325.96
95th-Percentile Queue Length [veh]	2.94	0.41	0.72	19.28	12.42	3.26	21.82
95th-Percentile Queue Length [ft]	73.49	10.36	18.09	482.04	310.56	81.41	545.56

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	97.37	97.37	65.56	67.67	67.67	67.67	44.94	1.82	1.82	87.22	12.91	12.91
Movement LOS	F	F	E	E	E	E	D	A	A	F	B	B
d_A, Approach Delay [s/veh]		93.39			67.67			6.87			14.23	
Approach LOS		F			E			A			B	
d_I, Intersection Delay [s/veh]	10.40											
Intersection LOS	B											
Intersection V/C	0.622											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	19.2
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	30.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	350	328	88	398	363	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.60	0.90	0.50	2.30	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	350	328	88	398	363	165
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	89	24	108	99	45
Total Analysis Volume [veh/h]	380	357	96	433	395	179
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		23		31	
Bicycle Volume [bicycles/h]	10		15		8	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	60
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal Group	2	2	1	6	8	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	4	4	5	4	4	4
Maximum Green [s]	16	16	30	16	16	16
Amber [s]	3.5	3.5	3.0	3.5	3.5	3.5
All red [s]	0.5	0.5	1.0	0.5	0.5	0.5
Split [s]	24	24	10	34	26	26
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	1	1	0	1	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no		no	no	no	
Maximum Recall	yes		no	yes	no	
Pedestrian Recall	yes		no	yes	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	20	6	30	22	22
g / C, Green / Cycle	0.33	0.33	0.10	0.50	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.21	0.22	0.05	0.23	0.22	0.11
Total Saturation Flow Adjustment	0.97	0.84	0.95	0.98	0.95	0.84
s, saturation flow rate [veh/h]	1852	1601	1796	1857	1805	1605
c, Capacity [veh/h]	617	534	180	929	662	589
d1, Uniform Delay [s]	16.78	17.16	25.67	9.78	15.40	13.54
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.55	6.54	10.94	1.68	3.94	1.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

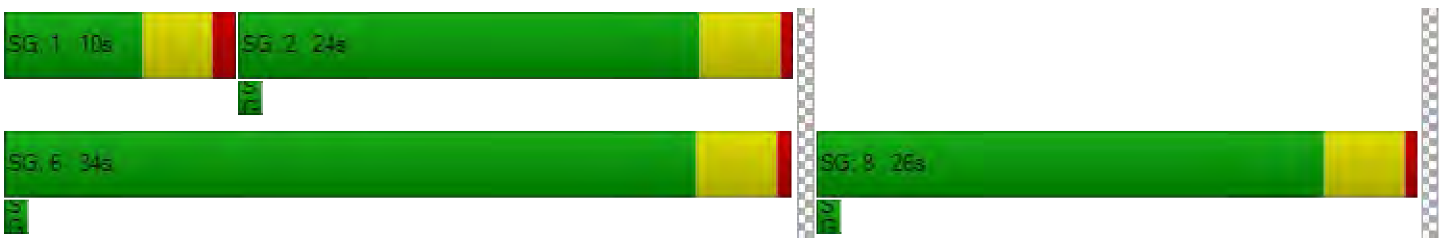
X, volume / capacity	0.62	0.67	0.53	0.47	0.60	0.30
d, Delay for Lane Group [s/veh]	21.33	23.70	36.61	11.46	19.34	14.87
Lane Group LOS	C	C	D	B	B	B
Critical Lane Group	no	yes	yes	no	yes	no
50th-Percentile Queue Length [veh]	6.26	6.17	1.81	5.41	6.27	2.38
50th-Percentile Queue Length [ft]	156.61	154.35	45.25	135.27	156.63	59.61
95th-Percentile Queue Length [veh]	11.81	11.67	4.16	10.49	11.81	5.30
95th-Percentile Queue Length [ft]	295.31	291.86	103.92	262.26	295.35	132.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	21.33	23.70	36.61	11.46	19.34	14.87
Movement LOS	C	C	D	B	B	B
d_A, Approach Delay [s/veh]	22.47		16.03		17.95	
Approach LOS	C		B		B	
d_I, Intersection Delay [s/veh]	19.21					
Intersection LOS	B					
Intersection V/C	0.619					

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#39: Sand Hill Rd/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	49.9
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.709

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	361	611	215	424	1038	208	158	691	188	101	526	178
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	0.80	0.90	0.00	0.80	1.00	1.90	0.70	0.50	0.00	0.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	361	611	215	424	1038	208	158	691	188	101	526	178
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	93	157	55	109	268	54	41	178	48	26	136	46
Total Analysis Volume [veh/h]	372	630	222	437	1070	214	163	712	194	104	542	184
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			12			5			3		
Bicycle Volume [bicycles/h]	28			9			33			20		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	16.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Protecte
Signal Group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	4	4	5	4	4	5	4	4	5	4	4
Maximum Green [s]	30	16	16	30	16	16	30	16	16	30	16	16
Amber [s]	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5	3.0	3.5	3.5
All red [s]	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5	1.0	0.5	0.5
Split [s]	24	54	54	42	72	72	16	42	42	12	38	38
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	1	1	0	1	1	0	1	1	0	1	1
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Minimum Recall	no	no		no	no		no	no		no	no	no
Maximum Recall	no	yes		no	yes		no	no		no	no	no
Pedestrian Recall	no	yes		no	yes		no	no		no	no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	20	50	50	38	68	68	12	38	38	8	34	34
g / C, Green / Cycle	0.13	0.33	0.33	0.25	0.45	0.45	0.08	0.25	0.25	0.05	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.11	0.18	0.14	0.12	0.30	0.13	0.05	0.20	0.12	0.03	0.15	0.12
Total Saturation Flow Adjustment	0.91	0.94	0.84	0.92	0.94	0.84	0.91	0.95	0.85	0.92	0.95	0.84
s, saturation flow rate [veh/h]	3467	3589	1601	3505	3589	1599	3440	3592	1607	3505	3610	1588
c, Capacity [veh/h]	462	1196	534	888	1627	725	275	910	407	187	818	360
d1, Uniform Delay [s]	63.10	40.43	38.70	47.77	31.93	25.88	66.64	52.15	47.55	69.27	52.78	50.73
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.86	1.66	2.38	1.95	2.10	1.04	9.06	6.66	3.96	11.42	4.20	5.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.53	0.42	0.49	0.66	0.30	0.59	0.78	0.48	0.56	0.66	0.51
d, Delay for Lane Group [s/veh]	76.96	42.09	41.08	49.72	34.03	26.91	75.69	58.81	51.51	80.69	56.97	55.84
Lane Group LOS	E	D	D	D	C	C	E	E	D	F	E	E
Critical Lane Group	yes	no	no	no	yes	no	no	yes	no	yes	no	no
50th-Percentile Queue Length [veh]	9.61	12.42	7.90	8.89	20.86	6.17	3.94	17.38	7.63	2.55	12.42	7.51
50th-Percentile Queue Length [ft]	240.35	310.43	197.39	222.14	521.51	154.23	98.46	434.46	190.86	63.72	310.51	187.79
95th-Percentile Queue Length [veh]	16.79	20.90	14.26	15.72	33.70	11.67	8.09	28.34	13.87	5.61	20.91	13.69
95th-Percentile Queue Length [ft]	419.69	522.59	356.51	393.00	842.46	291.67	202.32	708.58	346.84	140.23	522.71	342.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.96	42.09	41.08	49.72	34.03	26.91	75.69	58.81	51.51	80.69	56.97	55.84
Movement LOS	E	D	D	D	C	C	E	E	D	F	E	E
d_A, Approach Delay [s/veh]	52.51			37.13			60.06			59.69		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	49.94											
Intersection LOS	D											
Intersection V/C	0.709											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	87.6
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Base Volume Input [veh/h]	11	1786	0	0	360	15	25	0	26	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.40	2.00	2.00	2.50	2.00	4.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	1786	0	0	360	15	25	0	26	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	447	0	0	90	4	6	0	7	0	0	0
Total Analysis Volume [veh/h]	11	1786	0	0	360	15	25	0	26	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.02	0.00	0.00	0.00	0.00	0.21	0.00	0.03	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.04	0.00	0.00	0.00	0.00	0.00	40.46	87.59	14.65	0.00	0.00	0.00
Movement LOS	A	A			A	A	E	F	B			
95th-Percentile Queue Length [veh]	0.03	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.91	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.70	0.00	0.00	0.00	0.00	0.00	22.76	22.76	22.76	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.05			0.00			27.30			0.00		
Approach LOS	A			A			D			A		
d_I, Intersection Delay [s/veh]	0.67											
Intersection LOS	F											

Intersection Level Of Service Report
#74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	9.7
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.710

Intersection Setup

Name	University Avenue				O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	University Avenue				O'Brien Drive	
Base Volume Input [veh/h]	11	1724	356	10	171	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	2.40	2.50	0.00	4.70	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	1724	356	10	171	77
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	454	94	3	45	20
Total Analysis Volume [veh/h]	12	1815	375	11	180	81
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	6		0		1	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	5	2	6	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	5	0	5	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	9	66	57	0	19	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	1	1	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no	no	no		no	
Maximum Recall	yes	yes	yes		yes	
Pedestrian Recall	no	yes	yes		yes	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	7	64	55	17	17
g / C, Green / Cycle	0.08	0.75	0.65	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.01	0.51	0.11	0.10	0.05
Total Saturation Flow Adjustment	0.87	0.93	0.92	0.91	0.84
s, saturation flow rate [veh/h]	1654	3533	3514	1724	1594
c, Capacity [veh/h]	136	2660	2274	345	319
d1, Uniform Delay [s]	36.05	5.34	5.95	30.37	28.66
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.27	1.44	0.16	5.56	1.91
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.09	0.68	0.17	0.52	0.25
d, Delay for Lane Group [s/veh]	37.32	6.77	6.11	35.93	30.57
Lane Group LOS	D	A	A	D	C
Critical Lane Group	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	0.29	14.27	2.15	4.35	1.78
50th-Percentile Queue Length [ft]	7.20	356.75	53.79	108.76	44.47
95th-Percentile Queue Length [veh]	0.73	23.65	4.84	8.78	4.09
95th-Percentile Queue Length [ft]	18.32	591.35	121.04	219.57	102.31

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	37.32	6.77	6.11	6.11	35.93	30.57
Movement LOS	D	A	A	A	D	C
d_A, Approach Delay [s/veh]	6.97		6.11		34.27	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	9.72					
Intersection LOS	A					
Intersection V/C	0.710					

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	31.5
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Valparaiso Ave						University Drive (North)					
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Valparaiso Ave						University Drive (North)					
Base Volume Input [veh/h]	24	467	105	44	456	29	182	24	57	45	41	72
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.00	0.00	1.80	0.00	0.50	8.30	1.80	0.00	7.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	467	105	44	456	29	182	24	57	45	41	72
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	122	27	11	119	8	47	6	15	12	11	19
Total Analysis Volume [veh/h]	25	486	109	46	475	30	190	25	59	47	43	75
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	22			1			13			11		
Bicycle Volume [bicycles/h]	11			7			1			8		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	3	8	0	7	4	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	5	5	0	5	5	0	0	5	0	0	5	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	9	37	0	9	37	0	0	39	0	0	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	1	0	0	1	0	0	1	0	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	yes	yes		yes	yes			yes			yes	
Pedestrian Recall	no	yes		no	yes			yes			yes	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	0.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	33	42	33	35	35	35
g / C, Green / Cycle	0.49	0.39	0.49	0.39	0.41	0.41	0.41
(v / s)_i Volume / Saturation Flow Rate	0.04	0.33	0.08	0.27	0.34	0.04	0.07
Total Saturation Flow Adjustment	0.37	0.95	0.30	0.97	0.42	0.61	0.84
s, saturation flow rate [veh/h]	706	1813	566	1850	799	1165	1602
c, Capacity [veh/h]	349	704	280	718	329	480	660
d1, Uniform Delay [s]	12.63	23.67	14.09	21.88	22.37	15.32	15.88
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.40	11.92	1.26	5.70	21.19	0.41	0.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

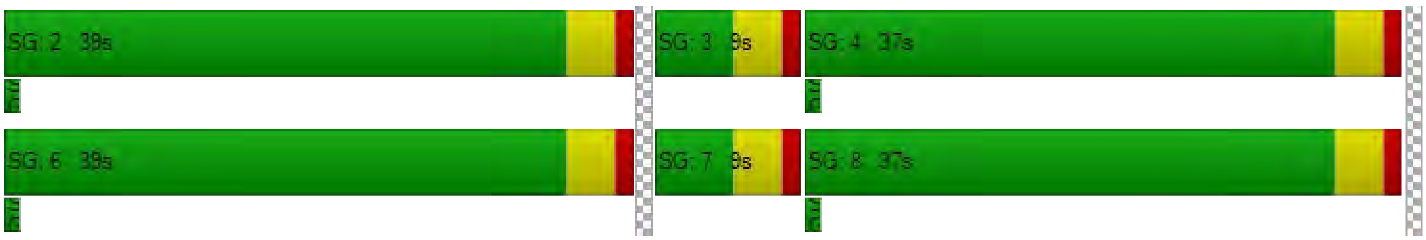
X, volume / capacity	0.07	0.85	0.16	0.70	0.83	0.10	0.18
d, Delay for Lane Group [s/veh]	13.03	35.59	15.35	27.57	43.57	15.73	16.47
Lane Group LOS	B	D	B	C	D	B	B
Critical Lane Group	no	yes	no	no	yes	no	no
50th-Percentile Queue Length [veh]	0.35	16.48	0.69	11.96	7.74	0.75	1.95
50th-Percentile Queue Length [ft]	8.75	411.98	17.16	298.93	193.52	18.78	48.69
95th-Percentile Queue Length [veh]	0.89	26.98	1.70	20.23	14.03	1.85	4.44
95th-Percentile Queue Length [ft]	22.16	674.43	42.41	505.63	350.79	46.22	110.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.03	35.59	35.59	15.35	27.57	27.57	43.57	43.57	43.57	15.73	16.47	16.47
Movement LOS	B	D	D	B	C	C	D	D	D	B	B	B
d_A, Approach Delay [s/veh]	34.68			26.55			43.57			16.26		
Approach LOS	C			C			D			B		
d_I, Intersection Delay [s/veh]	31.52											
Intersection LOS	C											
Intersection V/C	0.731											

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	81.9
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.650

Intersection Setup

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			no			yes			yes		

Volumes

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	209	3	108	19	3	66	18	794	93	69	1750	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.50	33.30	3.70	5.30	0.00	0.00	11.10	1.50	3.20	7.20	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	3	108	19	3	66	18	794	93	69	1750	16
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	1	28	5	1	17	5	205	24	18	451	4
Total Analysis Volume [veh/h]	215	3	111	20	3	68	19	819	96	71	1804	16
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			3		
Bicycle Volume [bicycles/h]	1			0			17			19		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	60.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	13	0	0	13	0	12	52	0	12	52	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	3.0	0.0	3.0	6.0	0.0	2.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	yes		no	yes	
Maximum Recall		no			no		no	no		no	no	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	11	11	11	11	10	50	50	10	50
g / C, Green / Cycle	0.10	0.10	0.10	0.10	0.09	0.44	0.44	0.09	0.44
(v / s)_i Volume / Saturation Flow Rate	0.08	0.07	0.01	0.04	0.01	0.23	0.06	0.04	0.51
Total Saturation Flow Adjustment	0.68	0.81	0.90	0.86	0.86	0.94	0.81	0.89	0.94
s, saturation flow rate [veh/h]	2586	1536	1714	1627	1625	3564	1534	1684	3563
c, Capacity [veh/h]	250	148	165	157	143	1563	673	148	1563
d1, Uniform Delay [s]	50.81	50.16	47.08	48.65	48.00	23.32	19.16	49.53	32.00
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	31.92	28.88	1.49	9.13	1.93	1.26	0.44	10.78	81.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

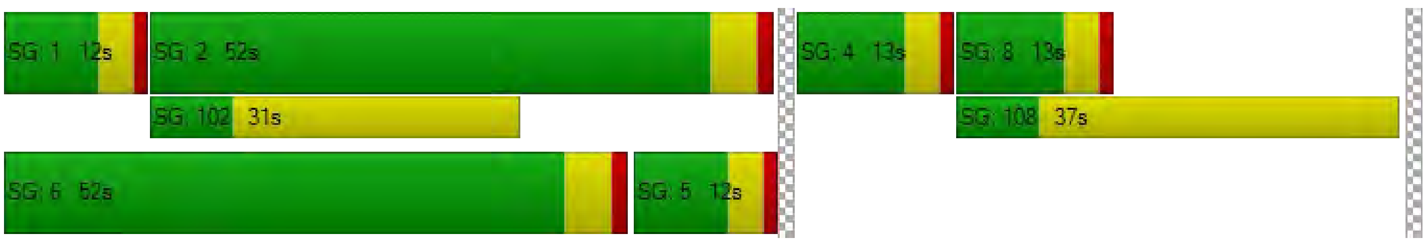
X, volume / capacity	0.87	0.75	0.12	0.45	0.13	0.52	0.14	0.48	1.16
d, Delay for Lane Group [s/veh]	82.73	79.03	48.57	57.78	49.93	24.58	19.61	60.31	113.50
Lane Group LOS	F	E	D	E	D	C	B	E	F
Critical Lane Group	yes	no	no	yes	yes	no	no	no	yes
50th-Percentile Queue Length [veh]	4.93	4.31	0.63	2.42	0.61	11.19	1.99	2.46	53.26
50th-Percentile Queue Length [ft]	123.35	107.77	15.79	60.51	15.21	279.70	49.76	61.45	1331.53
95th-Percentile Queue Length [veh]	9.73	8.72	1.57	5.36	1.51	19.09	4.52	5.44	85.22
95th-Percentile Queue Length [ft]	243.34	217.94	39.17	134.10	37.79	477.37	113.03	135.91	2130.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	82.73	82.73	79.03	48.57	57.78	57.78	49.93	24.58	19.61	60.31	113.50	113.50
Movement LOS	F	F	E	D	E	E	D	C	B	E	F	F
d_A, Approach Delay [s/veh]		81.48			55.76			24.59			111.50	
Approach LOS		F			E			C			F	
d_I, Intersection Delay [s/veh]						81.88						
Intersection LOS						F						
Intersection V/C						0.650						

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	51.3
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.732

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	373	638	423	398	535	100
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.30	1.10	0.00	0.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	373	638	423	398	535	100
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	96	164	109	103	138	26
Total Analysis Volume [veh/h]	385	658	436	410	552	103
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	29		41		20	

Intersection Settings

Located in CBD	yes
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal Group	0	6	7	0	2	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	50	62	0	38	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	1	1	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall		no	no		no	
Maximum Recall		yes	yes		yes	
Pedestrian Recall		yes	yes		yes	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	46	58	58	34	34
g / C, Green / Cycle	0.31	0.39	0.39	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.23	0.27	0.29	0.17	0.07
Total Saturation Flow Adjustment	0.80	0.85	0.76	0.86	0.76
s, saturation flow rate [veh/h]	4574	1620	1438	3256	1442
c, Capacity [veh/h]	1403	626	556	738	327
d1, Uniform Delay [s]	46.70	38.61	39.47	54.01	48.30
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.61	6.30	8.49	6.83	2.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

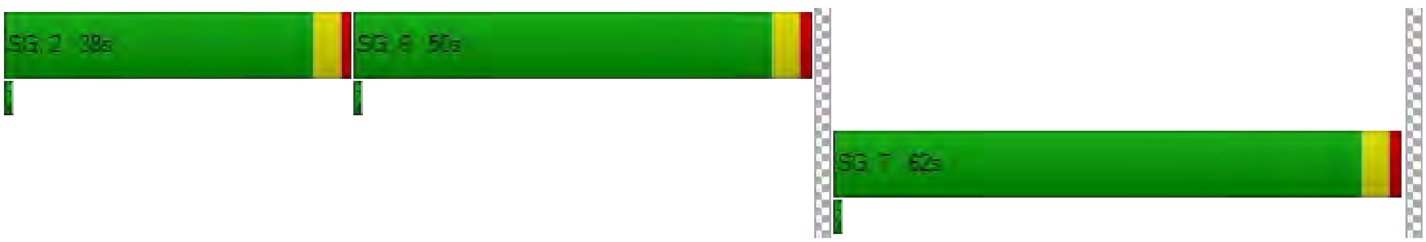
X, volume / capacity	0.74	0.70	0.74	0.75	0.32
d, Delay for Lane Group [s/veh]	50.31	44.90	47.96	60.84	50.82
Lane Group LOS	D	D	D	E	D
Critical Lane Group	yes	no	yes	yes	no
50th-Percentile Queue Length [veh]	16.90	17.69	17.31	13.38	3.91
50th-Percentile Queue Length [ft]	422.60	442.30	432.85	334.38	97.84
95th-Percentile Queue Length [veh]	27.62	28.82	28.24	22.32	8.05
95th-Percentile Queue Length [ft]	690.53	720.54	706.12	558.05	201.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	50.31	50.31	44.90	47.96	60.84	50.82
Movement LOS	D	D	D	D	E	D
d_A, Approach Delay [s/veh]	50.31		46.38		59.26	
Approach LOS	D		D		E	
d_I, Intersection Delay [s/veh]	51.31					
Intersection LOS	D					
Intersection V/C	0.732					

Sequence

Ring 1	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#110: Marsh Road/101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	49.8
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.851

Intersection Setup

Name	Marsh Road		Marsh Road		101 NB Ramps	
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		no		yes	

Volumes

Name	Marsh Road		Marsh Road		101 NB Ramps	
Base Volume Input [veh/h]	2255	0	0	567	544	239
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	0.00	0.00	3.00	5.10	12.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2255	0	0	567	544	239
Peak Hour Factor	0.9600	1.0000	1.0000	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	587	0	0	148	142	62
Total Analysis Volume [veh/h]	2349	0	0	591	567	249
Presence of On-Street Parking	no			no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	1		2		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	25.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal Group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	64	0	0	72	28	8
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	2.0
Walk [s]	7	0	0	0	7	0
Pedestrian Clearance [s]	18	0	0	0	20	0
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	yes			yes	no	no
Maximum Recall	no			no	no	no
Pedestrian Recall	no			no	no	no
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	62	70	26	98
g / C, Green / Cycle	0.62	0.70	0.26	0.98
(v / s)_i Volume / Saturation Flow Rate	0.68	0.17	0.17	0.17
Total Saturation Flow Adjustment	0.91	0.92	0.88	0.76
s, saturation flow rate [veh/h]	3465	3512	3335	1441
c, Capacity [veh/h]	2148	2459	867	1412
d1, Uniform Delay [s]	19.00	5.41	32.99	0.02
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	50.23	0.23	3.83	0.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

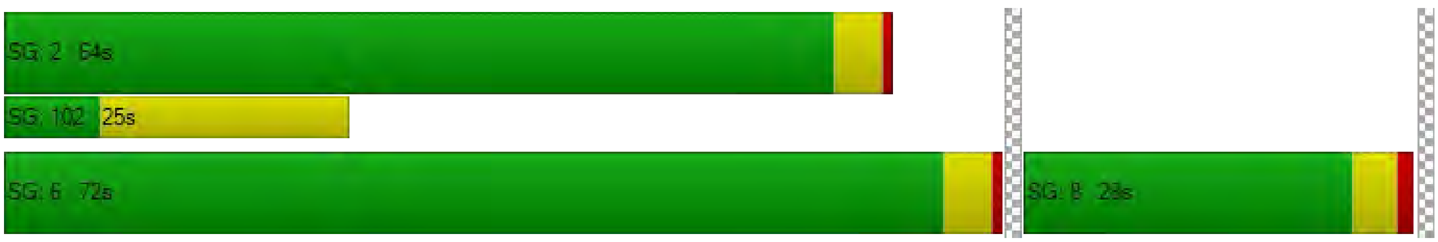
X, volume / capacity	1.09	0.24	0.65	0.18
d, Delay for Lane Group [s/veh]	69.23	5.64	36.82	0.30
Lane Group LOS	E	A	D	A
Critical Lane Group	yes	no	no	yes
50th-Percentile Queue Length [veh]	56.66	3.57	8.47	0.50
50th-Percentile Queue Length [ft]	1416.45	89.34	211.80	12.54
95th-Percentile Queue Length [veh]	90.65	7.47	15.11	1.26
95th-Percentile Queue Length [ft]	2266.33	186.66	377.79	31.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.23	0.00	0.00	5.64	36.82	0.30
Movement LOS	E			A	D	A
d_A, Approach Delay [s/veh]	69.23		5.64		25.67	
Approach LOS	E		A		C	
d_I, Intersection Delay [s/veh]	49.76					
Intersection LOS	D					
Intersection V/C	0.851					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	6.2
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.556

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	912	1585	100	29	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.10	0.80	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	912	1585	100	29	88
Peak Hour Factor	1.0000	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	235	409	26	7	23
Total Analysis Volume [veh/h]	0	940	1634	103	30	91
Presence of On-Street Parking		no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23		0		2	
Bicycle Volume [bicycles/h]	16		34		1	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal Group	0	2	6	0	3	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	30	30	0	30	0
Amber [s]	0.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	130	130	0	20	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	1	1	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no	no		no	
Maximum Recall		yes	yes		yes	
Pedestrian Recall		yes	yes		yes	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	128	128	18	18
g / C, Green / Cycle	0.85	0.85	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.26	0.49	0.02	0.06
Total Saturation Flow Adjustment	0.94	0.94	0.95	0.85
s, saturation flow rate [veh/h]	3578	3557	1805	1615
c, Capacity [veh/h]	3053	3035	217	194
d1, Uniform Delay [s]	2.19	3.15	59.06	61.55
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.26	0.79	1.33	7.96
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.31	0.57	0.14	0.47
d, Delay for Lane Group [s/veh]	2.45	3.94	60.39	69.50
Lane Group LOS	A	A	E	E
Critical Lane Group	no	yes	no	yes
50th-Percentile Queue Length [veh]	5.10	13.82	1.21	3.98
50th-Percentile Queue Length [ft]	127.39	345.60	30.21	99.48
95th-Percentile Queue Length [veh]	9.99	22.99	2.88	8.16
95th-Percentile Queue Length [ft]	249.81	574.73	72.05	204.05

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	2.45	3.94	3.94	60.39	69.50
Movement LOS		A	A	A	E	E
d_A, Approach Delay [s/veh]	2.45		3.94		67.25	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	6.18					
Intersection LOS	A					
Intersection V/C	0.556					

Sequence

Ring 1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	35.2
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.516

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	108	0	113	90	0	103	65	945	6	28	1307	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.60	0.00	2.70	2.20	0.00	1.90	3.10	0.50	0.00	14.30	0.50	5.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	0	113	90	0	103	65	945	6	28	1307	20
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	0	30	24	0	27	17	251	2	7	348	5
Total Analysis Volume [veh/h]	115	0	120	96	0	110	69	1005	6	30	1390	21
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			16			3			0		
Bicycle Volume [bicycles/h]	12			0			22			22		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	20.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	8	0	0	8	0	4	10	0	6	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	29	0	0	29	0	14	47	0	14	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		yes			yes		no	yes		yes	yes	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	R	L	C	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	27	27	27	27	12	45	12	38
g / C, Green / Cycle	0.28	0.28	0.28	0.28	0.13	0.47	0.13	0.40
(v / s)_i Volume / Saturation Flow Rate	0.08	0.08	0.07	0.07	0.04	0.28	0.02	0.39
Total Saturation Flow Adjustment	0.72	0.81	0.74	0.83	0.92	0.95	0.83	0.94
s, saturation flow rate [veh/h]	1372	1541	1408	1581	1751	3596	1579	3589
c, Capacity [veh/h]	390	438	400	449	221	1703	199	1436
d1, Uniform Delay [s]	26.56	26.39	26.12	26.16	37.75	18.30	36.96	28.18
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.92	1.54	1.41	1.29	3.65	1.53	1.59	19.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

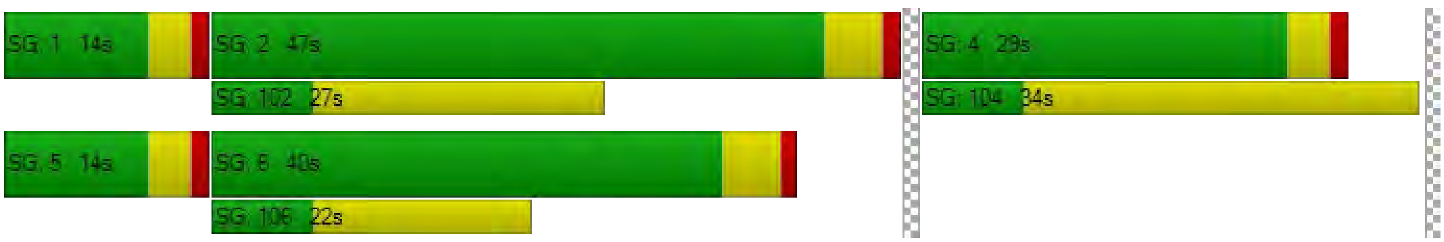
X, volume / capacity	0.29	0.27	0.24	0.24	0.31	0.59	0.15	0.98
d, Delay for Lane Group [s/veh]	28.48	27.93	27.53	27.45	41.39	19.83	38.55	48.15
Lane Group LOS	C	C	C	C	D	B	D	D
Critical Lane Group	yes	no	no	no	yes	no	no	yes
50th-Percentile Queue Length [veh]	2.63	2.71	2.14	2.45	1.84	11.81	0.77	28.05
50th-Percentile Queue Length [ft]	65.64	67.69	53.56	61.29	46.03	295.22	19.32	701.27
95th-Percentile Queue Length [veh]	5.75	5.91	4.82	5.42	4.22	20.01	1.90	44.98
95th-Percentile Queue Length [ft]	143.85	147.69	120.58	135.60	105.51	500.18	47.46	1124.60

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	28.48	28.48	27.93	27.53	27.53	27.45	41.39	19.83	19.83	38.55	48.15	48.15
Movement LOS	C	C	C	C	C	C	D	B	B	D	D	D
d_A, Approach Delay [s/veh]	28.20			27.49			21.21			47.95		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	35.21											
Intersection LOS	D											
Intersection V/C	0.516											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	21.0
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.451

Intersection Setup

Name	Branner Drive						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Branner Drive						Sand Hill Road					
Base Volume Input [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	5.00	0.00	2.30	4.50	1.10	0.00	5.90	2.00	4.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	4	5	0	11	6	280	2	4	344	6
Total Analysis Volume [veh/h]	2	0	18	21	0	45	23	1121	7	18	1376	25
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			0			5		
Bicycle Volume [bicycles/h]	2			0			35			15		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	58.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal Group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	3	0	0	3	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	20	0	0	20	0	12	58	0	12	58	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	2.9	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no		no	no		no	no	
Maximum Recall		yes			yes		yes	yes		yes	yes	
Pedestrian Recall		no			no		no	no		no	no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	L	C	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	18	18	10	56	10	56
g / C, Green / Cycle	0.17	0.17	0.10	0.53	0.10	0.53
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.01	0.32	0.01	0.40
Total Saturation Flow Adjustment	0.86	0.85	0.91	0.94	0.90	0.93
s, saturation flow rate [veh/h]	1625	1609	1727	3574	1704	3536
c, Capacity [veh/h]	279	276	165	1906	162	1886
d1, Uniform Delay [s]	36.49	37.58	43.56	16.71	43.43	18.94
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.50	2.04	1.77	1.36	1.38	2.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.07	0.24	0.14	0.59	0.11	0.74
d, Delay for Lane Group [s/veh]	36.99	39.63	45.33	18.06	44.81	21.63
Lane Group LOS	D	D	D	B	D	C
Critical Lane Group	no	yes	yes	no	no	yes
50th-Percentile Queue Length [veh]	0.53	1.82	0.67	13.57	0.52	19.89
50th-Percentile Queue Length [ft]	13.24	45.62	16.84	339.13	13.11	497.36
95th-Percentile Queue Length [veh]	1.32	4.19	1.67	22.60	1.31	32.20
95th-Percentile Queue Length [ft]	33.09	104.66	41.65	565.10	32.78	805.08

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.99	36.99	36.99	39.63	39.63	39.63	45.33	18.06	18.06	44.81	21.63	21.63
Movement LOS	D	D	D	D	D	D	D	B	B	D	C	C
d_A, Approach Delay [s/veh]	36.99			39.63			18.61			21.92		
Approach LOS	D			D			B			C		
d_I, Intersection Delay [s/veh]	21.04											
Intersection LOS	C											
Intersection V/C	0.451											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	51.3
Analysis Method:	HCM2000	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.684

Intersection Setup

Name				Sand Hill Road						Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name				Sand Hill Road						Sharon Park Drive		
Base Volume Input [veh/h]	164	916	1	16	1220	252	12	6	17	178	3	172
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.60	1.30	100.00	0.00	1.10	0.80	0.00	0.00	17.60	0.00	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	916	1	16	1220	252	12	6	17	178	3	172
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	241	0	4	321	66	3	2	4	47	1	45
Total Analysis Volume [veh/h]	173	964	1	17	1284	265	13	6	18	187	3	181
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			6			10		
Bicycle Volume [bicycles/h]	32			32			2			5		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	69.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal Group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	5	10	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	0.5	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	16	41	0	14	39	0	0	35	0	0	35	0
Vehicle Extension [s]	3.0	7.0	0.0	3.0	7.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no	no		no	no			no			no	
Maximum Recall	no	yes		no	yes			no			no	
Pedestrian Recall	no	no		no	no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	L	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	14	39	12	37	33	33	33
g / C, Green / Cycle	0.16	0.43	0.13	0.41	0.37	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.10	0.27	0.01	0.45	0.02	0.14	0.11
Total Saturation Flow Adjustment	0.94	0.94	0.95	0.91	0.85	0.71	0.83
s, saturation flow rate [veh/h]	1794	3570	1805	3461	1620	1352	1584
c, Capacity [veh/h]	279	1547	241	1423	594	496	581
d1, Uniform Delay [s]	35.51	19.80	34.12	26.50	18.47	21.00	20.38
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.94	1.91	0.57	51.83	0.20	2.24	1.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

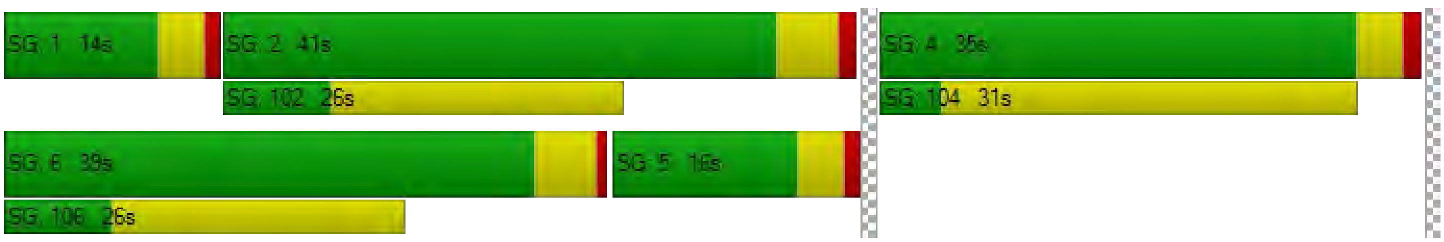
X, volume / capacity	0.62	0.62	0.07	1.09	0.06	0.38	0.31
d, Delay for Lane Group [s/veh]	45.45	21.71	34.69	78.33	18.67	23.24	21.77
Lane Group LOS	D	C	C	E	B	C	C
Critical Lane Group	yes	no	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	4.76	11.41	0.40	35.05	0.65	3.93	3.59
50th-Percentile Queue Length [ft]	119.12	285.30	10.10	876.35	16.30	98.24	89.66
95th-Percentile Queue Length [veh]	9.46	19.42	1.02	56.12	1.62	8.08	7.49
95th-Percentile Queue Length [ft]	236.52	485.59	25.47	1402.94	40.40	201.96	187.22

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	45.45	21.71	21.71	34.69	78.33	78.33	18.67	18.67	18.67	23.24	23.24	21.77
Movement LOS	D	C	C	C	E	E	B	B	B	C	C	C
d_A, Approach Delay [s/veh]	25.32			77.86			18.67			22.53		
Approach LOS	C			E			B			C		
d_I, Intersection Delay [s/veh]	51.34											
Intersection LOS	D											
Intersection V/C	0.684											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	320.4
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.964

Intersection Setup

Name				Haven Avenue			Bayfront Expressway			Marsh Road		
Approach	Northbound			Eastbound			Westbound			Southwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	no			yes			yes			yes		

Volumes

Name				Haven Avenue			Bayfront Expressway			Marsh Road		
Base Volume Input [veh/h]	125	31	2131	8	477	136	1287	63	13	16	25	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	19.20	0.00	2.90	0.00	0.40	2.20	2.90	14.30	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	31	2131	8	477	136	1287	63	13	16	25	3
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	8	555	2	124	35	335	16	3	4	7	1
Total Analysis Volume [veh/h]	130	32	2220	8	497	142	1341	66	14	17	26	3
Presence of On-Street Parking	no		no	no		no	no		no	no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			3			0			2		
Bicycle Volume [bicycles/h]	0			0			2			2		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss
Signal Group	2	3	2	4	1	4	8	2	8	6	4	6
Auxiliary Signal Groups			2,3									
Lead / Lag	Lag	-	-	Lag	-	-	-	-	-	-	-	-
Minimum Green [s]	10	6	10	4	12	4	0	10	0	0	4	0
Maximum Green [s]	50	26	50	10	30	10	0	50	0	0	10	0
Amber [s]	4.7	3.6	4.7	3.6	3.6	3.6	0.0	4.7	0.0	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	0.5	0.0	0.5	0.0	1.0	0.0	0.0	0.5	0.0
Split [s]	30	0	30	0	0	0	0	30	0	0	0	0
Vehicle Extension [s]	4.5	2.5	4.5	2.8	2.0	2.8	0.0	4.5	0.0	0.0	2.8	0.0
Walk [s]	7	0	7	7	5	7	0	7	0	0	7	0
Pedestrian Clearance [s]	16	0	16	22	26	22	0	16	0	0	22	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no	no		no			no			no	
Maximum Recall		no	no		no			no			no	
Pedestrian Recall		no	no		no			no			no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	29	54	32	32	54	54	12
g / C, Green / Cycle	0.19	0.36	0.21	0.21	0.36	0.36	0.08
(v / s)_i Volume / Saturation Flow Rate	0.09	0.80	0.14	0.09	0.26	0.05	0.02
Total Saturation Flow Adjustment	0.96	0.73	0.95	0.83	0.90	0.85	0.97
s, saturation flow rate [veh/h]	1827	2778	3600	1580	5110	1616	1845
c, Capacity [veh/h]	351	1001	764	335	1842	582	150
d1, Uniform Delay [s]	53.38	47.65	53.80	50.82	41.32	32.06	64.50
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.33	551.06	4.47	3.89	2.56	0.49	5.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.46	2.22	0.66	0.42	0.73	0.14	0.31
d, Delay for Lane Group [s/veh]	57.71	598.71	58.27	54.71	43.89	32.56	69.73
Lane Group LOS	E	F	E	D	D	C	E
Critical Lane Group	no	yes	yes	no	no	no	yes
50th-Percentile Queue Length [veh]	6.60	139.93	11.60	5.63	19.32	2.40	1.98
50th-Percentile Queue Length [ft]	164.94	3498.21	289.91	140.79	482.95	60.12	49.55
95th-Percentile Queue Length [veh]	12.32	223.89	19.69	10.84	31.31	5.33	4.50
95th-Percentile Queue Length [ft]	307.98	5597.14	492.37	270.92	782.86	133.36	112.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.71	57.71	598.71	58.27	58.27	54.71	43.89	32.56	32.56	69.73	69.73	69.73
Movement LOS	E	E	F	E	E	D	D	C	C	E	E	E
d_A, Approach Delay [s/veh]	561.92			57.49			43.25			69.73		
Approach LOS	F			E			D			E		
d_I, Intersection Delay [s/veh]	320.36											
Intersection LOS	F											
Intersection V/C	0.964											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	10.0
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.514

Intersection Setup

Name	Santa Cruz Avenue				Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Santa Cruz Avenue				Elder Ave	
Base Volume Input [veh/h]	61	669	641	79	46	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	61	669	641	79	46	41
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	178	170	21	12	11
Total Analysis Volume [veh/h]	65	712	682	84	49	44
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		2		12	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal Group	5	2	6	0	3	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	5	5	0	5	0
Maximum Green [s]	30	30	30	0	30	0
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	11	90	79	0	10	0
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	1	1	0	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	no	no	no		no	
Maximum Recall	yes	yes	yes		yes	
Pedestrian Recall	no	yes	yes		yes	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	86	75	6	6
g / C, Green / Cycle	0.07	0.86	0.75	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.04	0.38	0.41	0.03	0.03
Total Saturation Flow Adjustment	0.95	0.99	0.98	0.95	0.85
s, saturation flow rate [veh/h]	1805	1872	1868	1805	1615
c, Capacity [veh/h]	126	1610	1401	108	97
d1, Uniform Delay [s]	44.86	1.58	5.30	45.41	45.42
k, delay calibration	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.17	0.88	1.54	13.04	14.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.44	0.55	0.45	0.45
d, Delay for Lane Group [s/veh]	59.03	2.47	6.83	58.46	60.00
Lane Group LOS	E	A	A	E	E
Critical Lane Group	yes	no	yes	no	yes
50th-Percentile Queue Length [veh]	2.04	5.81	10.85	1.52	1.37
50th-Percentile Queue Length [ft]	50.92	145.33	271.30	38.09	34.37
95th-Percentile Queue Length [veh]	4.61	11.12	18.60	3.56	3.24
95th-Percentile Queue Length [ft]	115.35	277.97	465.05	89.03	81.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.03	2.47	6.83	6.83	58.46	60.00
Movement LOS	E	A	A	A	E	E
d_A, Approach Delay [s/veh]	7.20		6.83		59.19	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	9.98					
Intersection LOS	A					
Intersection V/C	0.514					

Sequence

Ring 1	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	12.7
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.701

Intersection Setup

Name	Chilco Street				Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	1
Pocket Length [ft]	80.00	100.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Chilco Street				Bayfront Expy	
Base Volume Input [veh/h]	201	196	19	767	2416	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.50	3.10	21.10	4.80	3.10	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	201	196	19	767	2416	156
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	53	5	206	649	42
Total Analysis Volume [veh/h]	216	211	20	825	2598	168
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		2		1	
Bicycle Volume [bicycles/h]	5		1		1	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	5	0	0	4	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	-	-
Minimum Green [s]	5	0	0	5	5	0
Maximum Green [s]	30	0	0	30	30	0
Amber [s]	3.0	0.0	0.0	3.0	3.0	0.0
All red [s]	1.0	0.0	0.0	1.0	1.0	0.0
Split [s]	29	0	0	101	101	0
Vehicle Extension [s]	3.0	0.0	0.0	3.0	3.0	0.0
Walk [s]	1	0	0	1	1	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no			no	no	
Maximum Recall	yes			yes	yes	
Pedestrian Recall	yes			yes	yes	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	27	27	99	99	99	99
g / C, Green / Cycle	0.21	0.21	0.76	0.76	0.76	0.76
(v / s)_i Volume / Saturation Flow Rate	0.13	0.13	0.32	0.17	0.52	0.11
Total Saturation Flow Adjustment	0.90	0.82	0.03	0.87	0.88	0.84
s, saturation flow rate [veh/h]	1711	1566	63	4939	5020	1594
c, Capacity [veh/h]	355	325	55	3761	3823	1214
d1, Uniform Delay [s]	46.70	47.16	5.10	4.44	7.66	4.13
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.53	9.62	17.33	0.13	0.99	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.61	0.65	0.36	0.22	0.68	0.14
d, Delay for Lane Group [s/veh]	54.23	56.78	22.42	4.57	8.65	4.37
Lane Group LOS	D	E	C	A	A	A
Critical Lane Group	no	yes	no	no	yes	no
50th-Percentile Queue Length [veh]	8.12	8.13	0.34	3.65	20.75	1.89
50th-Percentile Queue Length [ft]	203.00	203.16	8.39	91.24	518.71	47.21
95th-Percentile Queue Length [veh]	14.59	14.60	0.85	7.60	33.52	4.32
95th-Percentile Queue Length [ft]	364.82	365.06	21.26	189.95	838.11	107.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.23	56.78	22.42	4.57	8.65	4.37
Movement LOS	D	E	C	A	A	A
d_A, Approach Delay [s/veh]	55.49		4.99		8.39	
Approach LOS	E		A		A	
d_I, Intersection Delay [s/veh]	12.66					
Intersection LOS	B					
Intersection V/C	0.701					

Sequence

Ring 1	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	21.6
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.795

Intersection Setup

Name	Chrysler Drive				Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	140.00	100.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Chrysler Drive				Bayfront Expy	
Base Volume Input [veh/h]	382	43	2516	107	5	978
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.80	0.00	2.80	0.90	0.00	4.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	382	43	2516	107	5	978
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	98	11	648	28	1	252
Total Analysis Volume [veh/h]	394	44	2594	110	5	1008
Presence of On-Street Parking	no	no	no	no	no	no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		2		0	

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal Group	5	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	5	0	5	0	5	5
Maximum Green [s]	30	0	30	0	30	30
Amber [s]	3.0	0.0	3.0	0.0	3.0	3.0
All red [s]	1.0	0.0	1.0	0.0	1.0	1.0
Split [s]	38	0	83	0	9	92
Vehicle Extension [s]	3.0	0.0	3.0	0.0	3.0	3.0
Walk [s]	1	0	1	0	0	1
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	no		no		no	no
Maximum Recall	yes		yes		yes	yes
Pedestrian Recall	yes		yes		yes	yes
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	L	R	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	36	36	81	81	7	90
g / C, Green / Cycle	0.28	0.28	0.62	0.62	0.05	0.69
(v / s)_i Volume / Saturation Flow Rate	0.22	0.03	0.52	0.07	0.00	0.20
Total Saturation Flow Adjustment	0.93	0.85	0.88	0.84	0.95	0.87
s, saturation flow rate [veh/h]	1773	1615	5035	1601	1805	4934
c, Capacity [veh/h]	491	447	3137	997	97	3416
d1, Uniform Delay [s]	43.69	34.94	19.05	9.92	58.35	7.73
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.99	0.44	2.65	0.22	1.00	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.10	0.83	0.11	0.05	0.30
d, Delay for Lane Group [s/veh]	56.68	35.38	21.70	10.14	59.35	7.95
Lane Group LOS	E	D	C	B	E	A
Critical Lane Group	yes	no	yes	no	yes	no
50th-Percentile Queue Length [veh]	16.16	1.27	32.97	1.79	0.19	5.89
50th-Percentile Queue Length [ft]	404.08	31.82	824.26	44.76	4.67	147.18
95th-Percentile Queue Length [veh]	26.50	3.02	52.80	4.12	0.48	11.23
95th-Percentile Queue Length [ft]	662.47	75.57	1319.94	102.90	11.98	280.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.68	35.38	21.70	10.14	59.35	7.95
Movement LOS	E	D	C	B	E	A
d_A, Approach Delay [s/veh]	54.54		21.23		8.21	
Approach LOS	D		C		A	
d_I, Intersection Delay [s/veh]	21.57					
Intersection LOS	C					
Intersection V/C	0.795					

Sequence

Ring 1	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	7	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
#207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	23.6
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name				Chilco Street			Constitution Drive					
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name				Chilco Street			Constitution Drive					
Base Volume Input [veh/h]	14	136	5	17	160	2	28	2	114	158	10	398
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	21.40	1.50	20.00	11.80	3.80	0.00	3.60	50.00	2.60	2.50	50.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	136	5	17	160	2	28	2	114	158	10	398
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	37	1	5	44	1	8	1	31	43	3	109
Total Analysis Volume [veh/h]	15	149	5	19	176	2	31	2	125	174	11	437
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.30	1.60	1.01	10.83
95th-Percentile Queue Length [ft]	32.45	40.02	25.16	270.68
Approach Delay [s/veh]	12.44	13.06	10.76	33.32
Approach LOS	B	B	B	D
Intersection Delay [s/veh]	23.65			
Intersection LOS	C			

Intersection Level Of Service Report
#209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	15.5
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.037

Intersection Setup

Name							Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name							Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	11	0	4	2	481	3	2	24	1	13	0	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.70	0.00	0.00	16.70	0.00	7.70	0.00	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	4	2	481	3	2	24	1	13	0	56
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	1	137	1	1	7	0	4	0	16
Total Analysis Volume [veh/h]	13	0	5	2	547	3	2	27	1	15	0	64
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	no			no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	no			no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.04	0.00	0.12
d_M, Delay for Movement [s/veh]	15.49	13.85	8.77	7.25	0.00	0.00	8.50	0.00	0.00	15.13	14.84	13.19
Movement LOS	C	B	A	A	A	A	A	A	A	C	B	B
95th-Percentile Queue Length [veh]	0.13	0.13	0.13	1.56	1.56	1.56	0.09	0.09	0.09	0.56	0.56	0.56
95th-Percentile Queue Length [ft]	3.23	3.23	3.23	39.09	39.09	39.09	2.25	2.25	2.25	13.95	13.95	13.95
d_A, Approach Delay [s/veh]	13.62			0.03			0.57			13.56		
Approach LOS	B			A			A			B		
d_I, Intersection Delay [s/veh]	1.99											
Intersection LOS	C											

Intersection Level Of Service Report
#213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.0
Analysis Method:	HCM2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Chrysler Drive									Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Chrysler Drive									Independence Drive		
Base Volume Input [veh/h]	0	101	0	1	2	3	0	0	15	35	3	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	5.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	101	0	1	2	3	0	0	15	35	3	6
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	29	0	0	1	1	0	0	4	10	1	2
Total Analysis Volume [veh/h]	0	117	0	1	2	3	0	0	17	41	3	7
Pedestrian Volume [ped/h]	0			0			5			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			no	no
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			no	no
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.01
d_M, Delay for Movement [s/veh]	7.21	0.00	0.00	8.52	0.00	0.00	9.40	9.80	8.94	9.68	9.99	8.59
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.02	0.02	0.02	0.06	0.06	0.06	0.19	0.19	0.19
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	0.44	0.44	0.44	1.39	1.39	1.39	4.83	4.83	4.83
d_A, Approach Delay [s/veh]	0.00			1.42			8.94			9.55		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	3.39											
Intersection LOS	A											

Intersection Level Of Service Report
#214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	Chrysler Drive				Jefferson Drive	
Approach	Southbound		Northeastbound		Northwestbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	yes		yes		yes	

Volumes

Name	Chrysler Drive				Jefferson Drive	
Base Volume Input [veh/h]	9	7	132	7	2	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	22.20	42.90	0.80	71.40	0.00	2.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	7	132	7	2	134
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	2	38	2	1	39
Total Analysis Volume [veh/h]	10	8	152	8	2	154
Pedestrian Volume [ped/h]	1		0		1	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			no
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			no
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.17
d_M, Delay for Movement [s/veh]	7.78	0.00	0.00	0.00	10.36	9.94
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.04	0.04	0.00	0.00	0.64	0.64
95th-Percentile Queue Length [ft]	1.05	1.05	0.00	0.00	15.96	15.96
d_A, Approach Delay [s/veh]	4.32		0.00		9.94	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.88					
Intersection LOS	B					

Intersection Level Of Service Report
#215: Chrysler Dr/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	14.4
Analysis Method:	HCM2000	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chrysler Drive						Constitution Drive					
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Chrysler Drive						Constitution Drive					
Base Volume Input [veh/h]	190	6	1	66	285	9	2	2	78	1	234	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	0.00	100.00	1.50	1.80	11.10	50.00	50.00	5.10	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	190	6	1	66	285	9	2	2	78	1	234	14
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	53	2	0	18	79	3	1	1	22	0	65	4
Total Analysis Volume [veh/h]	211	7	1	73	317	10	2	2	87	1	260	16
Pedestrian Volume [ped/h]	2			0			2			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.70	4.32	0.50	2.25
95th-Percentile Queue Length [ft]	42.53	107.97	12.58	56.34
Approach Delay [s/veh]	12.62	17.35	9.68	13.19
Approach LOS	B	C	A	B
Intersection Delay [s/veh]	14.42			
Intersection LOS	B			

Intersection Level Of Service Report
#233: Sand Hill Circle/Sand Hill Road

Control Type:	Signalized	Delay (sec / veh):	361.8
Analysis Method:	HCM2000	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.712

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Base Volume Input [veh/h]	9	54	0	0	87	180	0	0	0	5	1849	9
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.70	2.00	2.00	5.70	1.10	2.00	2.00	2.00	0.00	0.90	11.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	54	0	0	87	180	0	0	0	5	1849	9
Peak Hour Factor	0.8900	0.8900	1.0000	1.0000	0.8900	0.8900	1.0000	1.0000	1.0000	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	15	0	0	24	51	0	0	0	1	519	3
Total Analysis Volume [veh/h]	10	61	0	0	98	202	0	0	0	6	2078	10
Presence of On-Street Parking	no					no				no		no
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	2			1			0			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Split	Split	Split
Signal Group	0	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	11	0	0	11	0	0	0	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	10	0	0	10	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	0	0	0	14	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no			no						yes	
Maximum Recall		no			no						no	
Pedestrian Recall		no			no						no	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	C	R		C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		0.00
g_i, Effective Green Time [s]	13	13	13		29
g / C, Green / Cycle	0.14	0.14	0.14		0.32
(v / s)_i Volume / Saturation Flow Rate	0.04	0.05	0.13		0.58
Total Saturation Flow Adjustment	0.93	0.95	0.83		0.94
s, saturation flow rate [veh/h]	1773	1798	1579		3582
c, Capacity [veh/h]	246	250	219		1134
d1, Uniform Delay [s]	34.76	35.29	38.26		30.75
k, delay calibration	0.50	0.50	0.50		0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00
d2, Incremental Delay [s]	2.93	4.58	43.19		384.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00
PF, progression factor	1.00	1.00	1.00		1.00

Lane Group Results

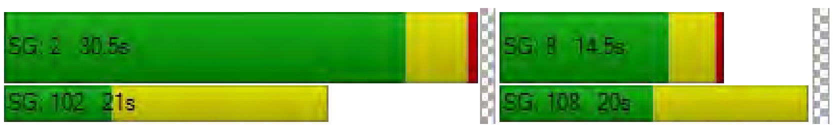
X, volume / capacity	0.29	0.39	0.92		1.85
d, Delay for Lane Group [s/veh]	37.69	39.87	81.45		414.86
Lane Group LOS	D	D	F		F
Critical Lane Group	no	no	yes		yes
50th-Percentile Queue Length [veh]	1.76	2.51	7.24		92.18
50th-Percentile Queue Length [ft]	44.11	62.67	181.04		2304.61
95th-Percentile Queue Length [veh]	4.06	5.53	13.29		147.49
95th-Percentile Queue Length [ft]	101.57	138.23	332.21		3687.37

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	37.69	37.69	0.00	0.00	39.87	81.45	0.00	0.00	0.00	414.86	414.86	414.86
Movement LOS	D	D			D	F				F	F	F
d_A, Approach Delay [s/veh]	37.69			67.87			0.00			414.86		
Approach LOS	D			E			A			F		
d_I, Intersection Delay [s/veh]	361.76											
Intersection LOS	F											
Intersection V/C	0.712											

Sequence

Ring 1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
#234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	31.3
Analysis Method:	HCM2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.360

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	yes			yes			yes			yes		

Volumes

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Base Volume Input [veh/h]	0	23	193	129	0	0	38	697	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.00	4.30	0.00	2.00	2.00	5.30	1.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	23	193	129	0	0	38	697	0	0	0	0
Peak Hour Factor	1.0000	0.9300	0.9300	0.9300	1.0000	1.0000	0.9300	0.9300	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	6	52	35	0	0	10	187	0	0	0	0
Total Analysis Volume [veh/h]	0	25	208	139	0	0	41	749	0	0	0	0
Presence of On-Street Parking			no	no			no					
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			23			0		

Intersection Settings

Located in CBD	no
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Split	Split	Split	Protecte	Permiss	Protecte	Permiss	Permiss	Protecte	Protecte	Permiss
Signal Group	0	8	0	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	0	6	0	0	4	8	0	0	0	0
Maximum Green [s]	0	11	0	22	0	0	13	26	0	0	0	0
Amber [s]	0.0	3.0	0.0	3.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0
All red [s]	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	0.0	2.5	0.0	2.0	0.0	0.0	2.0	4.0	0.0	0.0	0.0	0.0
Walk [s]	0	10	0	0	0	0	5	10	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	0	0	10	10	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		no		no			no	yes				
Maximum Recall		no		no			no	no				
Pedestrian Recall		no		no			no	no				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Calculations

Lane Group	C	L	L	C	
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	
g_i, Effective Green Time [s]	13	24	29	29	
g / C, Green / Cycle	0.14	0.27	0.32	0.32	
(v / s)_i Volume / Saturation Flow Rate	0.07	0.08	0.02	0.21	
Total Saturation Flow Adjustment	0.82	0.95	0.90	0.94	
s, saturation flow rate [veh/h]	3133	1805	1714	3582	
c, Capacity [veh/h]	435	481	543	1134	
d1, Uniform Delay [s]	36.05	26.22	21.53	26.57	
k, delay calibration	0.50	0.50	0.50	0.50	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	4.66	1.51	0.27	3.03	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	

Lane Group Results

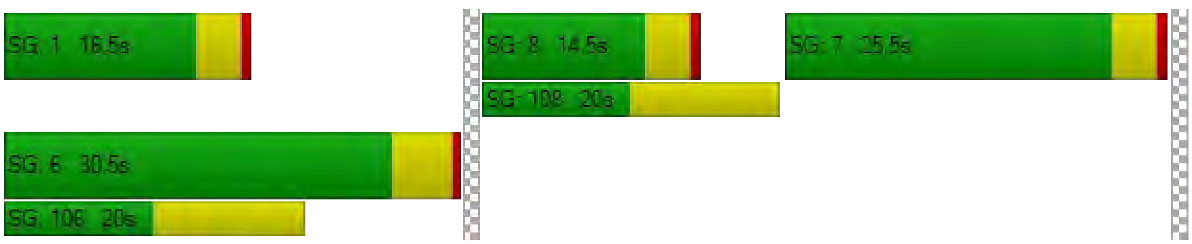
X, volume / capacity	0.54	0.29	0.08	0.66	
d, Delay for Lane Group [s/veh]	40.71	27.73	21.80	29.59	
Lane Group LOS	D	C	C	C	
Critical Lane Group	yes	yes	no	yes	
50th-Percentile Queue Length [veh]	3.30	3.04	0.78	9.96	
50th-Percentile Queue Length [ft]	82.48	75.93	19.46	248.95	
95th-Percentile Queue Length [veh]	6.98	6.51	1.91	17.29	
95th-Percentile Queue Length [ft]	174.60	162.85	47.79	432.30	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	40.71	40.71	27.73	0.00	0.00	21.80	29.59	0.00	0.00	0.00	0.00
Movement LOS		D	D	C			C	C				
d_A, Approach Delay [s/veh]	40.71			27.73			29.19			0.00		
Approach LOS	D			C			C			A		
d_I, Intersection Delay [s/veh]	31.33											
Intersection LOS	C											
Intersection V/C	0.360											

Sequence

Ring 1	1	-	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Menlo Park GP Circulation Update

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Scenario 1: Existing PM

1/9/2015

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	980	893	1547	401	3821

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	29	1083	4	66	1014	203	27	9	467	229	13	1	3145

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	185	720	84	30	697	377	475	15	130	98	41	72	2924

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	2	681	108	194	841	54	45	29	6	84	18	143	2205

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	199	610	457	673	357	60	2356

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringwood Ave	58	70	38	63	1	272	10	775	97	379	568	5	2336

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	3800	62	304	813	78	1577	6634

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	24	46	1104	116	191	116	35	2362	75	359	675	10	5113

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	50	1299	3	13	623	30	163	15	39	139	17	61	2452

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	68	1339	885	15	33	141	2481

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1368	217	72	966	218	44	2885

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	301	1484	263	74	1016	22	28	137	210	210	249	76	4070

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	35	1276	922	261	504	68	3066

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	8	935	10	54	719	29	117	2	28	21	2	97	2022

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	11	738	3	5	680	84	102	4	31	1	1	4	1664

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	30	671	13	26	597	6	61	51	69	56	43	28	1651

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	46	94	256	356	93	332	92	429	216	236	453	29	2632

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	57	596	125	32	523	24	267	215	64	52	135	26	2116

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	13	335	94	30	262	48	78	232	38	28	116	29	1303

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	19	15	31	107	9	238	24	1750	100	65	1215	13	3586

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	363	144	79	59	171	41	98	1525	46	56	992	304	3878

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	118	202	133	129	215	77	87	1426	94	114	1047	97	3739

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	172	50	137	50	58	43	1406	41	1451	87	3495

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	44	348	108	451	249	80	113	1339	590	180	1154	39	4695

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	66	6	36	58	45	48	72	1845	20	68	1586	54	3904

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	249	182	323	1917	1334	86	4091

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	26	0	39	4	3	0	310	2332	6	30	1660	4	4414

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	350	328	88	398	363	165	1692

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Sand Hill Rd/Santa Cruz Ave	361	611	215	424	1038	208	158	691	188	101	526	178	4699

ID	Intersection Name	Northbound		Southbound		Eastbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
58	University Avenue and Adams Drive	11	1786	360	15	25	0	26	2223

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	11	1724	356	10	171	77	2349

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	24	467	105	44	456	29	182	24	57	45	41	72	1546

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	209	3	108	19	3	66	18	794	93	69	1750	16	3148

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	373	638	423	398	535	100	2467

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road/101 NB Ramps	2255	567	544	239	3605

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	912	1585	100	29	88	2714

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	108	0	113	90	0	103	65	945	6	28	1307	20	2785

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	2	0	17	20	0	43	22	1076	7	17	1321	24	2549

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	164	916	1	16	1220	252	12	6	17	178	3	172	2957

ID	Intersection Name	Northbound			Eastbound			Westbound			Southwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	125	31	2131	8	477	136	1287	63	13	16	25	3	4315

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	61	669	641	79	46	41	1537

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	201	196	19	767	2416	156	3755

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	382	43	2516	107	5	978	4031

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	14	136	5	17	160	2	28	2	114	158	10	398	1044

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	11	0	4	2	481	3	2	24	1	13	0	56	597

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	0	101	0	1	2	3	0	0	15	35	3	6	166

ID	Intersection Name	Southbound		Northeastbound		Northwestbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
214	Chrysler Dr/Jefferson Dr	9	7	132	7	2	134	291

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	190	6	1	66	285	9	2	2	78	1	234	14	888

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Circle/Sand Hill Road	9	54	87	180	5	1849	9	2193

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	23	193	129	38	697	1080

Menlo Park GP Circulation Update

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Scenario 1: Existing PM

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1/9/2015

Turning Movement Volume: Detail

ID	Intersection Name	Volume Type	Northeastbound	Southwestbound	Southeastbound		Total Volume
			Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	Final Base	980	893	1547	401	3821
		Growth Rate	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0
		Net New Trips	0	0	0	0	0
		Other	0	0	0	0	0
		Future Total	**980**	**893**	**1547**	**401**	**3821**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	Final Base	29	1083	4	66	1014	203	27	9	467	229	13	1	3145
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**29**	**1083**	**4**	**66**	**1014**	**203**	**27**	**9**	**467**	**229**	**13**	**1**	**3145**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	Final Base	185	720	84	30	697	377	475	15	130	98	41	72	2924
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**185**	**720**	**84**	**30**	**697**	**377**	**475**	**15**	**130**	**98**	**41**	**72**	**2924**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	Final Base	2	681	108	194	841	54	45	29	6	84	18	143	2205
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**2**	**681**	**108**	**194**	**841**	**54**	**45**	**29**	**6**	**84**	**18**	**143**	**2205**

ID	Intersection Name	Volume Type	Northeastbound		Northwestbound		Southeastbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	Final Base	199	610	457	673	357	60	2356
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**199**	**610**	**457**	**673**	**357**	**60**	**2356**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringwood Ave	Final Base	58	70	38	63	1	272	10	775	97	379	568	5	2336
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**58**	**70**	**38**	**63**	**1**	**272**	**10**	**775**	**97**	**379**	**568**	**5**	**2336**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Final Base	3800	62	304	813	78	1577	6634
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**3800**	**62**	**304**	**813**	**78**	**1577**	**6634**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Final Base	24	46	1404	116	191	116	35	2362	75	359	675	10	5413
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	-300	0	0	0	0	0	0	0	0	0	-300
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**24**	**46**	**1104**	**116**	**191**	**116**	**35**	**2362**	**75**	**359**	**675**	**10**	**5113**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	Final Base	50	1299	3	13	623	30	163	15	39	139	17	61	2452
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**50**	**1299**	**3**	**13**	**623**	**30**	**163**	**15**	**39**	**139**	**17**	**61**	**2452**

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	Final Base	68	1339	885	15	33	141	2481
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**68**	**1339**	**885**	**15**	**33**	**141**	**2481**

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	Final Base	1368	217	72	966	218	44	2885
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**1368**	**217**	**72**	**966**	**218**	**44**	**2885**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	Final Base	301	1484	263	74	1016	22	28	137	210	210	249	76	4070
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**301**	**1484**	**263**	**74**	**1016**	**22**	**28**	**137**	**210**	**210**	**249**	**76**	**4070**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Southeastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	Final Base	35	1276	922	261	504	68	3066
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**35**	**1276**	**922**	**261**	**504**	**68**	**3066**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	Final Base	8	935	10	54	719	29	117	2	28	21	2	97	2022
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**8**	**935**	**10**	**54**	**719**	**29**	**117**	**2**	**28**	**21**	**2**	**97**	**2022**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	Final Base	11	738	3	5	680	84	102	4	31	1	1	4	1664
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**11**	**738**	**3**	**5**	**680**	**84**	**102**	**4**	**31**	**1**	**1**	**4**	**1664**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	Final Base	30	671	13	26	597	6	61	51	69	56	43	28	1651
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**30**	**671**	**13**	**26**	**597**	**6**	**61**	**51**	**69**	**56**	**43**	**28**	**1651**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	Final Base	46	94	256	356	93	332	92	429	216	236	453	29	2632
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**46**	**94**	**256**	**356**	**93**	**332**	**92**	**429**	**216**	**236**	**453**	**29**	**2632**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	Final Base	57	596	125	32	523	24	267	215	64	52	135	26	2116
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**57**	**596**	**125**	**32**	**523**	**24**	**267**	**215**	**64**	**52**	**135**	**26**	**2116**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	Final Base	13	335	94	30	262	48	78	232	38	28	116	29	1303
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**13**	**335**	**94**	**30**	**262**	**48**	**78**	**232**	**38**	**28**	**116**	**29**	**1303**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Final Base	19	15	31	107	9	238	24	1750	100	65	1215	13	3586
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**19**	**15**	**31**	**107**	**9**	**238**	**24**	**1750**	**100**	**65**	**1215**	**13**	**3586**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Final Base	363	144	79	59	171	41	98	1525	46	56	992	304	3878
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**363**	**144**	**79**	**59**	**171**	**41**	**98**	**1525**	**46**	**56**	**992**	**304**	**3878**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	Final Base	118	202	133	129	215	77	87	1426	94	114	1047	97	3739
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**118**	**202**	**133**	**129**	**215**	**77**	**87**	**1426**	**94**	**114**	**1047**	**97**	**3739**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
			Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	Final Base	172	50	137	50	58	43	1406	41	1451	87	3495
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**172**	**50**	**137**	**50**	**58**	**43**	**1406**	**41**	**1451**	**87**	**3495**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Final Base	44	348	108	451	249	80	113	1339	590	180	1154	39	4695
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**44**	**348**	**108**	**451**	**249**	**80**	**113**	**1339**	**590**	**180**	**1154**	**39**	**4695**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	Final Base	66	6	36	58	45	48	72	1845	20	68	1586	54	3904
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**66**	**6**	**36**	**58**	**45**	**48**	**72**	**1845**	**20**	**68**	**1586**	**54**	**3904**

ID	Intersection Name	Volume Type	Northeastbound		Northwestbound		Southeastbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	Final Base	249	182	323	1917	1334	86	4091
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**249**	**182**	**323**	**1917**	**1334**	**86**	**4091**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	Final Base	26	0	39	4	3	0	310	2332	6	30	1660	4	4414
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**26**	**0**	**39**	**4**	**3**	**0**	**310**	**2332**	**6**	**30**	**1660**	**4**	**4414**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Northwestbound		Total Volume
			Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	Final Base	350	328	88	398	363	165	1692
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**350**	**328**	**88**	**398**	**363**	**165**	**1692**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Sand Hill Rd/Santa Cruz Ave	Final Base	361	611	215	424	1038	208	158	691	188	101	526	178	4699
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**361**	**611**	**215**	**424**	**1038**	**208**	**158**	**691**	**188**	**101**	**526**	**178**	**4699**

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound			Total Volume
			Left	Thru	Thru	Right	Left	Thru	Right	
58	University Avenue and Adams Drive	Final Base	11	1786	360	15	25	0	26	2223
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0
		Future Total	**11**	**1786**	**360**	**15**	**25**	**0**	**26**	**2223**

ID	Intersection Name	Volume Type	Northbound		Southbound		Eastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	Final Base	11	1724	356	10	171	77	2349
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**11**	**1724**	**356**	**10**	**171**	**77**	**2349**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	Final Base	24	467	105	44	456	29	182	24	57	45	41	72	1546
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**24**	**467**	**105**	**44**	**456**	**29**	**182**	**24**	**57**	**45**	**41**	**72**	**1546**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	Final Base	209	3	108	19	3	66	18	794	93	69	1750	16	3148
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**209**	**3**	**108**	**19**	**3**	**66**	**18**	**794**	**93**	**69**	**1750**	**16**	**3148**

ID	Intersection Name	Volume Type	Southbound		Westbound		Northeastbound		Total Volume
			Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Final Base	373	638	423	398	535	100	2467
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**373**	**638**	**423**	**398**	**535**	**100**	**2467**

ID	Intersection Name	Volume Type	Northbound	Southbound	Northwestbound		Total Volume
			Thru	Thru	Left	Right	
110	Marsh Road/101 NB Ramps	Final Base	2255	567	544	239	3605
		Growth Rate	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0
		Net New Trips	0	0	0	0	0
		Other	0	0	0	0	0
		Future Total	**2255**	**567**	**544**	**239**	**3605**

ID	Intersection Name	Volume Type	Northeastbound	Southwestbound		Southeastbound		Total Volume
			Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	Final Base	912	1585	100	29	88	2714
		Growth Rate	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0
		Other	0	0	0	0	0	0
		Future Total	**912**	**1585**	**100**	**29**	**88**	**2714**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	Final Base	108	0	113	90	0	103	65	945	6	28	1307	20	2785
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**108**	**0**	**113**	**90**	**0**	**103**	**65**	**945**	**6**	**28**	**1307**	**20**	**2785**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Westbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	Final Base	2	0	17	20	0	43	22	1076	7	17	1321	24	2549
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**2**	**0**	**17**	**20**	**0**	**43**	**22**	**1076**	**7**	**17**	**1321**	**24**	**2549**

ID	Intersection Name	Volume Type	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	Final Base	164	916	1	16	1220	252	12	6	17	178	3	172	2957
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**164**	**916**	**1**	**16**	**1220**	**252**	**12**	**6**	**17**	**178**	**3**	**172**	**2957**

ID	Intersection Name	Volume Type	Northbound			Eastbound			Westbound			Southwestbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	Final Base	125	31	2131	8	477	136	1287	63	13	16	25	3	4315
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**125**	**31**	**2131**	**8**	**477**	**136**	**1287**	**63**	**13**	**16**	**25**	**3**	**4315**

ID	Intersection Name	Volume Type	Northeastbound		Southwestbound		Southeastbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	Final Base	61	669	641	79	46	41	1537
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**61**	**669**	**641**	**79**	**46**	**41**	**1537**

ID	Intersection Name	Volume Type	Northbound		Westbound		Southeastbound		Total Volume
			Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	Final Base	201	196	19	767	2416	156	3755
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**201**	**196**	**19**	**767**	**2416**	**156**	**3755**

ID	Intersection Name	Volume Type	Northbound		Eastbound		Westbound		Total Volume
			Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	Final Base	382	43	2516	107	5	978	4031
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**382**	**43**	**2516**	**107**	**5**	**978**	**4031**

ID	Intersection Name	Volume Type	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	Final Base	14	136	5	17	160	2	28	2	114	158	10	398	1044
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**14**	**136**	**5**	**17**	**160**	**2**	**28**	**2**	**114**	**158**	**10**	**398**	**1044**

ID	Intersection Name	Volume Type	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	Final Base	11	0	4	2	481	3	2	24	1	13	0	56	597
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**11**	**0**	**4**	**2**	**481**	**3**	**2**	**24**	**1**	**13**	**0**	**56**	**597**

ID	Intersection Name	Volume Type	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	Final Base	0	101	0	1	2	3	0	0	15	35	3	6	166
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**0**	**101**	**0**	**1**	**2**	**3**	**0**	**0**	**15**	**35**	**3**	**6**	**166**

ID	Intersection Name	Volume Type	Southbound		Northeastbound		Northwestbound		Total Volume
			Left	Thru	Thru	Right	Left	Right	
214	Chrysler Dr/Jefferson Dr	Final Base	9	7	132	7	2	134	291
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0
		Future Total	**9**	**7**	**132**	**7**	**2**	**134**	**291**

ID	Intersection Name	Volume Type	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	Final Base	190	6	1	66	285	9	2	2	78	1	234	14	888
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0	0	0	0	0	0
		Future Total	**190**	**6**	**1**	**66**	**285**	**9**	**2**	**2**	**78**	**1**	**234**	**14**	**888**

ID	Intersection Name	Volume Type	Northbound		Southbound		Westbound			Total Volume
			Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Circle/Sand Hill Road	Final Base	9	54	87	180	5	1849	9	2193
		Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0	0	0
		Other	0	0	0	0	0	0	0	0
		Future Total	**9**	**54**	**87**	**180**	**5**	**1849**	**9**	**2193**

ID	Intersection Name	Volume Type	Northbound		Southbound	Eastbound		Total Volume
			Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Final Base	23	193	129	38	697	1080
		Growth Rate	1.00	1.00	1.00	1.00	1.00	-
		In Process	0	0	0	0	0	0
		Net New Trips	0	0	0	0	0	0
		Other	0	0	0	0	0	0
		Future Total	**23**	**193**	**129**	**38**	**697**	**1080**

Signal Warrants Report For Intersection #58: University Avenue and Adams Drive

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	S, N
Minor Approaches	W
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	S	N	W
1	36	8	1
2	36	8	1
3	54	11	2
4	54	11	2
5	72	15	2
6	180	38	5
7	198	41	6
8	359	75	10
9	629	131	18
10	647	135	18
11	647	135	18
12	701	146	20
13	773	161	22
14	809	169	23
15	809	169	23
16	863	180	24
17	1078	225	31
18	1132	236	32
19	1222	255	35
20	1366	285	39
21	1438	300	41
22	1689	353	48
23	1725	360	49
24	1797	375	51

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	5	44	1	1	No	No	No	No	No	No	No	No	No	No
2	5	44	1	1	No	No	No	No	No	No	No	No	No	No
3	5	65	1	2	No	No	No	No	No	No	No	No	No	No
4	5	65	1	2	No	No	No	No	No	No	No	No	No	No
5	5	87	1	2	No	No	No	No	No	No	No	No	No	No
6	5	218	1	5	No	No	No	No	No	No	No	No	No	No
7	5	239	1	6	No	No	No	No	No	No	No	No	No	No
8	5	434	1	10	No	No	No	No	No	No	No	No	No	No
9	5	760	1	18	No	No	No	No	No	No	No	No	No	No
10	5	782	1	18	No	No	No	No	No	No	No	No	No	No
11	5	782	1	18	No	No	No	No	No	No	No	No	No	No
12	5	847	1	20	No	No	No	No	No	No	No	No	No	No
13	5	934	1	22	No	No	No	No	No	No	No	No	No	No
14	5	978	1	23	No	No	No	No	No	No	No	No	No	No
15	5	978	1	23	No	No	No	No	No	No	No	No	No	No
16	5	1043	1	24	No	No	No	No	No	No	No	No	No	No
17	5	1303	1	31	No	No	No	No	No	No	No	No	No	No
18	5	1368	1	32	No	No	No	No	No	No	No	No	No	No
19	5	1477	1	35	No	No	No	No	No	No	No	No	No	No
20	5	1651	1	39	No	No	No	No	No	No	No	No	No	No
21	5	1738	1	41	No	No	No	No	No	No	No	No	No	No
22	5	2042	1	48	No	No	No	No	No	No	No	Yes	No	No
23	5	2085	1	49	No	No	No	No	No	No	No	Yes	No	No
24	5	2172	1	51	No	No	No	No	No	No	No	Yes	No	No
Hours Met					0	0	0	0	0	0	0	3	0	0

Warrant 3 Condition A

Orientation	W
Total Stopped Delay Per Vehicle on Minor Approach (s)	27.3
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:23
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	51
High Minor Volume Condition Met	No
Total Entering Volume on All Approaches During Same Hour	2223
Number of Approaches on Intersection	3
Total Volume Condition Met	Yes
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection #207: Chilco St/Constitution Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	SE, W
Minor Approaches	N, S
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	SE	W	N	S
1	11	3	4	3
2	11	3	4	3
3	17	4	5	5
4	17	4	5	5
5	23	6	7	6
6	57	14	18	16
7	62	16	20	17
8	113	29	36	31
9	198	50	63	54
10	204	52	64	56
11	204	52	64	56
12	221	56	70	60
13	243	62	77	67
14	255	65	81	70
15	255	65	81	70
16	272	69	86	74
17	340	86	107	93
18	357	91	113	98
19	385	98	122	105
20	430	109	136	118
21	453	115	143	124
22	532	135	168	146
23	543	138	172	149
24	566	144	179	155

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	14	2	7	No	No	No	No	No	No	No	No	No	No
2	2	14	2	7	No	No	No	No	No	No	No	No	No	No
3	2	21	2	10	No	No	No	No	No	No	No	No	No	No
4	2	21	2	10	No	No	No	No	No	No	No	No	No	No
5	2	29	2	13	No	No	No	No	No	No	No	No	No	No
6	2	71	2	34	No	No	No	No	No	No	No	No	No	No
7	2	78	2	37	No	No	No	No	No	No	No	No	No	No
8	2	142	2	67	No	No	No	No	No	No	No	No	No	No
9	2	248	2	117	No	No	No	No	No	No	No	No	No	No
10	2	256	2	120	No	No	No	No	No	No	No	No	No	No
11	2	256	2	120	No	No	No	No	No	No	No	No	No	No
12	2	277	2	130	No	No	No	No	No	No	No	No	No	No
13	2	305	2	144	No	No	No	No	No	No	No	No	No	No
14	2	320	2	151	No	No	No	No	No	No	No	No	No	No
15	2	320	2	151	No	No	No	No	No	No	No	No	No	No
16	2	341	2	160	No	No	No	Yes	No	No	No	No	No	No
17	2	426	2	200	No	No	Yes	Yes	No	No	No	No	No	No
18	2	448	2	211	No	No	Yes	Yes	No	No	No	No	No	No
19	2	483	2	227	No	Yes	Yes	Yes	No	No	No	No	No	No
20	2	539	2	254	No	Yes	Yes	Yes	No	No	No	Yes	No	No
21	2	568	2	267	No	Yes	Yes	Yes	No	No	No	Yes	No	No
22	2	667	2	314	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
23	2	681	2	321	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
24	2	710	2	334	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	No
Hours Met					3	6	8	9	0	0	3	5	3	0

Warrant 3 Condition A

Orientation	N	S
Total Stopped Delay Per Vehicle on Minor Approach (s)	13.1	12.4
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:38	0:32
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	179	155
High Minor Volume Condition Met	Yes	Yes
Total Entering Volume on All Approaches During Same Hour	1044	1044
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection #209: Jefferson Dr/Constitution Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N, SW
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	N	SW
1	1	10	0	1
2	1	10	0	1
3	1	15	0	2
4	1	15	0	2
5	1	19	1	3
6	3	49	2	7
7	3	53	2	8
8	5	97	3	14
9	9	170	5	24
10	10	175	5	25
11	10	175	5	25
12	11	190	6	27
13	12	209	6	30
14	12	219	7	31
15	12	219	7	31
16	13	233	7	33
17	16	292	9	41
18	17	306	9	43
19	18	330	10	47
20	21	369	11	52
21	22	389	12	55
22	25	457	14	65
23	26	467	14	66
24	27	486	15	69

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	11	2	1	No	No	No	No	No	No	No	No	No	No
2	2	11	2	1	No	No	No	No	No	No	No	No	No	No
3	2	16	2	2	No	No	No	No	No	No	No	No	No	No
4	2	16	2	2	No	No	No	No	No	No	No	No	No	No
5	2	20	2	4	No	No	No	No	No	No	No	No	No	No
6	2	52	2	9	No	No	No	No	No	No	No	No	No	No
7	2	56	2	10	No	No	No	No	No	No	No	No	No	No
8	2	102	2	17	No	No	No	No	No	No	No	No	No	No
9	2	179	2	29	No	No	No	No	No	No	No	No	No	No
10	2	185	2	30	No	No	No	No	No	No	No	No	No	No
11	2	185	2	30	No	No	No	No	No	No	No	No	No	No
12	2	201	2	33	No	No	No	No	No	No	No	No	No	No
13	2	221	2	36	No	No	No	No	No	No	No	No	No	No
14	2	231	2	38	No	No	No	No	No	No	No	No	No	No
15	2	231	2	38	No	No	No	No	No	No	No	No	No	No
16	2	246	2	40	No	No	No	No	No	No	No	No	No	No
17	2	308	2	50	No	No	No	No	No	No	No	No	No	No
18	2	323	2	52	No	No	No	No	No	No	No	No	No	No
19	2	348	2	57	No	No	No	No	No	No	No	No	No	No
20	2	390	2	63	No	No	No	No	No	No	No	No	No	No
21	2	411	2	67	No	No	No	No	No	No	No	No	No	No
22	2	482	2	79	No	No	No	No	No	No	No	No	No	No
23	2	493	2	80	No	No	No	No	No	No	No	No	No	No
24	2	513	2	84	No	No	No	No	No	No	No	Yes	No	No
Hours Met					0	0	0	0	0	0	0	1	0	0

Warrant 3 Condition A

Orientation	N	SW
Total Stopped Delay Per Vehicle on Minor Approach (s)	13.6	13.6
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:03	0:15
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	69
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	597	597
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection #213: Chrysler Dr/Independence Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	NE, S
Minor Approaches	SE, NW
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	NE	S	SE	NW
1	0	2	0	1
2	0	2	0	1
3	0	3	0	1
4	0	3	0	1
5	0	4	1	2
6	1	10	2	4
7	1	11	2	5
8	1	20	3	9
9	2	35	5	15
10	2	36	5	16
11	2	36	5	16
12	2	39	6	17
13	3	43	6	19
14	3	45	7	20
15	3	45	7	20
16	3	48	7	21
17	4	61	9	26
18	4	64	9	28
19	4	69	10	30
20	5	77	11	33
21	5	81	12	35
22	6	95	14	41
23	6	97	14	42
24	6	101	15	44

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	2	2	1	No	No	No	No	No	No	No	No	No	No
2	2	2	2	1	No	No	No	No	No	No	No	No	No	No
3	2	3	2	1	No	No	No	No	No	No	No	No	No	No
4	2	3	2	1	No	No	No	No	No	No	No	No	No	No
5	2	4	2	3	No	No	No	No	No	No	No	No	No	No
6	2	11	2	6	No	No	No	No	No	No	No	No	No	No
7	2	12	2	7	No	No	No	No	No	No	No	No	No	No
8	2	21	2	12	No	No	No	No	No	No	No	No	No	No
9	2	37	2	20	No	No	No	No	No	No	No	No	No	No
10	2	38	2	21	No	No	No	No	No	No	No	No	No	No
11	2	38	2	21	No	No	No	No	No	No	No	No	No	No
12	2	41	2	23	No	No	No	No	No	No	No	No	No	No
13	2	46	2	25	No	No	No	No	No	No	No	No	No	No
14	2	48	2	27	No	No	No	No	No	No	No	No	No	No
15	2	48	2	27	No	No	No	No	No	No	No	No	No	No
16	2	51	2	28	No	No	No	No	No	No	No	No	No	No
17	2	65	2	35	No	No	No	No	No	No	No	No	No	No
18	2	68	2	37	No	No	No	No	No	No	No	No	No	No
19	2	73	2	40	No	No	No	No	No	No	No	No	No	No
20	2	82	2	44	No	No	No	No	No	No	No	No	No	No
21	2	86	2	47	No	No	No	No	No	No	No	No	No	No
22	2	101	2	55	No	No	No	No	No	No	No	No	No	No
23	2	103	2	56	No	No	No	No	No	No	No	No	No	No
24	2	107	2	59	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	SE	NW
Total Stopped Delay Per Vehicle on Minor Approach (s)	8.9	9.6
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:02	0:07
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	15	44
High Minor Volume Condition Met	No	No
Total Entering Volume on All Approaches During Same Hour	166	166
Number of Approaches on Intersection	4	4
Total Volume Condition Met	No	No
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

Signal Warrants Report For Intersection #214: Chrysler Dr/Jefferson Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	N, SW
Minor Approaches	SE
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets
	N	SW	SE
1	0	3	3
2	0	3	3
3	0	4	4
4	0	4	4
5	1	6	5
6	2	14	14
7	2	15	15
8	3	28	27
9	6	49	48
10	6	50	49
11	6	50	49
12	6	54	53
13	7	60	58
14	7	63	61
15	7	63	61
16	8	67	65
17	10	83	82
18	10	88	86
19	11	95	92
20	12	106	103
21	13	111	109
22	15	131	128
23	15	133	131
24	16	139	136

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	3	1	3	No	No	No	No	No	No	No	No	No	No
2	2	3	1	3	No	No	No	No	No	No	No	No	No	No
3	2	4	1	4	No	No	No	No	No	No	No	No	No	No
4	2	4	1	4	No	No	No	No	No	No	No	No	No	No
5	2	7	1	5	No	No	No	No	No	No	No	No	No	No
6	2	16	1	14	No	No	No	No	No	No	No	No	No	No
7	2	17	1	15	No	No	No	No	No	No	No	No	No	No
8	2	31	1	27	No	No	No	No	No	No	No	No	No	No
9	2	55	1	48	No	No	No	No	No	No	No	No	No	No
10	2	56	1	49	No	No	No	No	No	No	No	No	No	No
11	2	56	1	49	No	No	No	No	No	No	No	No	No	No
12	2	60	1	53	No	No	No	No	No	No	No	No	No	No
13	2	67	1	58	No	No	No	No	No	No	No	No	No	No
14	2	70	1	61	No	No	No	No	No	No	No	No	No	No
15	2	70	1	61	No	No	No	No	No	No	No	No	No	No
16	2	75	1	65	No	No	No	No	No	No	No	No	No	No
17	2	93	1	82	No	No	No	No	No	No	No	No	No	No
18	2	98	1	86	No	No	No	No	No	No	No	No	No	No
19	2	106	1	92	No	No	No	No	No	No	No	No	No	No
20	2	118	1	103	No	No	No	No	No	No	No	No	No	No
21	2	124	1	109	No	No	No	No	No	No	No	No	No	No
22	2	146	1	128	No	No	No	No	No	No	No	No	No	No
23	2	148	1	131	No	No	No	No	No	No	No	No	No	No
24	2	155	1	136	No	No	No	No	No	No	No	No	No	No
Hours Met					0	0	0	0	0	0	0	0	0	0

Warrant 3 Condition A

Orientation	SE
Total Stopped Delay Per Vehicle on Minor Approach (s)	9.9
Number of Lanes on Minor Street Approach	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:22
Delay Condition Met	No
Volume on Minor Street Approach During Same Hour	136
High Minor Volume Condition Met	Yes
Total Entering Volume on All Approaches During Same Hour	291
Number of Approaches on Intersection	3
Total Volume Condition Met	No
Warrant Met for Approach	No
Warrant Met for Intersection	**No**

Signal Warrants Report For Intersection #215: Chrysler Dr/Constitution Dr

Warrants Summary

Warrant	Name	Met?
#1	Eight Hour Vehicular Volume	No
#2	Four Hour Vehicular Volume	No
#3	Peak Hour	No

Intersection Warrants Parameters

Major Approaches	E, W
Minor Approaches	N, SW
Speed > 40mph	No
Population < 10,000	No
Warrant Factor	100%

Warrant Analysis Traffic Volumes

Hour	Major Streets		Minor Streets	
	E	W	N	SW
1	2	7	4	5
2	2	7	4	5
3	2	11	6	7
4	2	11	6	7
5	3	14	8	10
6	8	36	20	25
7	9	40	22	27
8	16	72	39	50
9	29	126	69	87
10	30	130	71	90
11	30	130	71	90
12	32	140	77	97
13	35	155	85	107
14	37	162	89	112
15	37	162	89	112
16	39	173	95	120
17	49	216	118	149
18	52	227	124	157
19	56	245	134	169
20	62	274	150	189
21	66	288	158	199
22	77	338	185	234
23	79	346	189	239
24	82	360	197	249

Warrant Analysis by Hour

Hour	Major Lanes		Minor Lanes		Warrant 1 Condition A				Warrant 1 Condition B				Warrant 2	Warrant 3
	Number	Volume	Number	Volume	100%	80%	70%	56%	100%	80%	70%	56%		Condition B
1	2	9	2	9	No	No	No	No	No	No	No	No	No	No
2	2	9	2	9	No	No	No	No	No	No	No	No	No	No
3	2	13	2	13	No	No	No	No	No	No	No	No	No	No
4	2	13	2	13	No	No	No	No	No	No	No	No	No	No
5	2	17	2	18	No	No	No	No	No	No	No	No	No	No
6	2	44	2	45	No	No	No	No	No	No	No	No	No	No
7	2	49	2	49	No	No	No	No	No	No	No	No	No	No
8	2	88	2	89	No	No	No	No	No	No	No	No	No	No
9	2	155	2	156	No	No	No	No	No	No	No	No	No	No
10	2	160	2	161	No	No	No	No	No	No	No	No	No	No
11	2	160	2	161	No	No	No	No	No	No	No	No	No	No
12	2	172	2	174	No	No	No	No	No	No	No	No	No	No
13	2	190	2	192	No	No	No	No	No	No	No	No	No	No
14	2	199	2	201	No	No	No	No	No	No	No	No	No	No
15	2	199	2	201	No	No	No	No	No	No	No	No	No	No
16	2	212	2	215	No	No	No	No	No	No	No	No	No	No
17	2	265	2	267	No	No	No	No	No	No	No	No	No	No
18	2	279	2	281	No	No	No	No	No	No	No	No	No	No
19	2	301	2	303	No	No	No	No	No	No	No	No	No	No
20	2	336	2	339	No	No	No	Yes	No	No	No	No	No	No
21	2	354	2	357	No	No	No	Yes	No	No	No	No	No	No
22	2	415	2	419	No	No	No	Yes	No	No	No	No	No	No
23	2	425	2	428	No	No	Yes	Yes	No	No	No	No	No	No
24	2	442	2	446	No	No	Yes	Yes	No	No	No	No	No	No
Hours Met					0	0	2	5	0	0	0	0	0	0

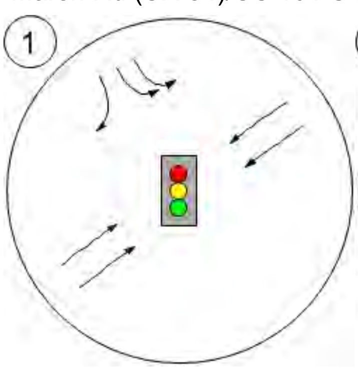
Warrant 3 Condition A

Orientation	N	SW
Total Stopped Delay Per Vehicle on Minor Approach (s)	12.6	13.2
Number of Lanes on Minor Street Approach	1	1
VehicleHours of Stopped Delay on Minor Approach ([h]h:mm)	0:41	0:54
Delay Condition Met	No	No
Volume on Minor Street Approach During Same Hour	197	249
High Minor Volume Condition Met	Yes	Yes
Total Entering Volume on All Approaches During Same Hour	888	888
Number of Approaches on Intersection	4	4
Total Volume Condition Met	Yes	Yes
Warrant Met for Approach	No	No
Warrant Met for Intersection	**No**	

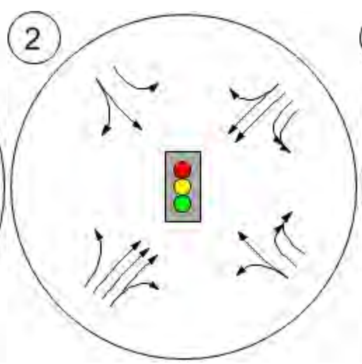
Study Intersections

Lane Configuration and Traffic Control

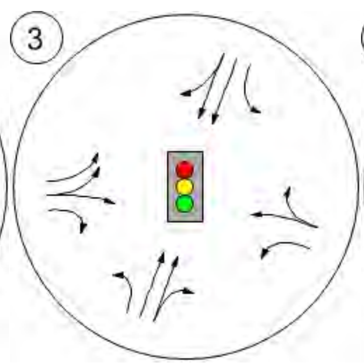
Marsh Rd (SR 84)/US 101 S



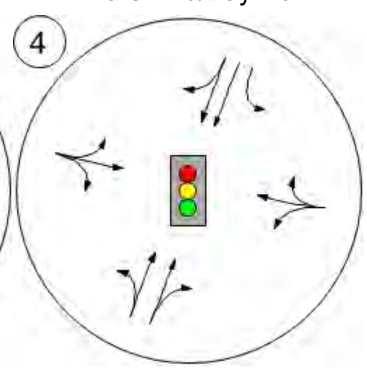
Marsh Rd/Rolison Rd-Scott D



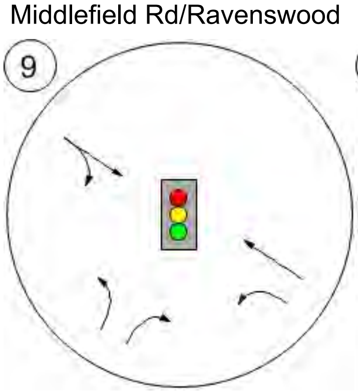
Marsh Rd/Florence St-Bohan



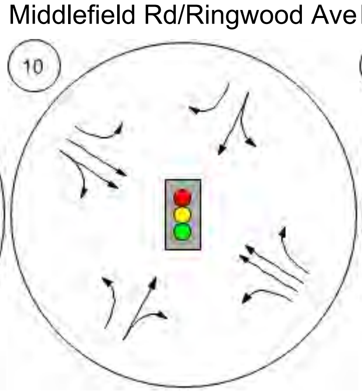
Marsh Rd/Bay Rd



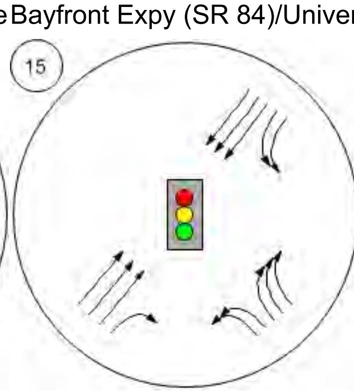
Middlefield Rd/Ravenswood



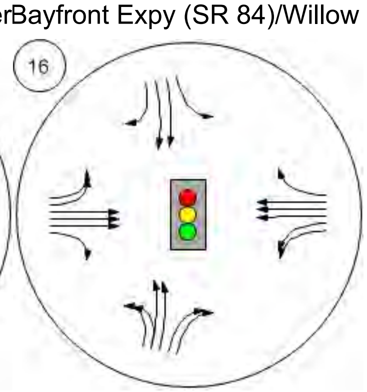
Middlefield Rd/Ringwood Ave



Bayfront Expy (SR 84)/Univer

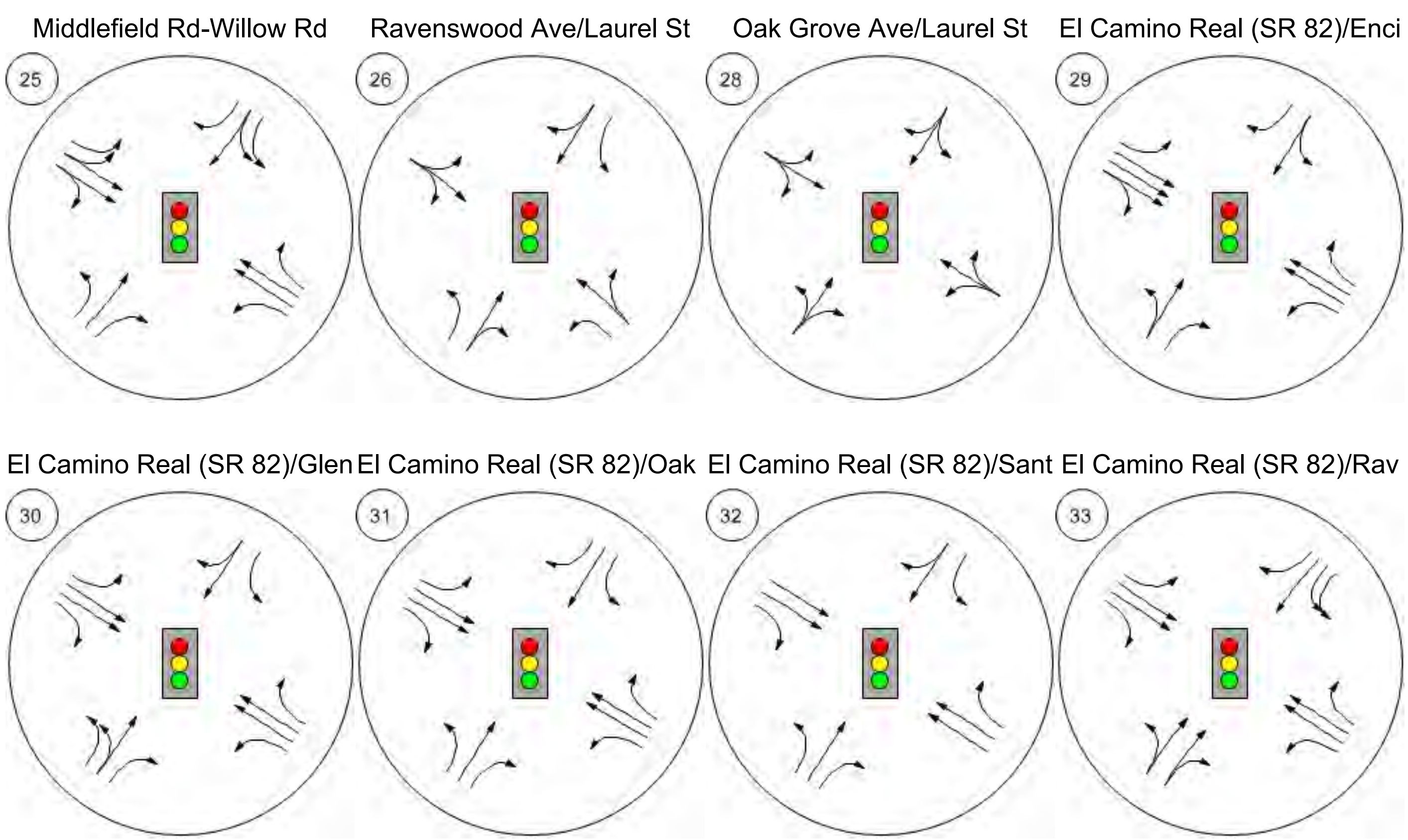


Bayfront Expy (SR 84)/Willow

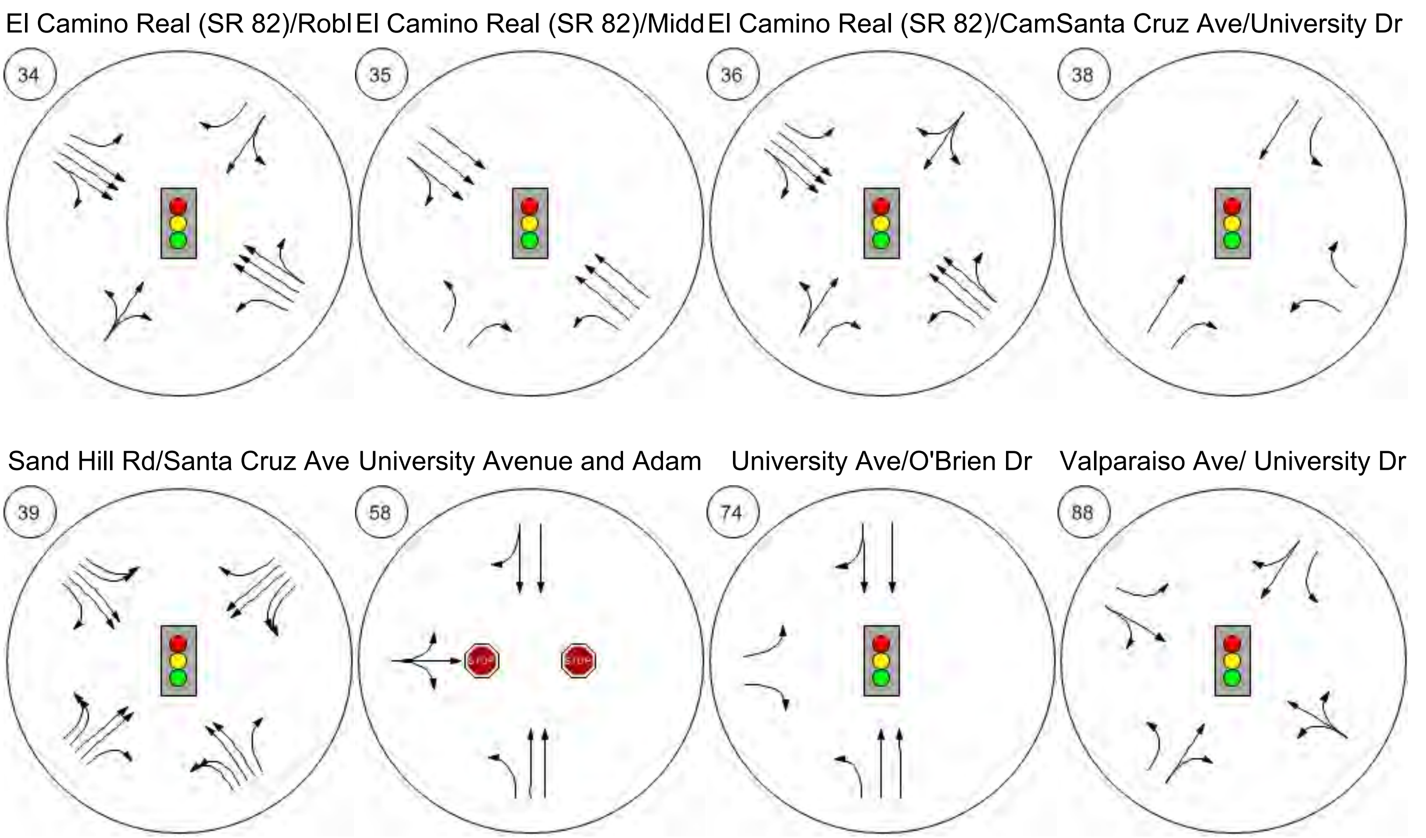


Lane Configuration and Traffic Control

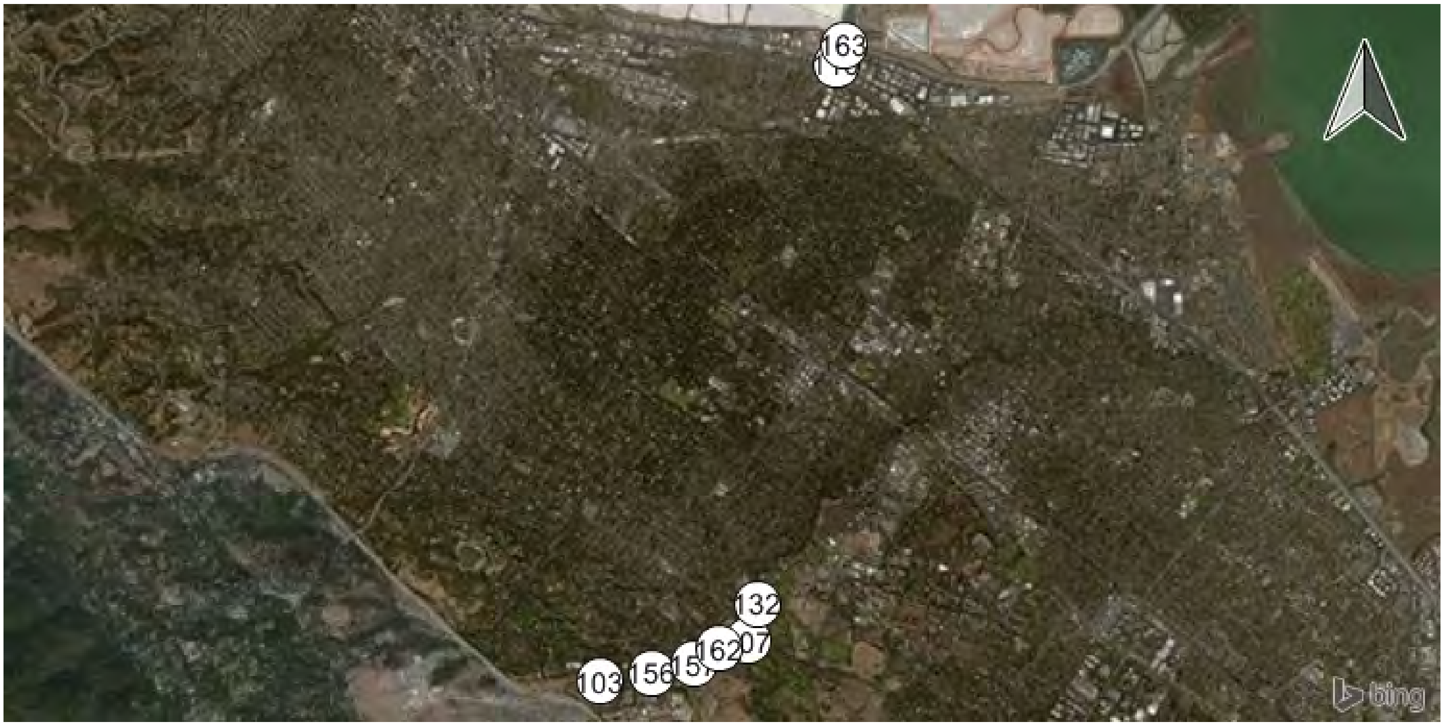
Lane Configuration and Traffic Control



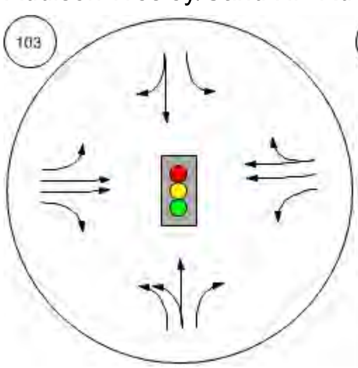
Lane Configuration and Traffic Control



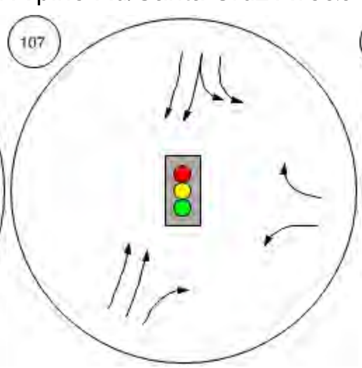
Lane Configuration and Traffic Control



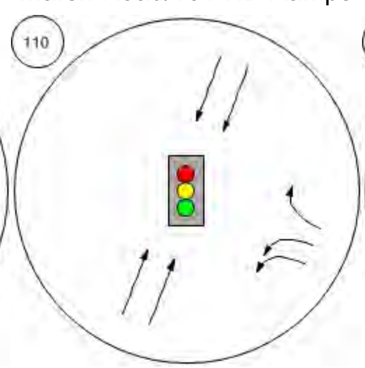
Addison Wesley/Sand Hill Rd



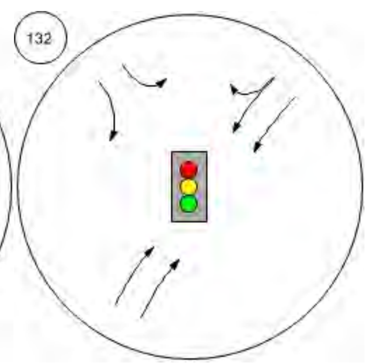
Alpine Rd/Santa Cruz Ave&J



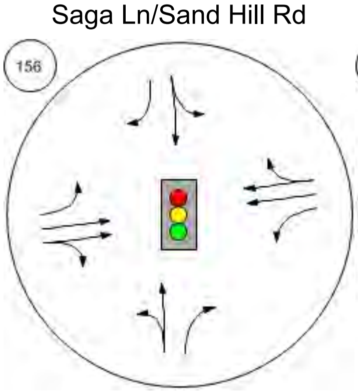
Marsh Road/101 NB Ramps



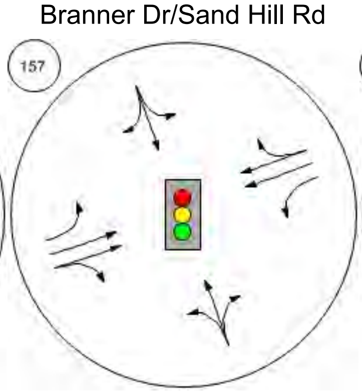
Oak Ave/Sand Hill Rd



Saga Ln/Sand Hill Rd

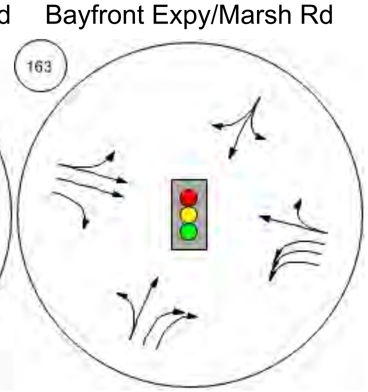


Branner Dr/Sand Hill Rd

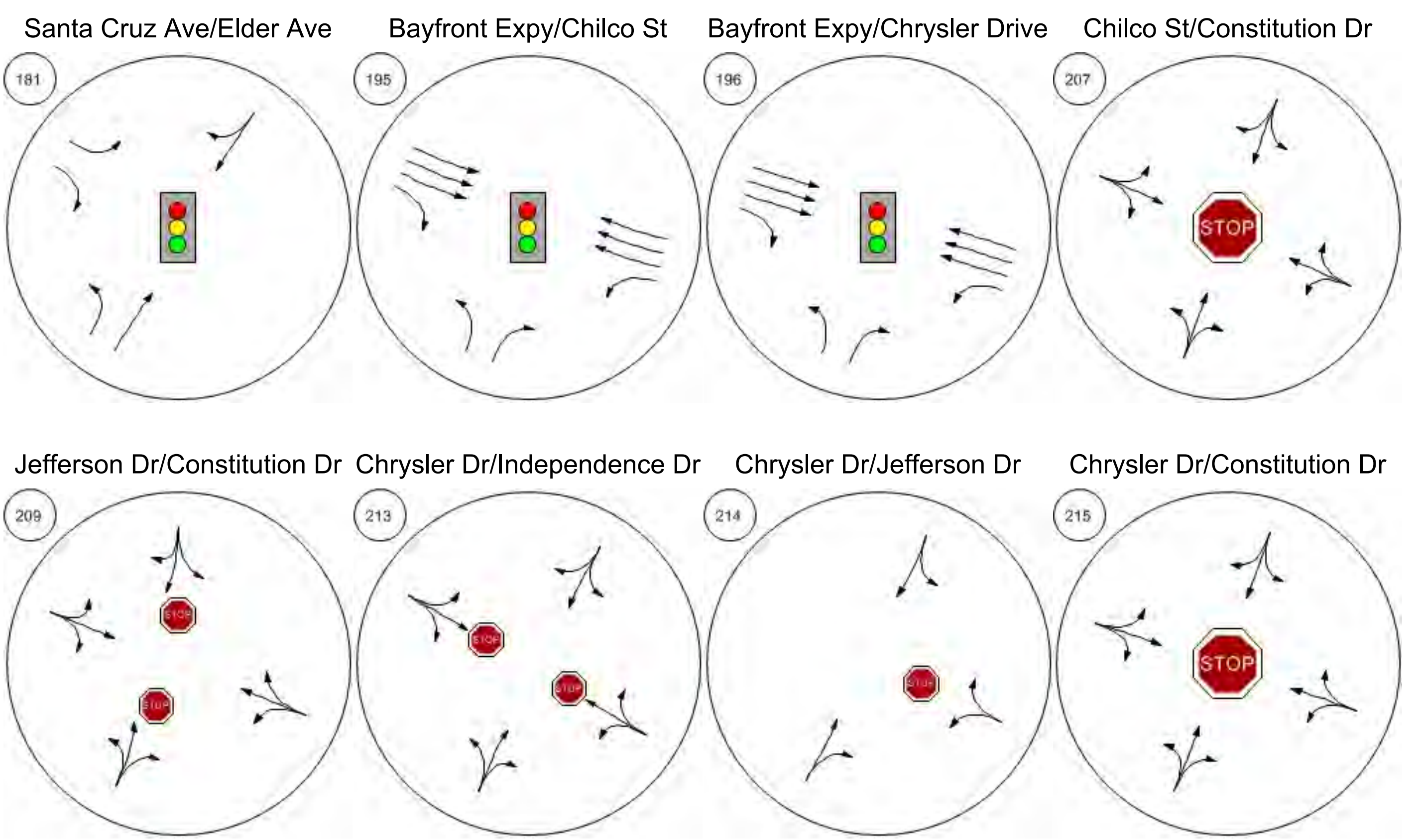


Sharon Park Dr/ Sand Hill Rd

Bayfront Expy/Marsh Rd

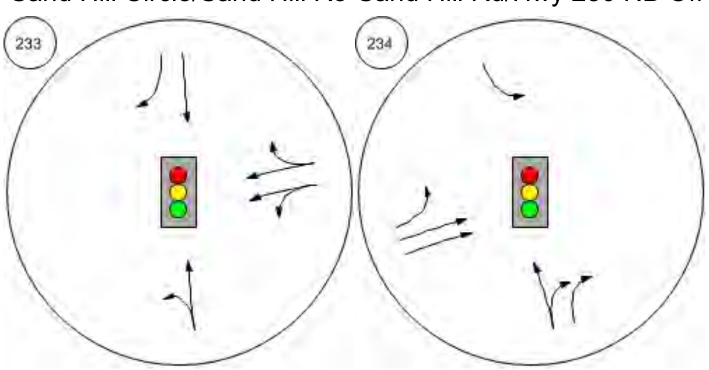


Lane Configuration and Traffic Control



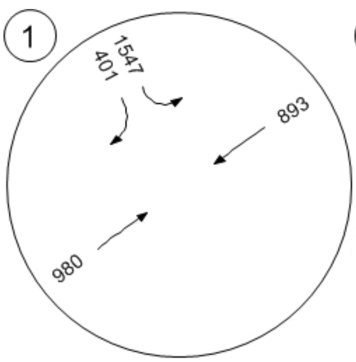
Lane Configuration and Traffic Control

Sand Hill Circle/Sand Hill Ro Sand Hill Rd/Hwy 280 NB Off

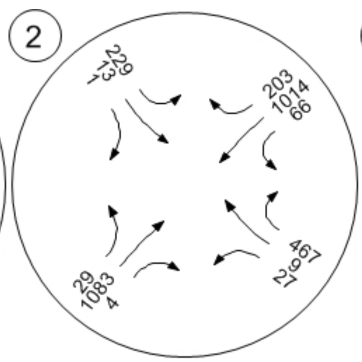


Traffic Volume - Base Volume

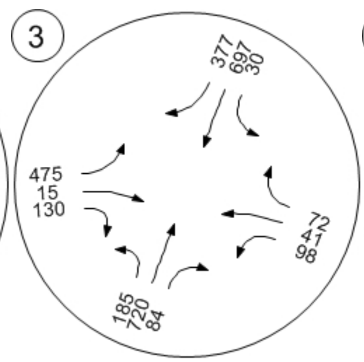
Marsh Rd (SR 84)/US 101 S



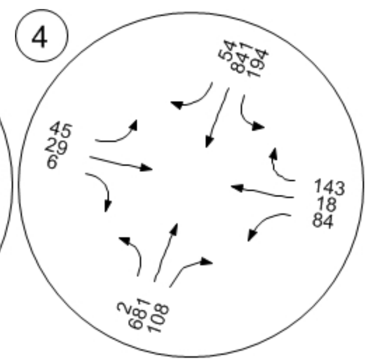
Marsh Rd/Rolison Rd-Scott D



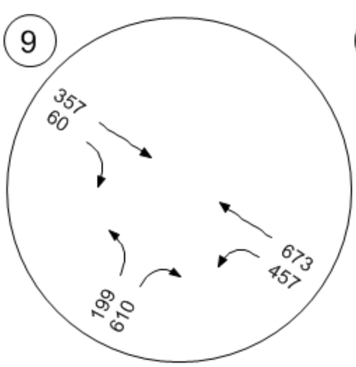
Marsh Rd/Florence St-Bohan



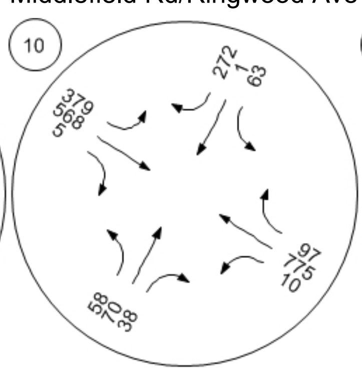
Marsh Rd/Bay Rd



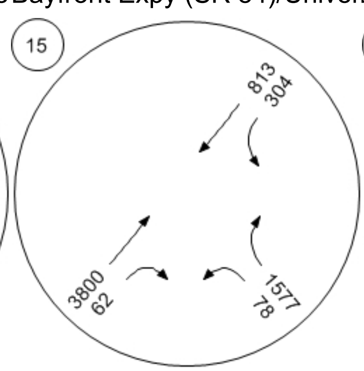
Middlefield Rd/Ravenswood



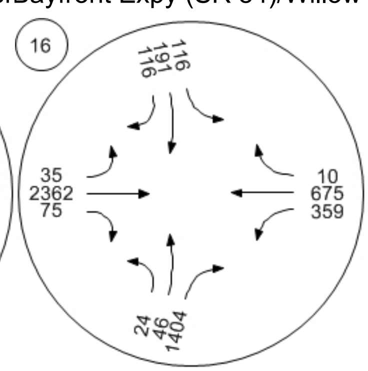
Middlefield Rd/Ringwood Ave



Bayfront Expy (SR 84)/Univer

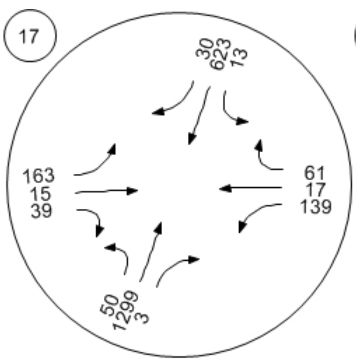


Bayfront Expy (SR 84)/Willow

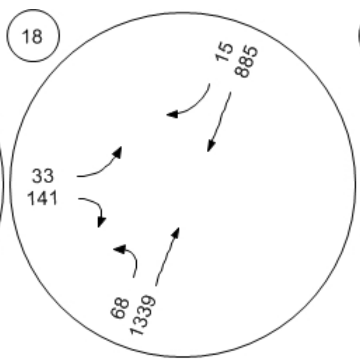


Traffic Volume - Base Volume

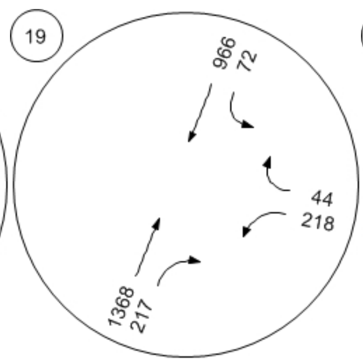
Willow Rd (SR 114)/Hamilton



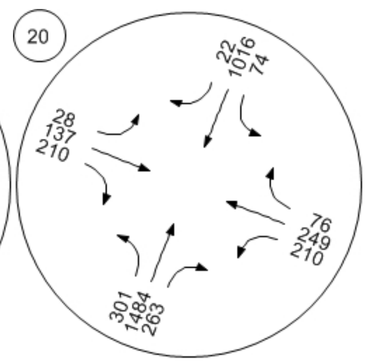
Willow Rd (SR 114)/Ivy Dr



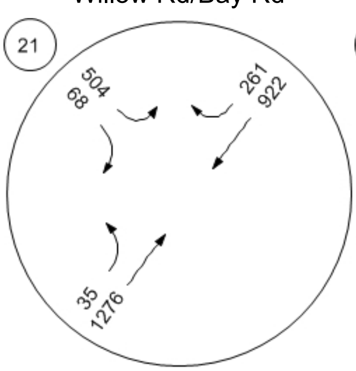
Willow Rd (SR 114)/O'Brien



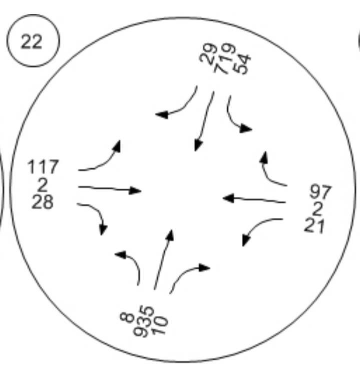
Willow Rd (SR 114)/Newbrid



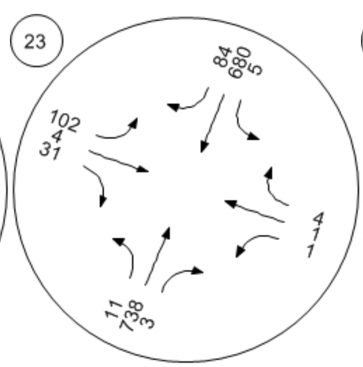
Willow Rd/Bay Rd



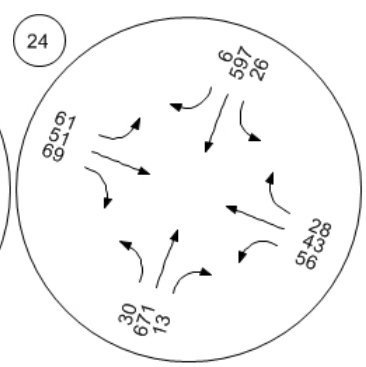
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

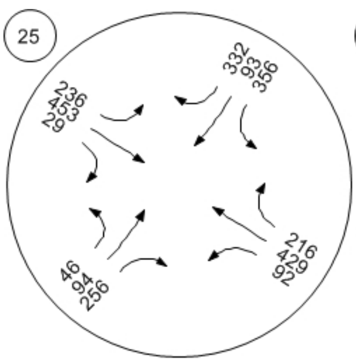


Willow Rd/Gilbert Ave

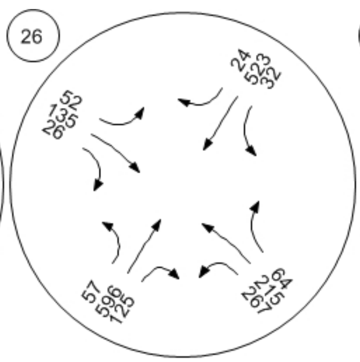


Traffic Volume - Base Volume

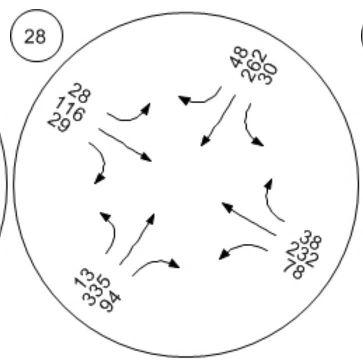
Middlefield Rd-Willow Rd



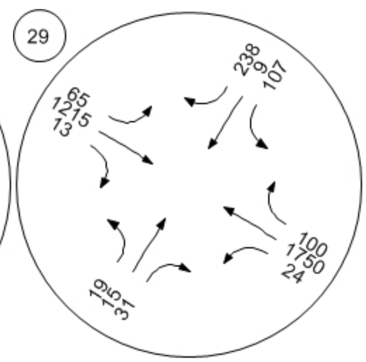
Ravenswood Ave/Laurel St



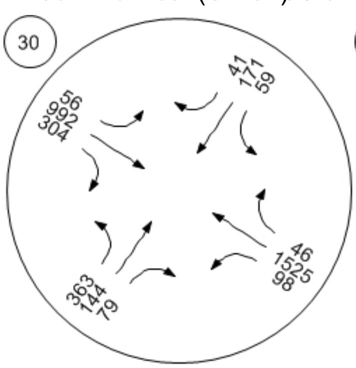
Oak Grove Ave/Laurel St



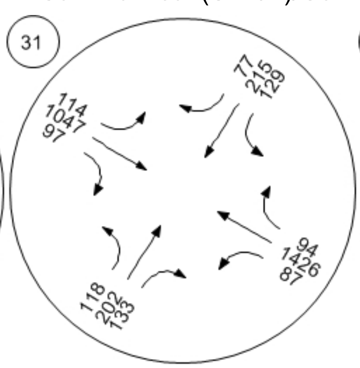
El Camino Real (SR 82)/Enci



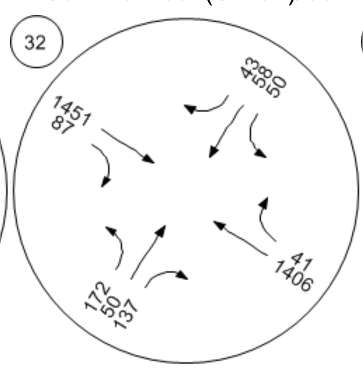
El Camino Real (SR 82)/Glen



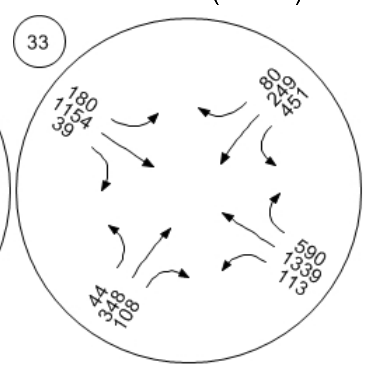
El Camino Real (SR 82)/Oak



El Camino Real (SR 82)/Sant

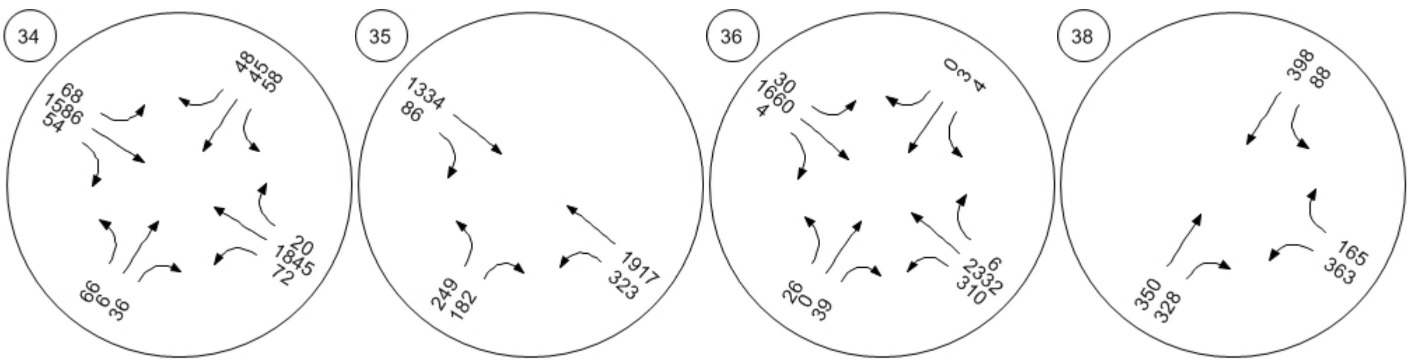


El Camino Real (SR 82)/Rav

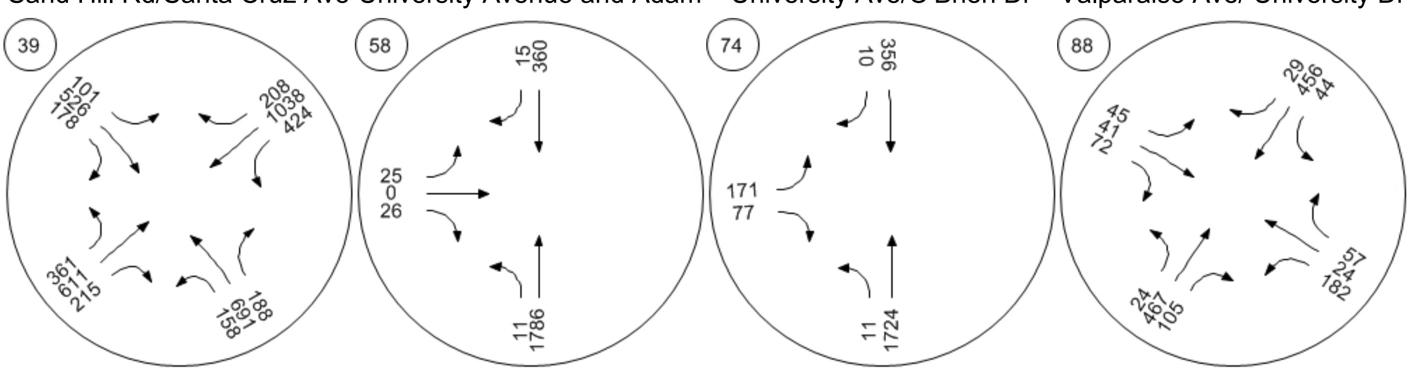


Traffic Volume - Base Volume

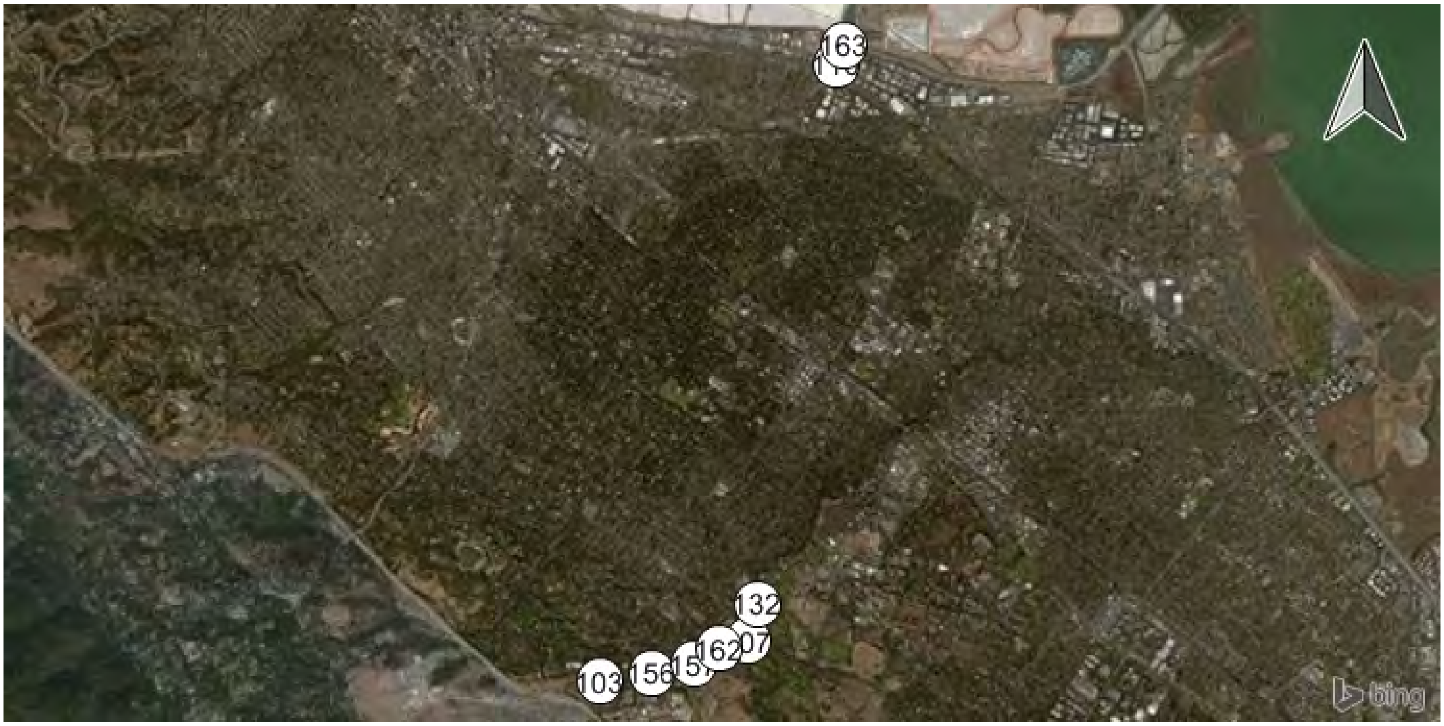
El Camino Real (SR 82)/Robl El Camino Real (SR 82)/Midd El Camino Real (SR 82)/Cam Santa Cruz Ave/University Dr

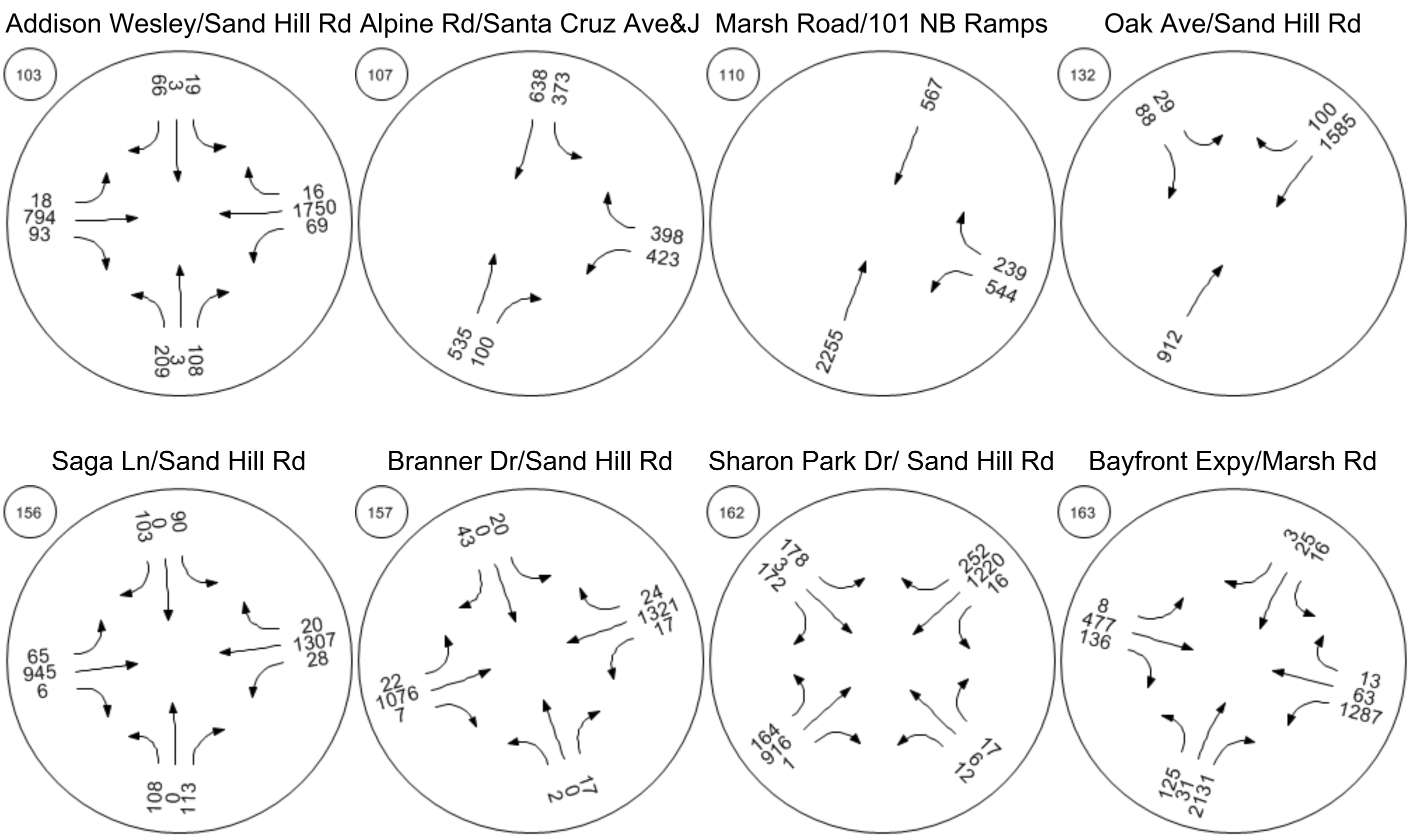


Sand Hill Rd/Santa Cruz Ave University Avenue and Adam University Ave/O'Brien Dr Valparaiso Ave/ University Dr



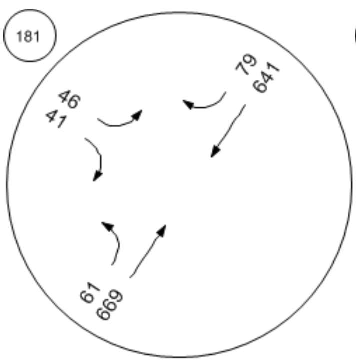
Traffic Volume - Base Volume



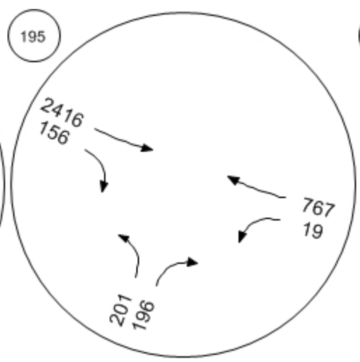


Traffic Volume - Base Volume

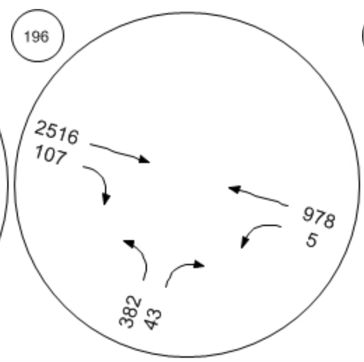
Santa Cruz Ave/Elder Ave



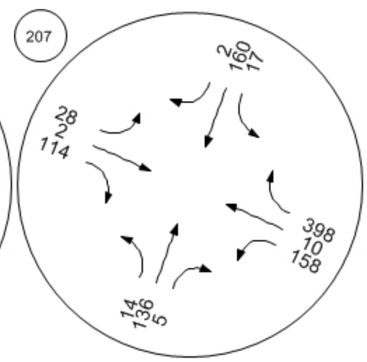
Bayfront Expy/Chilco St



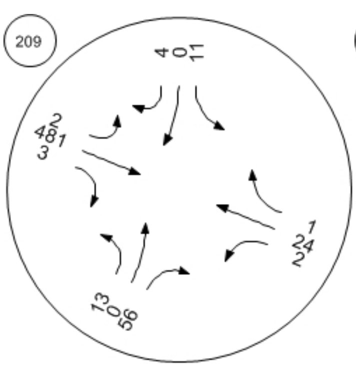
Bayfront Expy/Chrysler Drive



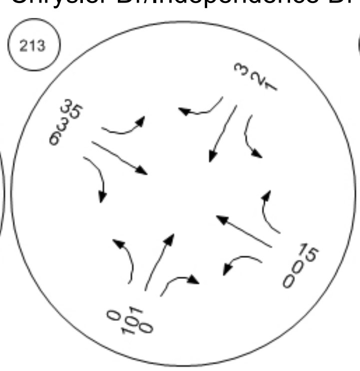
Chilco St/Constitution Dr



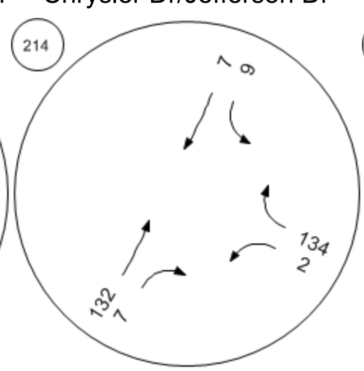
Jefferson Dr/Constitution Dr



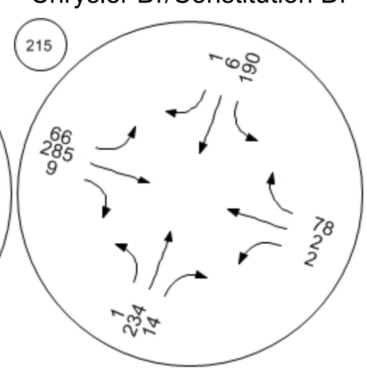
Chrysler Dr/Independence Dr



Chrysler Dr/Jefferson Dr

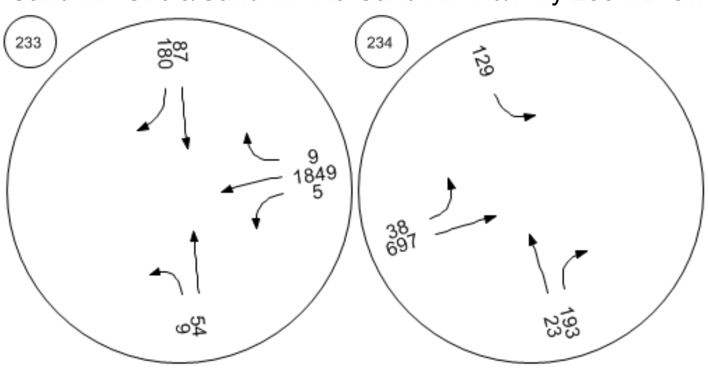


Chrysler Dr/Constitution Dr



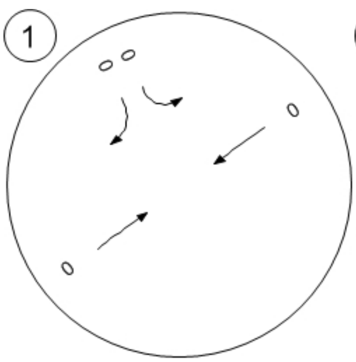
Traffic Volume - Base Volume

Sand Hill Circle/Sand Hill Ro Sand Hill Rd/Hwy 280 NB Off

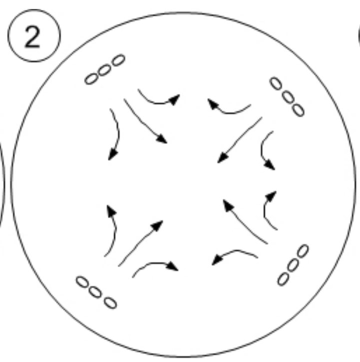


Traffic Volume - In-Process Volume

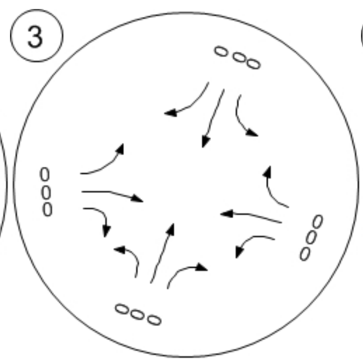
Marsh Rd (SR 84)/US 101 S



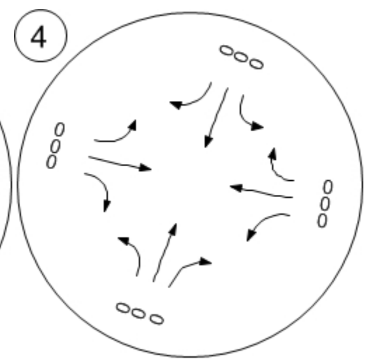
Marsh Rd/Rolison Rd-Scott D



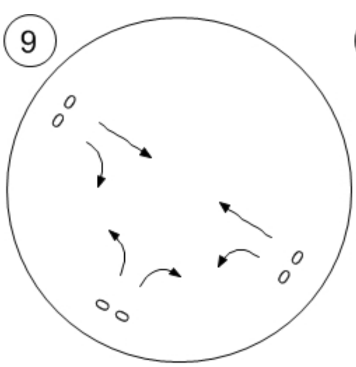
Marsh Rd/Florence St-Bohan



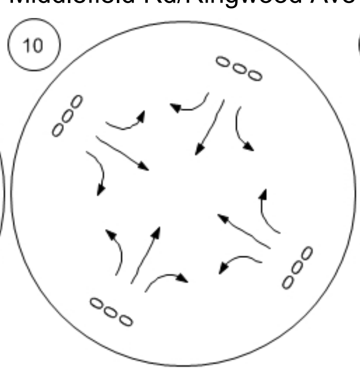
Marsh Rd/Bay Rd



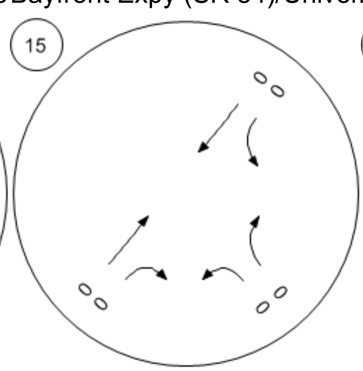
Middlefield Rd/Ravenswood



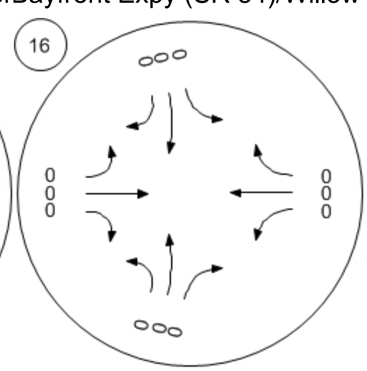
Middlefield Rd/Ringwood Ave



Bayfront Expy (SR 84)/Univer

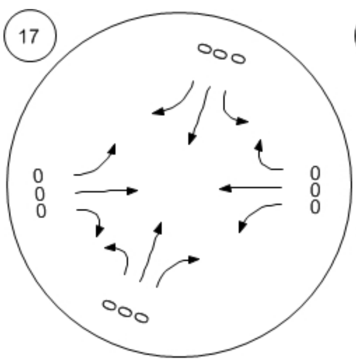


Bayfront Expy (SR 84)/Willow

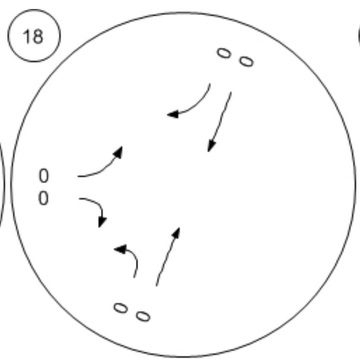


Traffic Volume - In-Process Volume

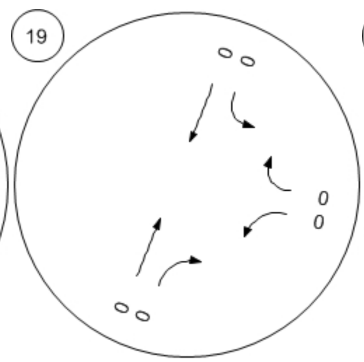
Willow Rd (SR 114)/Hamilton



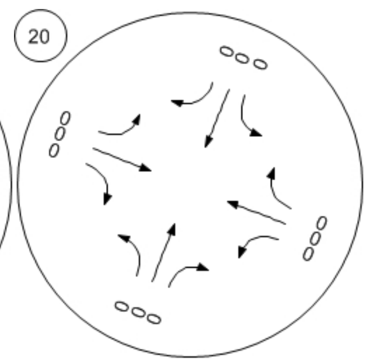
Willow Rd (SR 114)/Ivy Dr



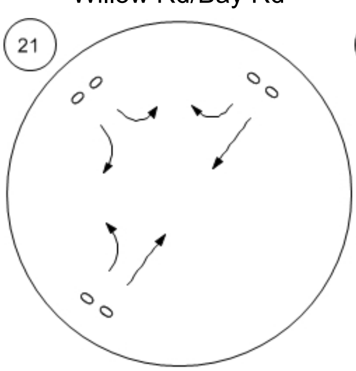
Willow Rd (SR 114)/O'Brien



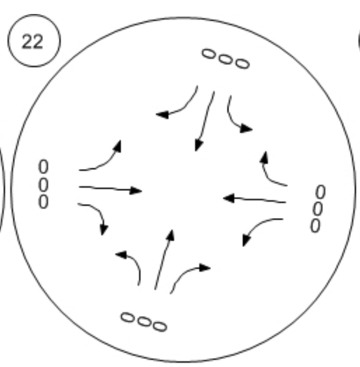
Willow Rd (SR 114)/Newbrid



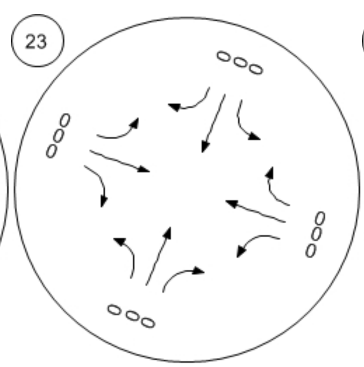
Willow Rd/Bay Rd



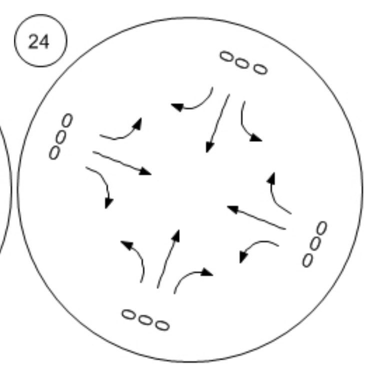
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

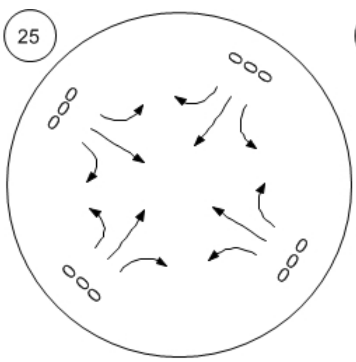


Willow Rd/Gilbert Ave

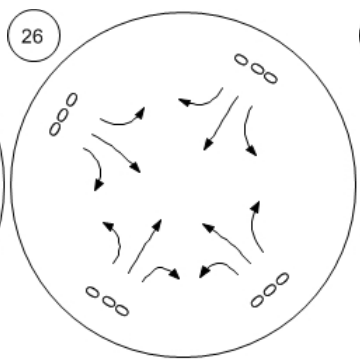


Traffic Volume - In-Process Volume

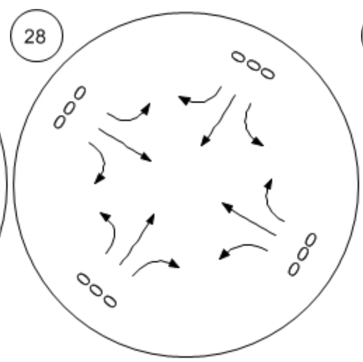
Middlefield Rd-Willow Rd



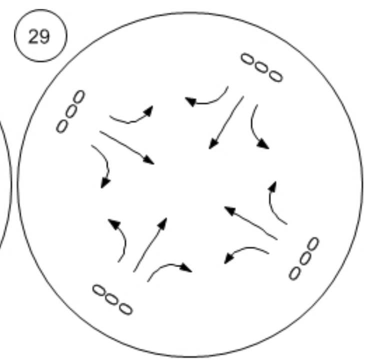
Ravenswood Ave/Laurel St



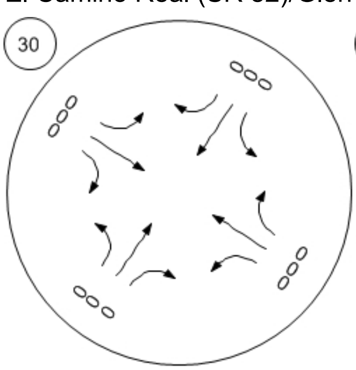
Oak Grove Ave/Laurel St



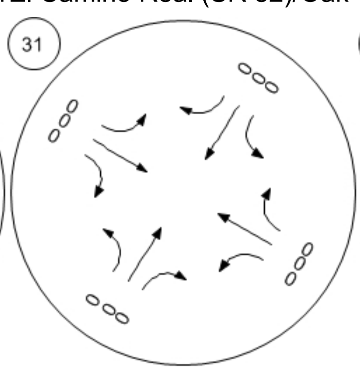
El Camino Real (SR 82)/Enci



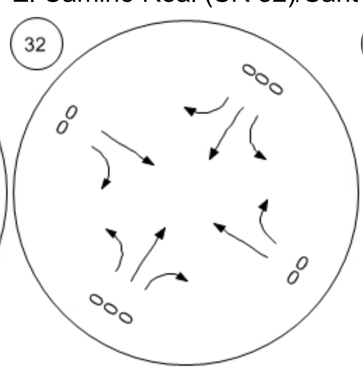
El Camino Real (SR 82)/Glen



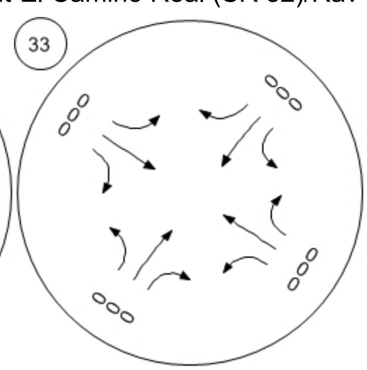
El Camino Real (SR 82)/Oak



El Camino Real (SR 82)/Sant

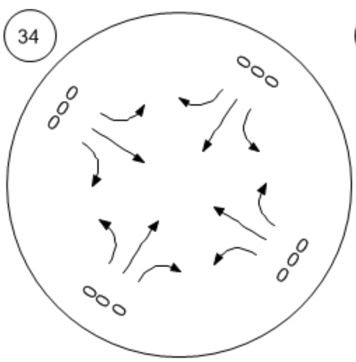


El Camino Real (SR 82)/Rav

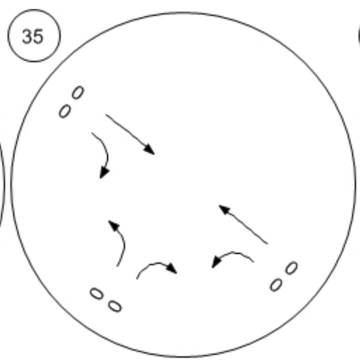


Traffic Volume - In-Process Volume

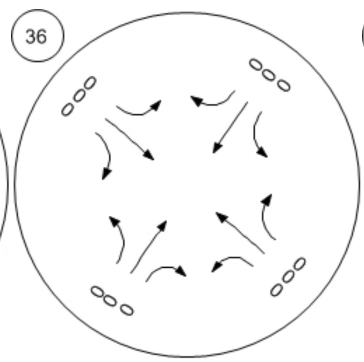
El Camino Real (SR 82)/Robl



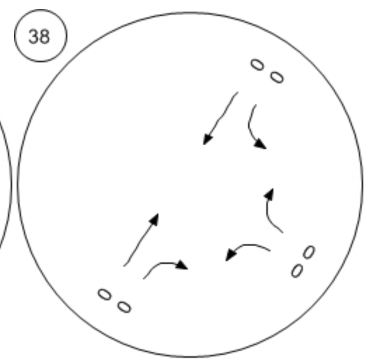
El Camino Real (SR 82)/Midd



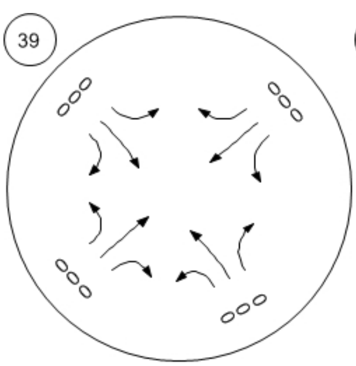
El Camino Real (SR 82)/Cam



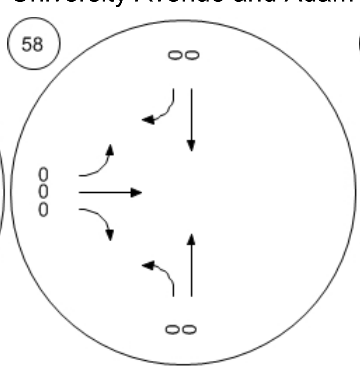
Santa Cruz Ave/University Dr



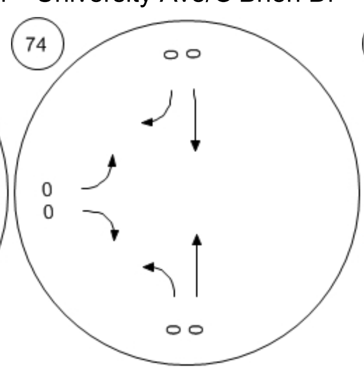
Sand Hill Rd/Santa Cruz Ave



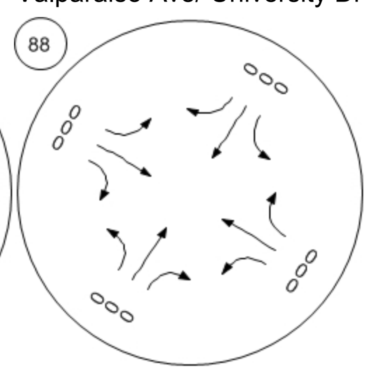
University Avenue and Adam



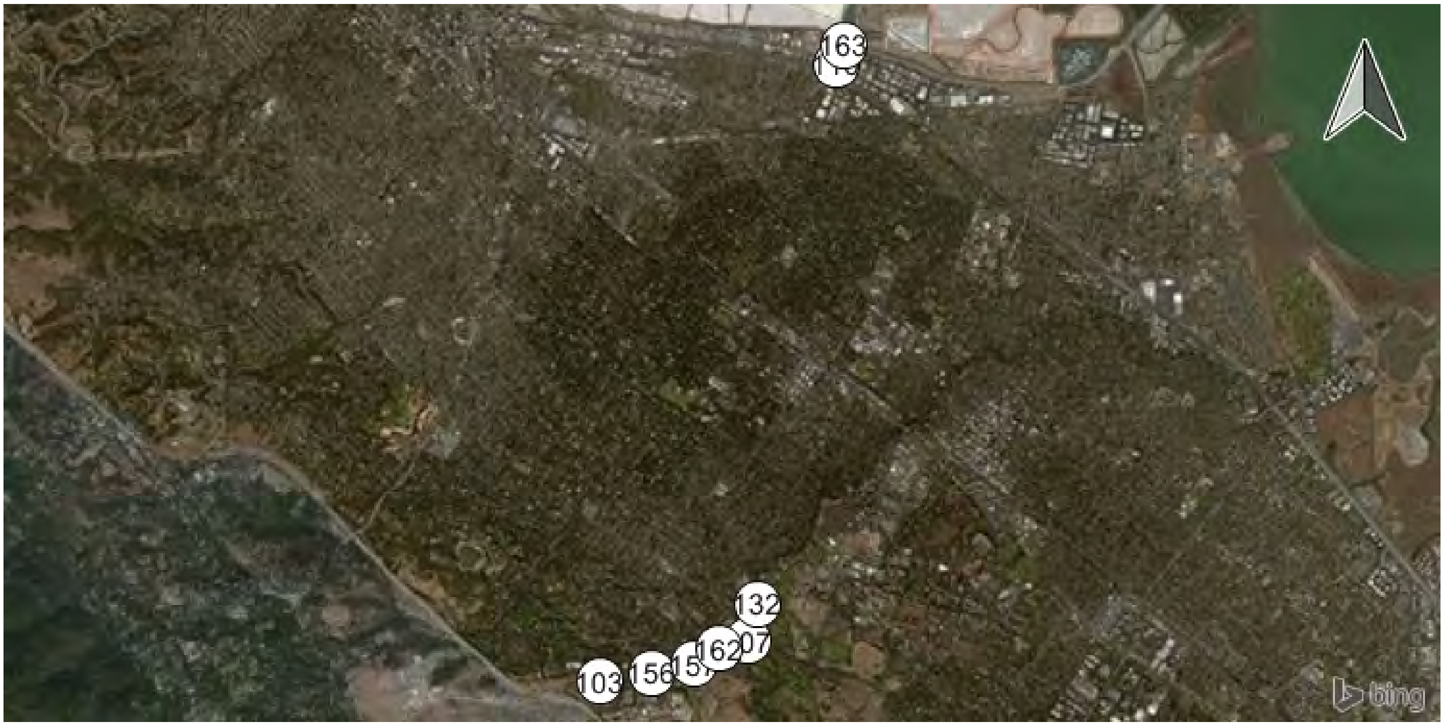
University Ave/O'Brien Dr



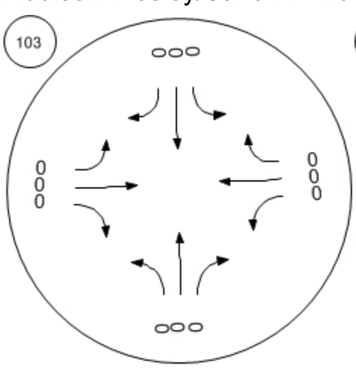
Valparaiso Ave/ University Dr



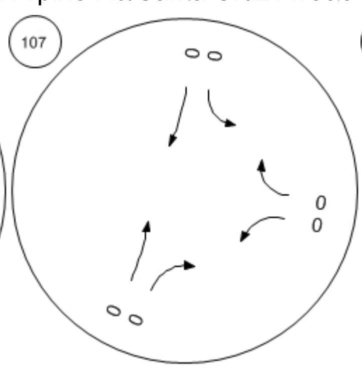
Traffic Volume - In-Process Volume



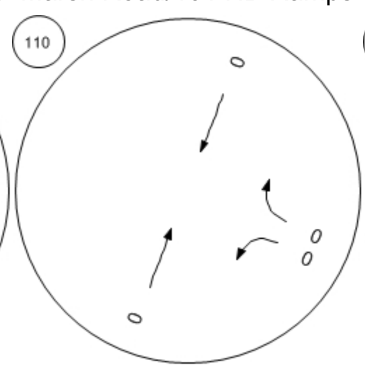
Addison Wesley/Sand Hill Rd



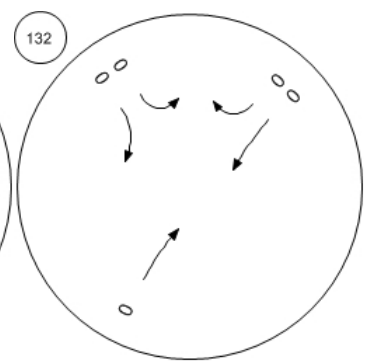
Alpine Rd/Santa Cruz Ave&J



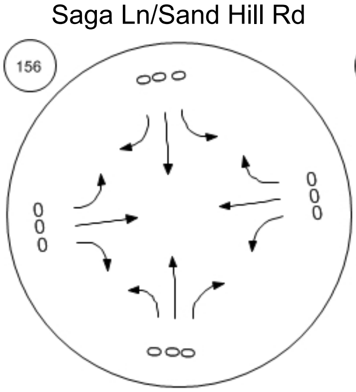
Marsh Road/101 NB Ramps



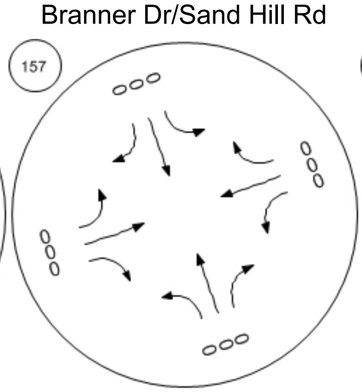
Oak Ave/Sand Hill Rd



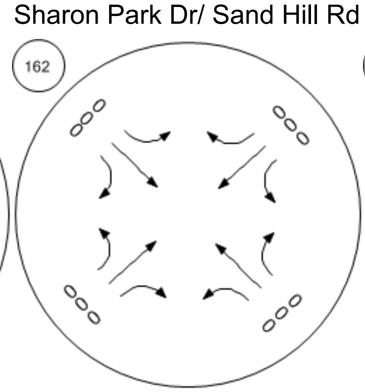
Saga Ln/Sand Hill Rd



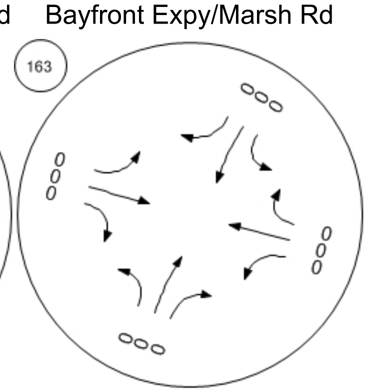
Branner Dr/Sand Hill Rd



Sharon Park Dr/ Sand Hill Rd

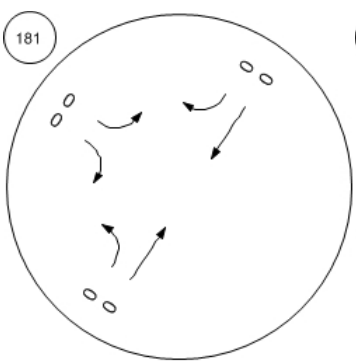


Bayfront Expy/Marsh Rd

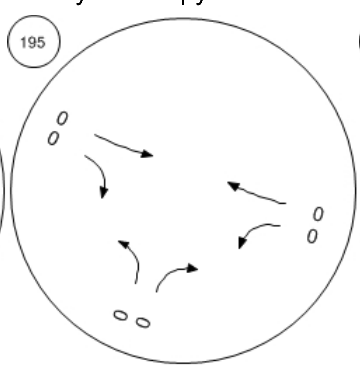


Traffic Volume - In-Process Volume

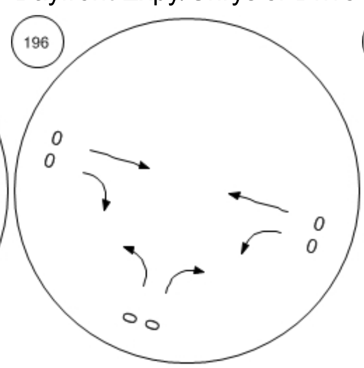
Santa Cruz Ave/Elder Ave



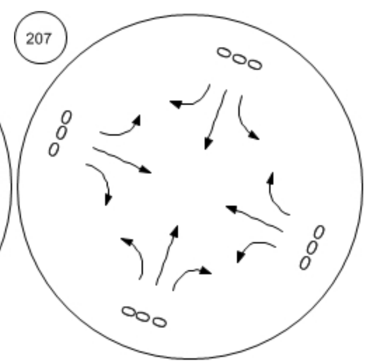
Bayfront Expy/Chilco St



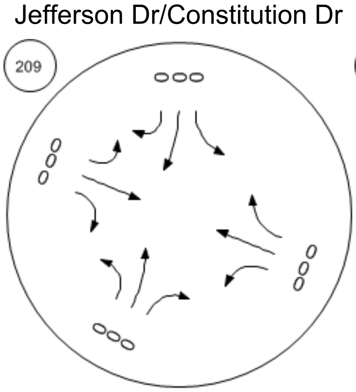
Bayfront Expy/Chrysler Drive



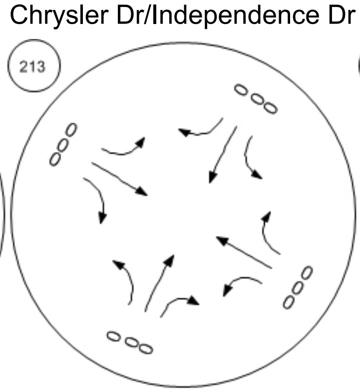
Chilco St/Constitution Dr



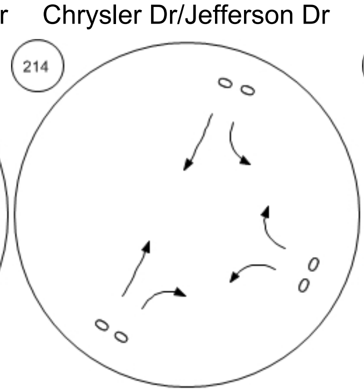
Jefferson Dr/Constitution Dr



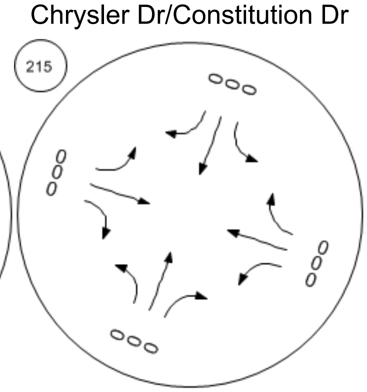
Chrysler Dr/Independence Dr



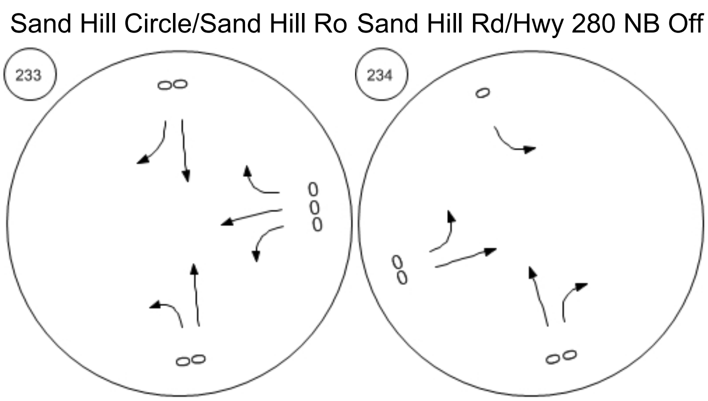
Chrysler Dr/Jefferson Dr



Chrysler Dr/Constitution Dr

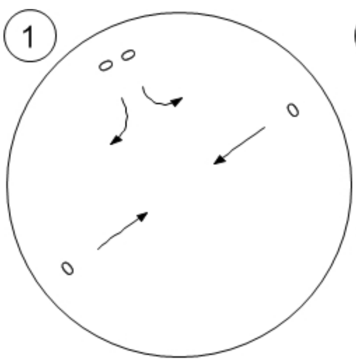


Traffic Volume - In-Process Volume

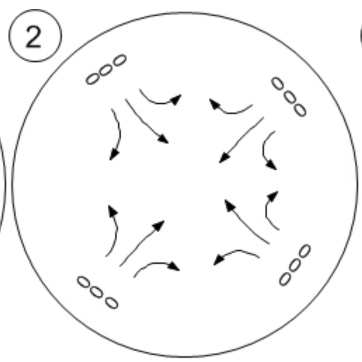


Traffic Volume - Net New Site Trips

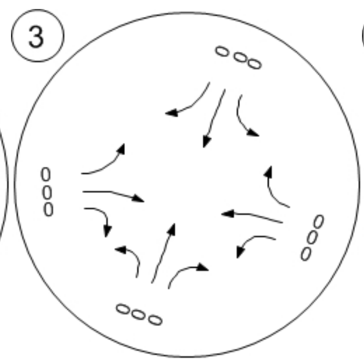
Marsh Rd (SR 84)/US 101 S



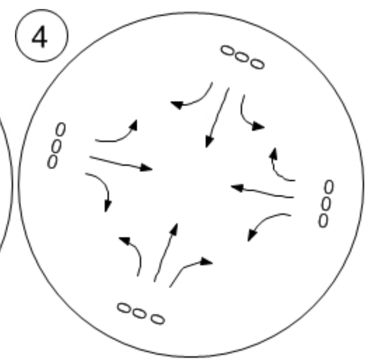
Marsh Rd/Rolison Rd-Scott D



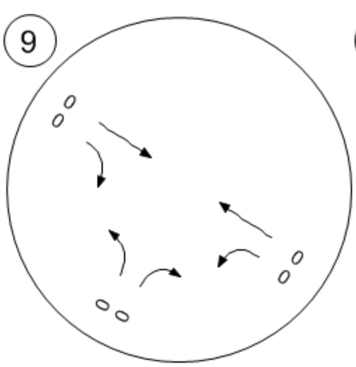
Marsh Rd/Florence St-Bohan



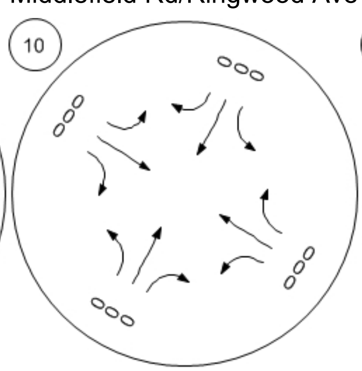
Marsh Rd/Bay Rd



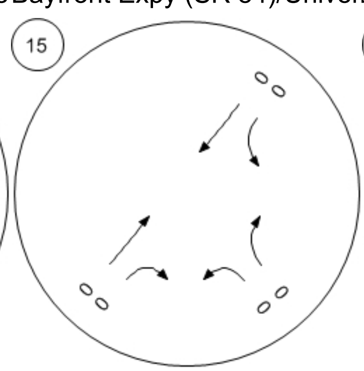
Middlefield Rd/Ravenswood



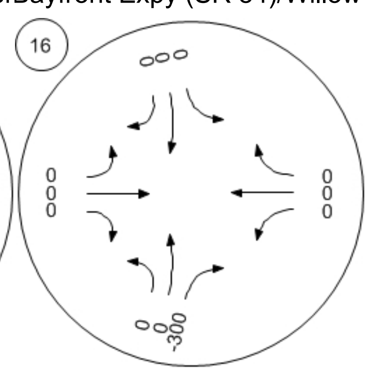
Middlefield Rd/Ringwood Ave



Bayfront Expy (SR 84)/Univer

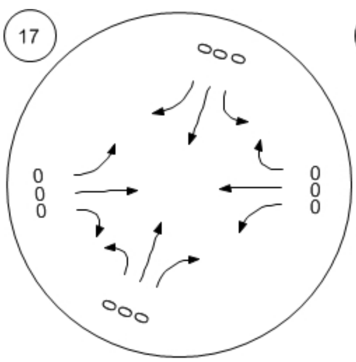


Bayfront Expy (SR 84)/Willow

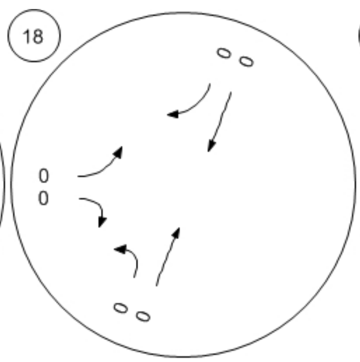


Traffic Volume - Net New Site Trips

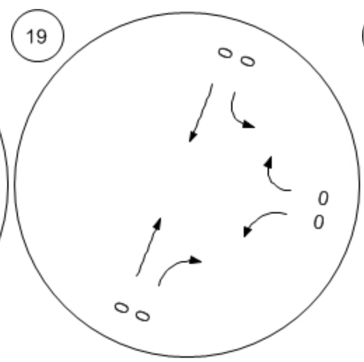
Willow Rd (SR 114)/Hamilton



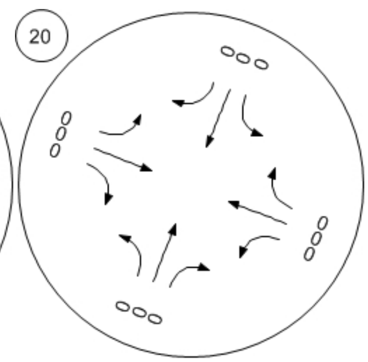
Willow Rd (SR 114)/Ivy Dr



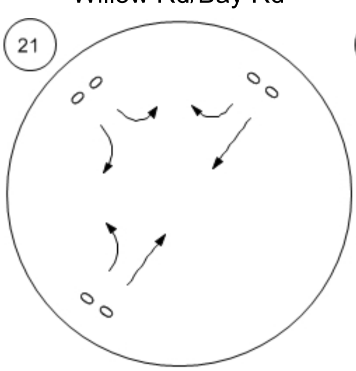
Willow Rd (SR 114)/O'Brien



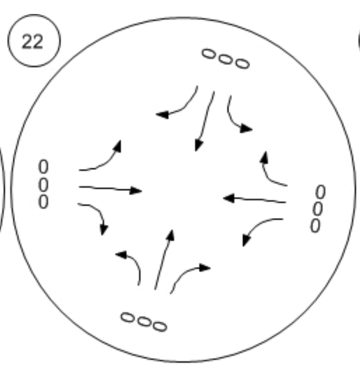
Willow Rd (SR 114)/Newbrid



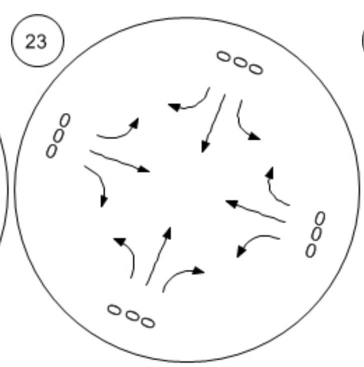
Willow Rd/Bay Rd



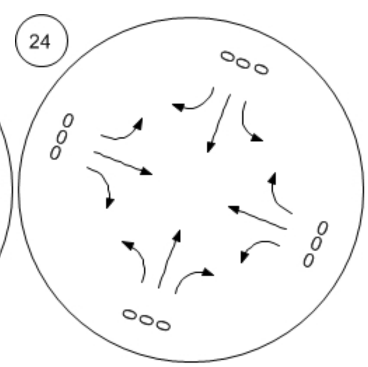
Willow Rd/Durham St-VA Me



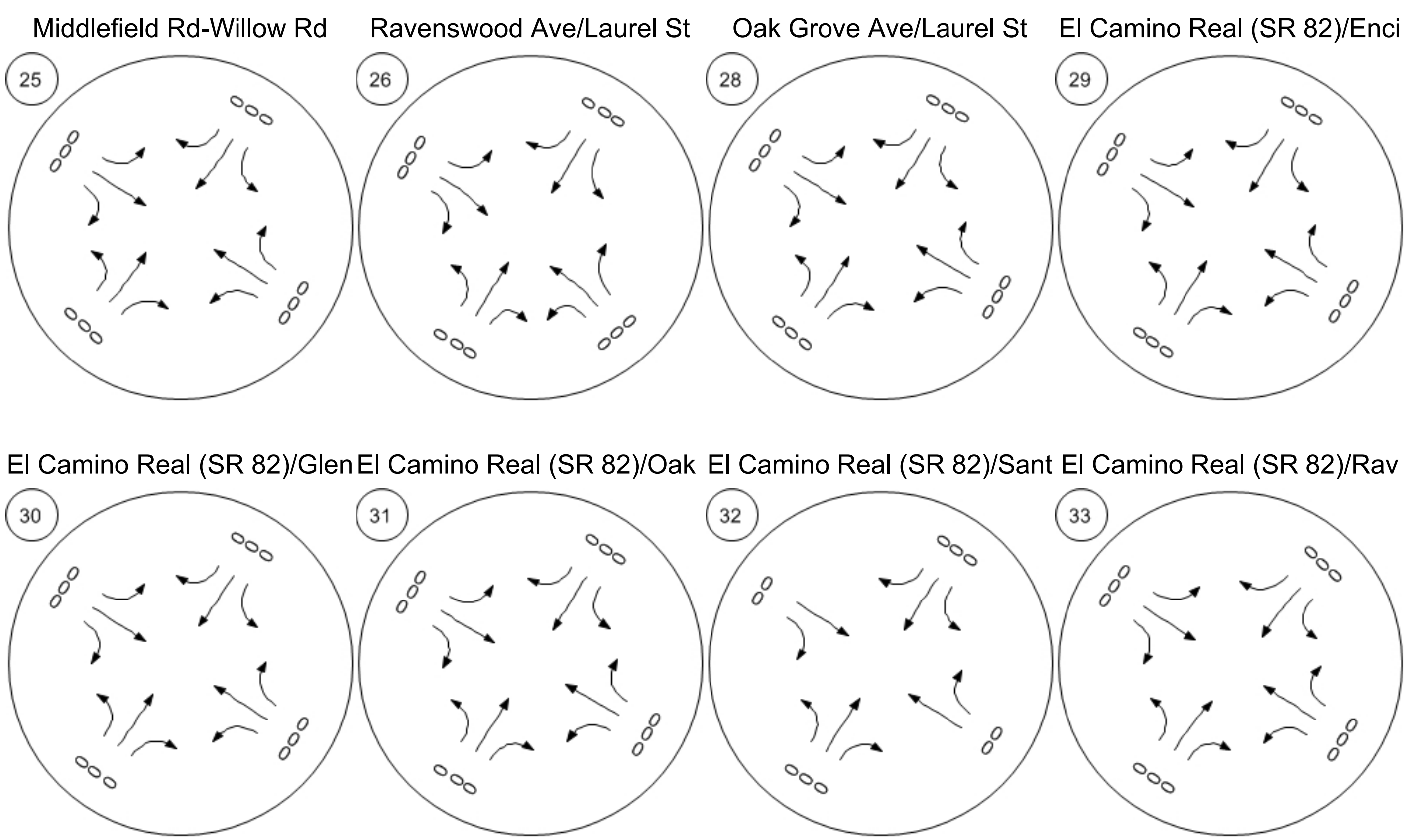
Willow Rd/Coleman Ave



Willow Rd/Gilbert Ave

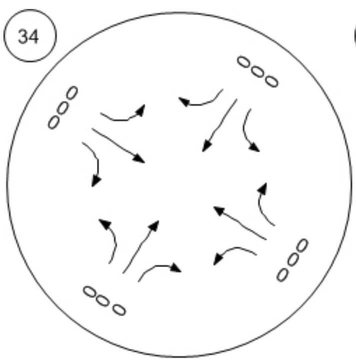


Traffic Volume - Net New Site Trips

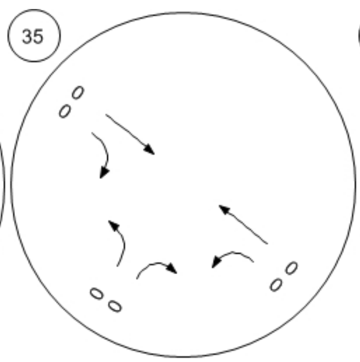


Traffic Volume - Net New Site Trips

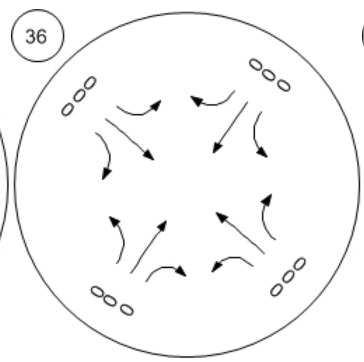
El Camino Real (SR 82)/Robl



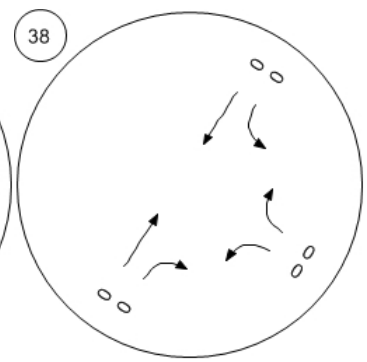
El Camino Real (SR 82)/Midd



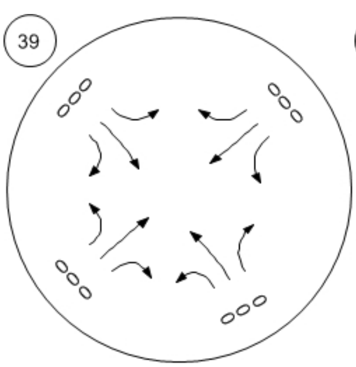
El Camino Real (SR 82)/Cam



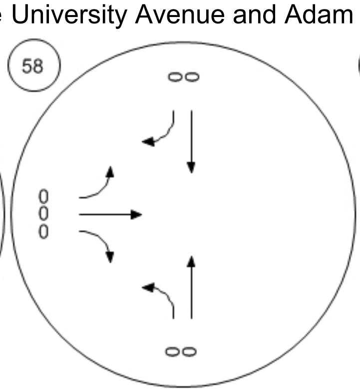
Santa Cruz Ave/University Dr



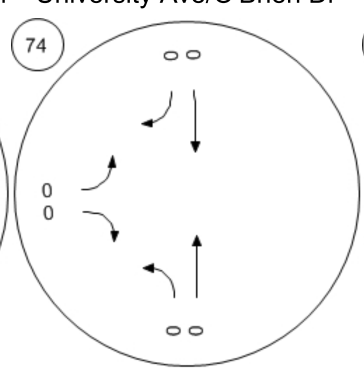
Sand Hill Rd/Santa Cruz Ave



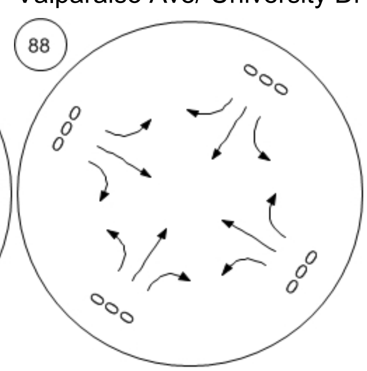
University Avenue and Adam



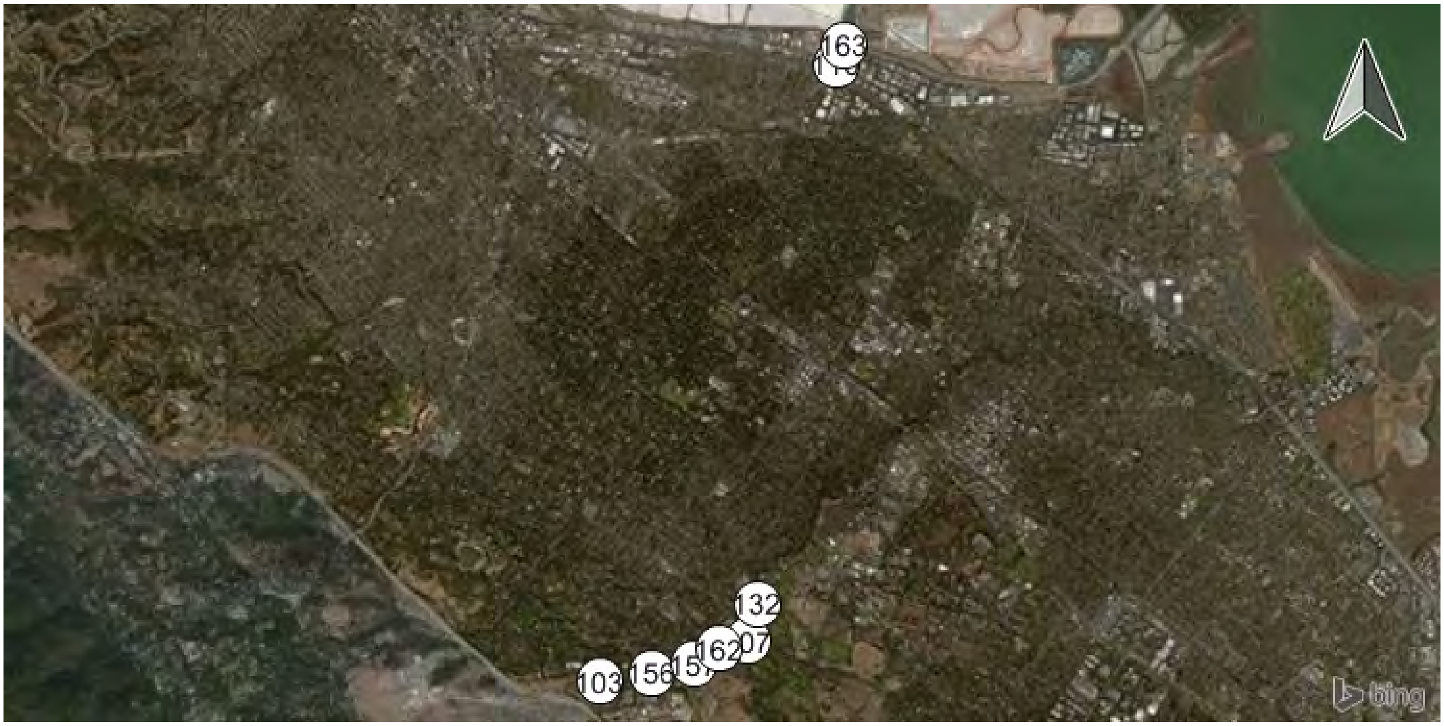
University Ave/O'Brien Dr



Valparaiso Ave/ University Dr

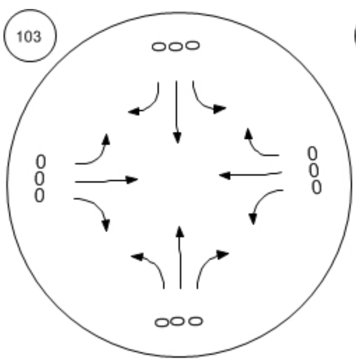


Traffic Volume - Net New Site Trips



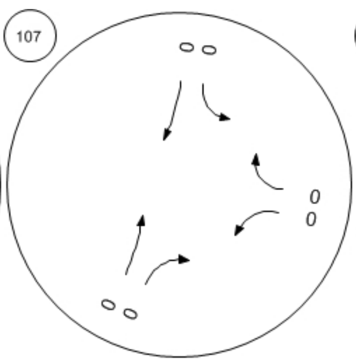
Addison Wesley/Sand Hill Rd

103



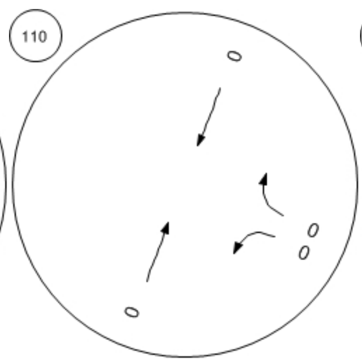
Alpine Rd/Santa Cruz Ave&J

107



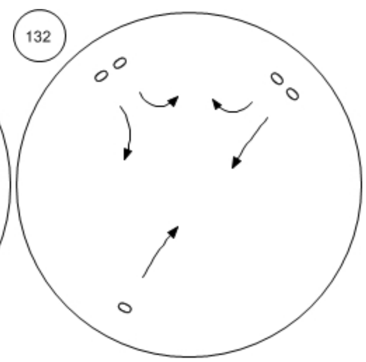
Marsh Road/101 NB Ramps

110



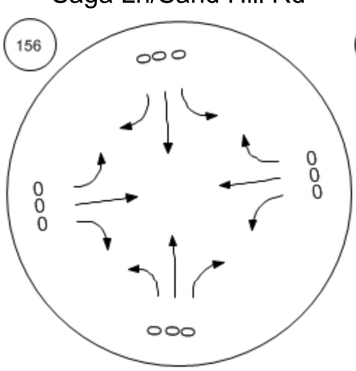
Oak Ave/Sand Hill Rd

132



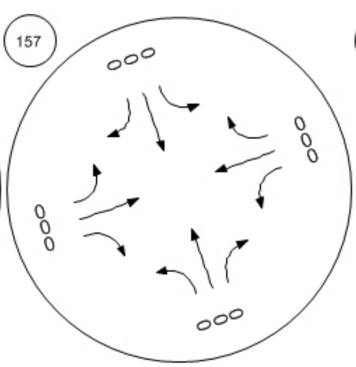
Saga Ln/Sand Hill Rd

156



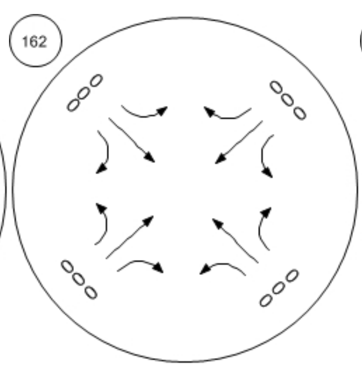
Branner Dr/Sand Hill Rd

157



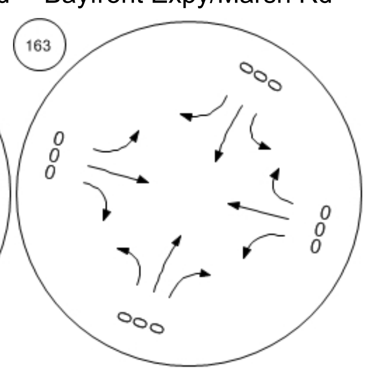
Sharon Park Dr/ Sand Hill Rd

162



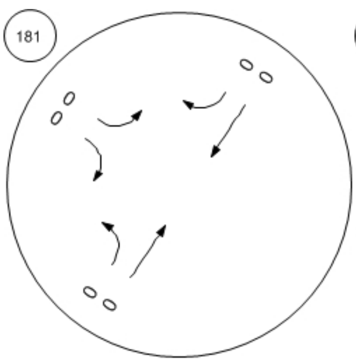
Bayfront Expy/Marsh Rd

163

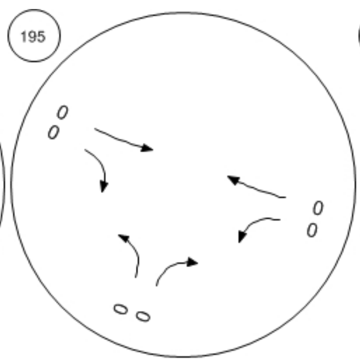


Traffic Volume - Net New Site Trips

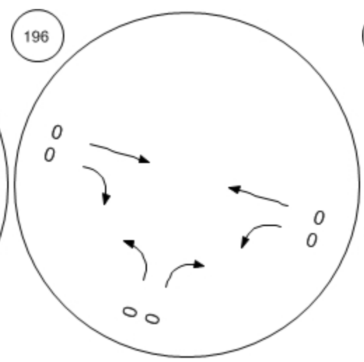
Santa Cruz Ave/Elder Ave



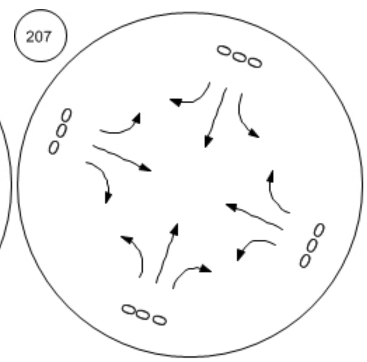
Bayfront Expy/Chilco St



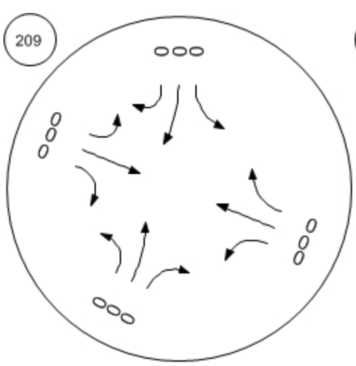
Bayfront Expy/Chrysler Drive



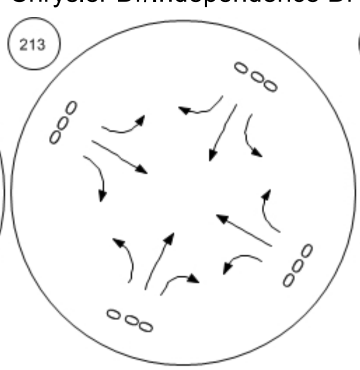
Chilco St/Constitution Dr



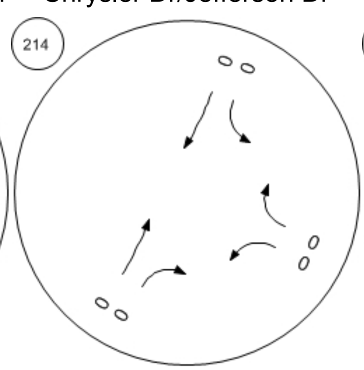
Jefferson Dr/Constitution Dr



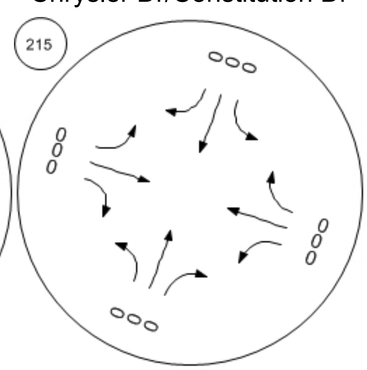
Chrysler Dr/Independence Dr



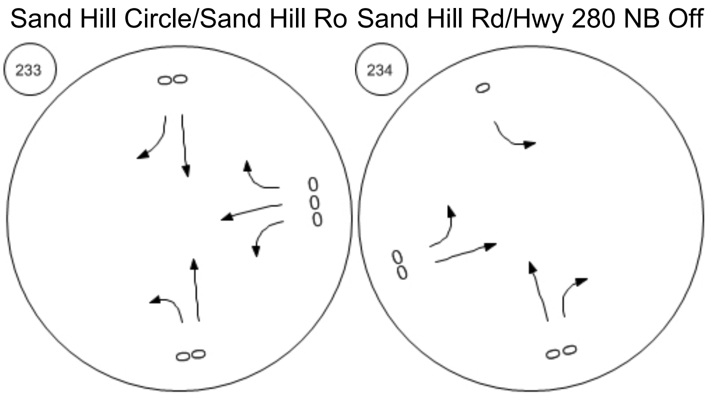
Chrysler Dr/Jefferson Dr



Chrysler Dr/Constitution Dr

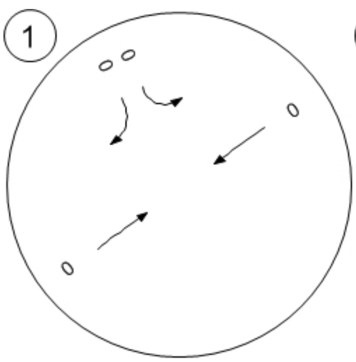


Traffic Volume - Net New Site Trips

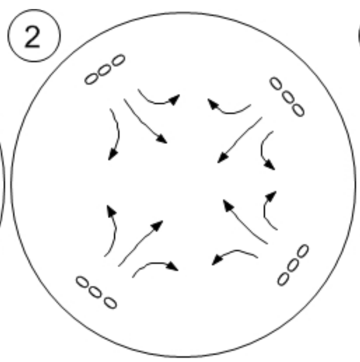


Traffic Volume - Other Volume

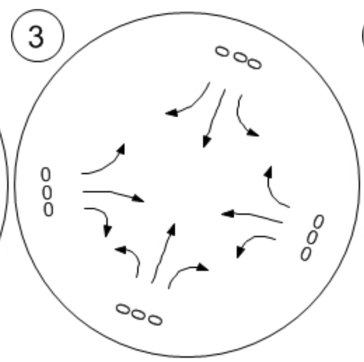
Marsh Rd (SR 84)/US 101 S



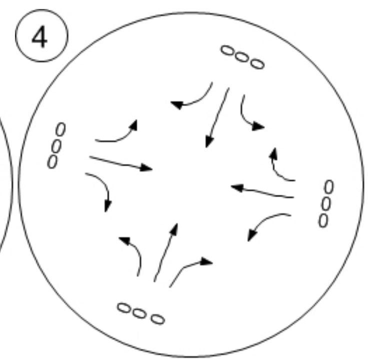
Marsh Rd/Rolison Rd-Scott D



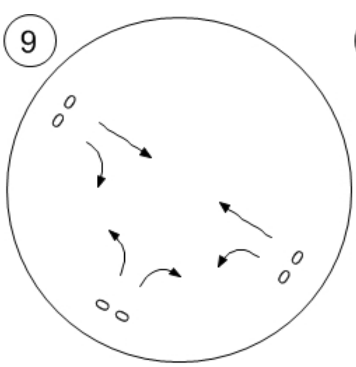
Marsh Rd/Florence St-Bohan



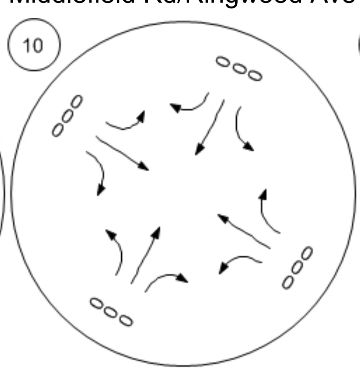
Marsh Rd/Bay Rd



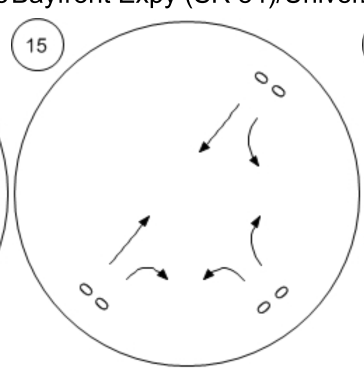
Middlefield Rd/Ravenswood



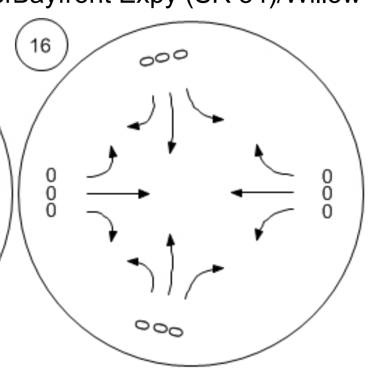
Middlefield Rd/Ringwood Ave



Bayfront Expy (SR 84)/Univer

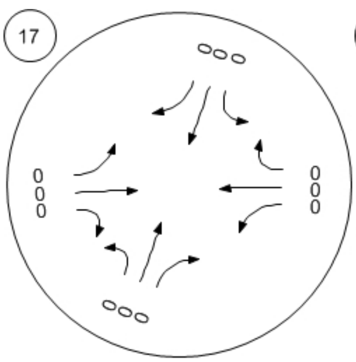


Bayfront Expy (SR 84)/Willow

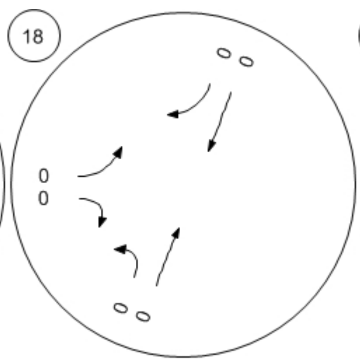


Traffic Volume - Other Volume

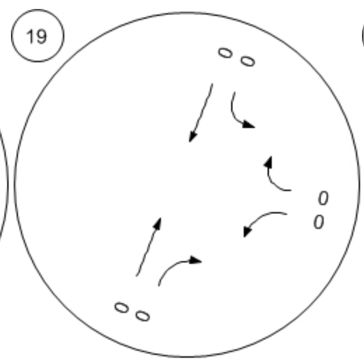
Willow Rd (SR 114)/Hamilton



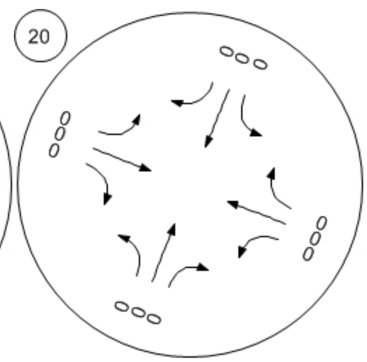
Willow Rd (SR 114)/Ivy Dr



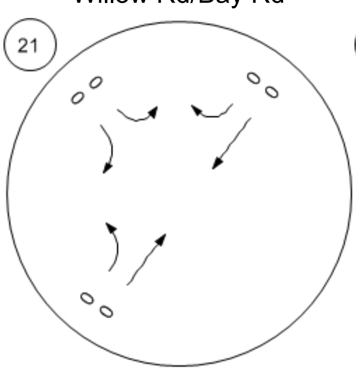
Willow Rd (SR 114)/O'Brien



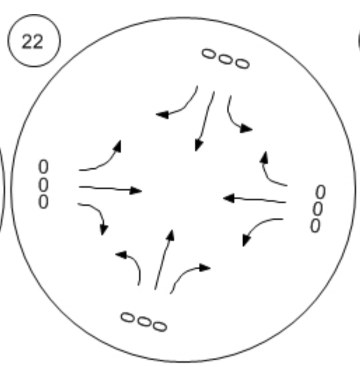
Willow Rd (SR 114)/Newbrid



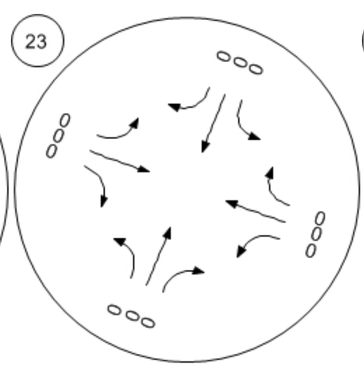
Willow Rd/Bay Rd



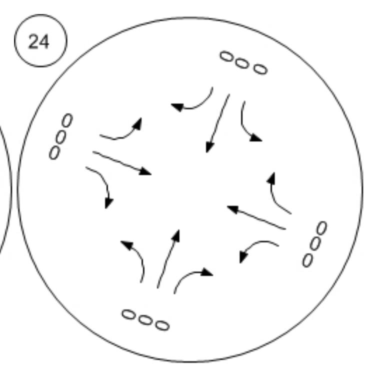
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

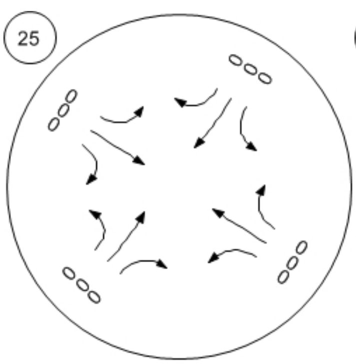


Willow Rd/Gilbert Ave

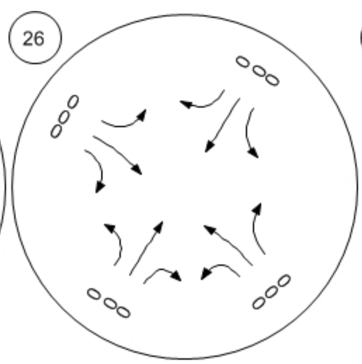


Traffic Volume - Other Volume

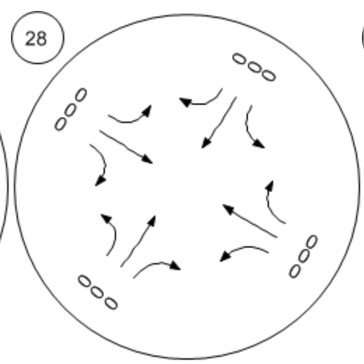
Middlefield Rd-Willow Rd



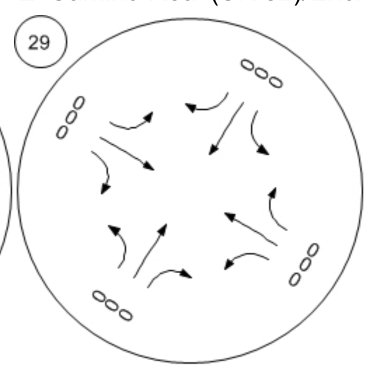
Ravenswood Ave/Laurel St



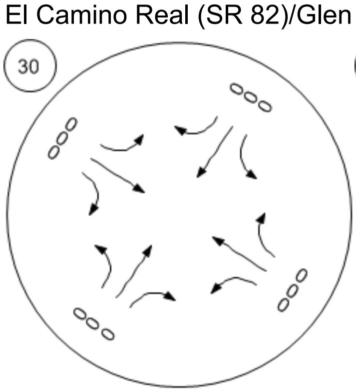
Oak Grove Ave/Laurel St



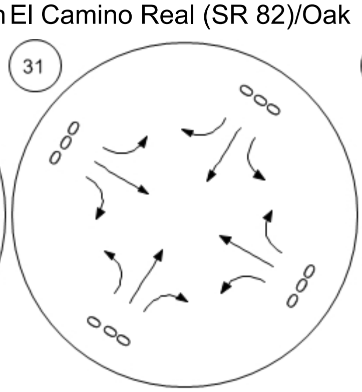
El Camino Real (SR 82)/Enci



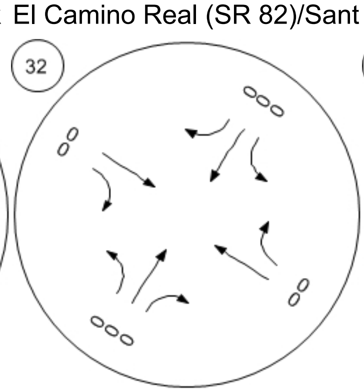
El Camino Real (SR 82)/Glen



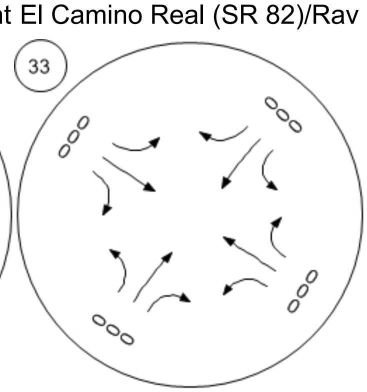
El Camino Real (SR 82)/Oak



El Camino Real (SR 82)/Sant

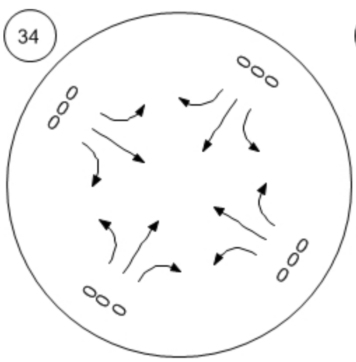


El Camino Real (SR 82)/Rav

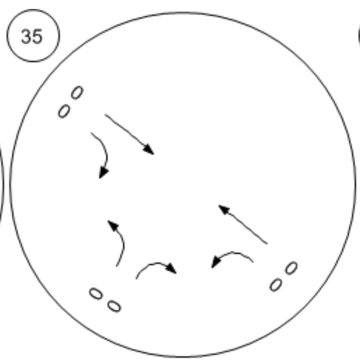


Traffic Volume - Other Volume

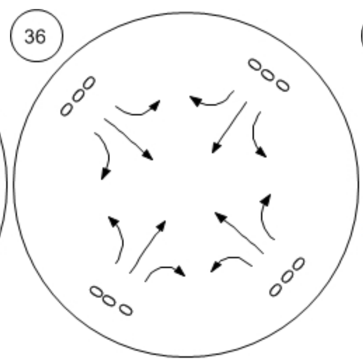
El Camino Real (SR 82)/Robl



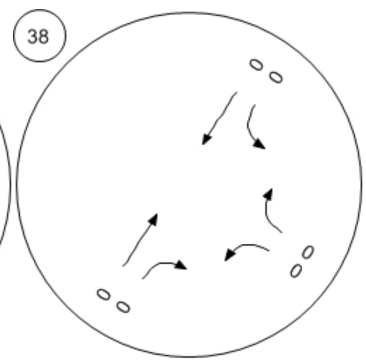
El Camino Real (SR 82)/Midd



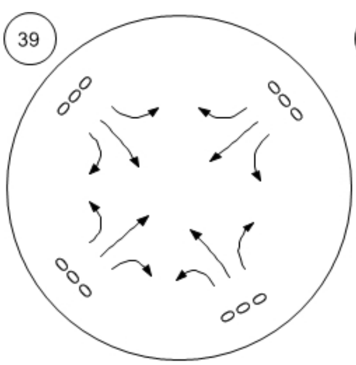
El Camino Real (SR 82)/Cam



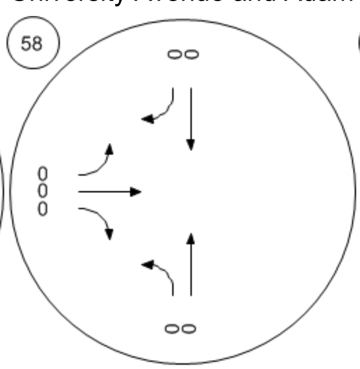
Santa Cruz Ave/University Dr



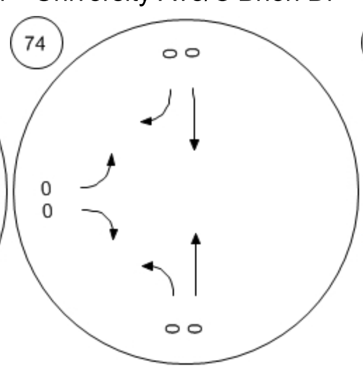
Sand Hill Rd/Santa Cruz Ave



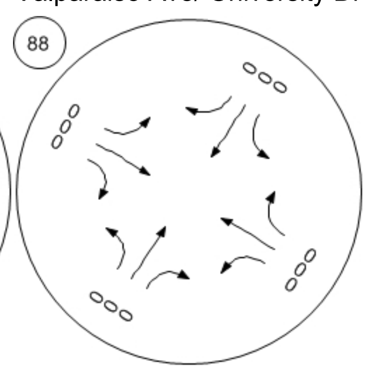
University Avenue and Adam



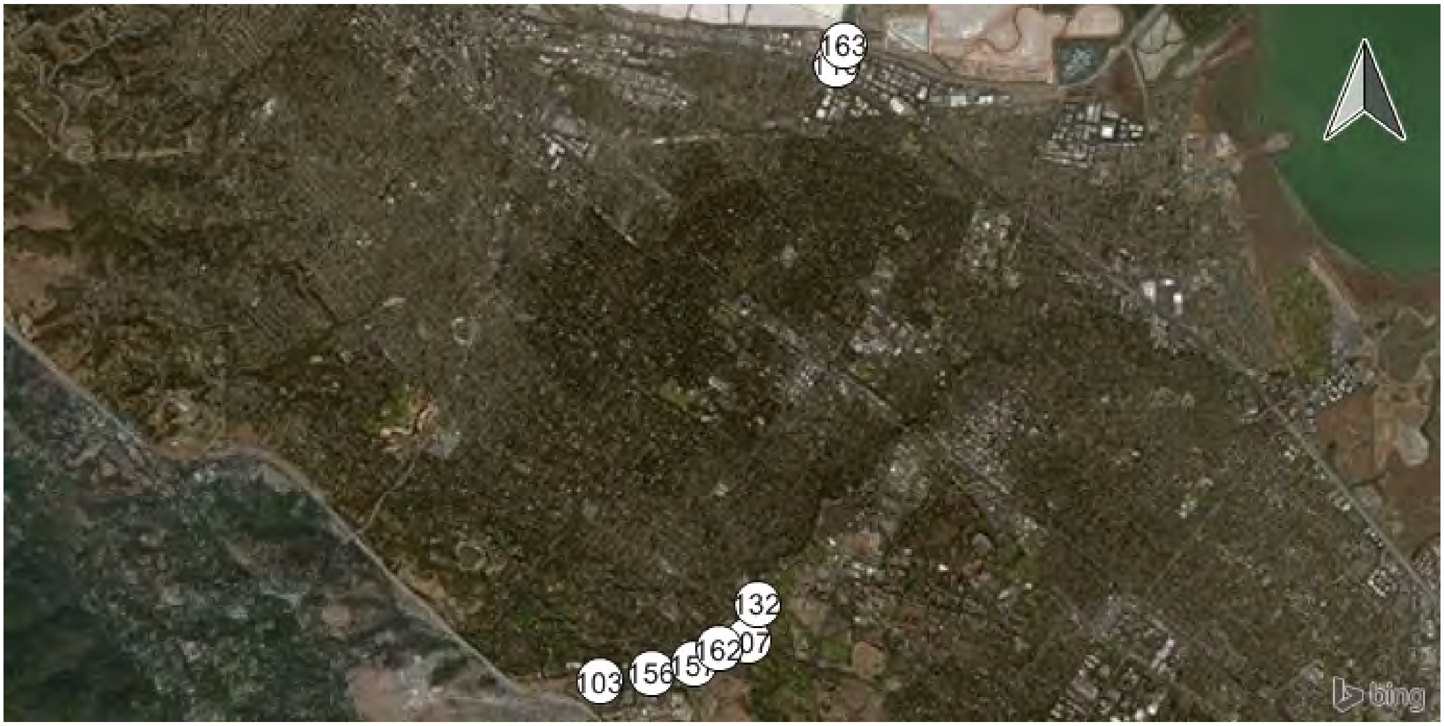
University Ave/O'Brien Dr



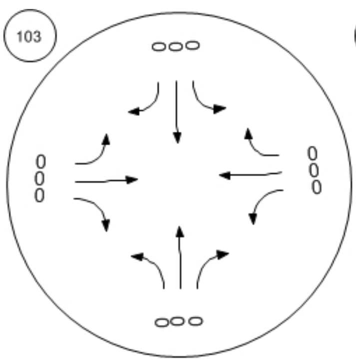
Valparaiso Ave/ University Dr



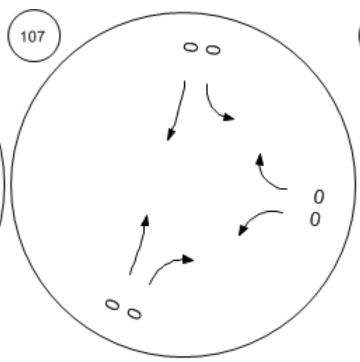
Traffic Volume - Other Volume



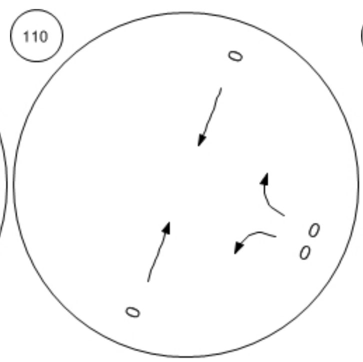
Addison Wesley/Sand Hill Rd



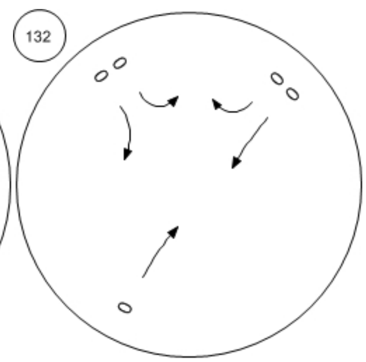
Alpine Rd/Santa Cruz Ave&J



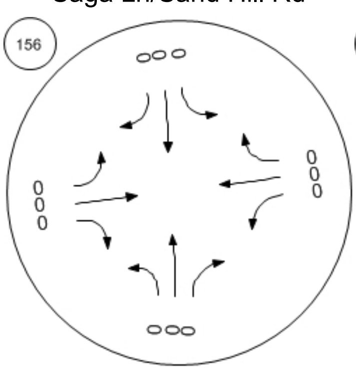
Marsh Road/101 NB Ramps



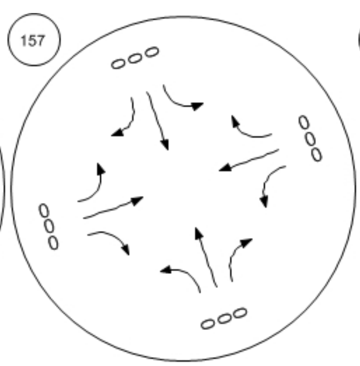
Oak Ave/Sand Hill Rd



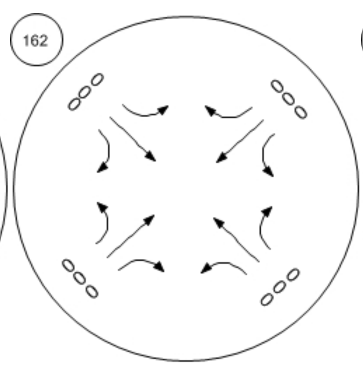
Saga Ln/Sand Hill Rd



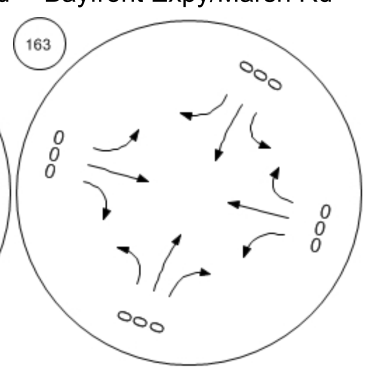
Branner Dr/Sand Hill Rd



Sharon Park Dr/ Sand Hill Rd

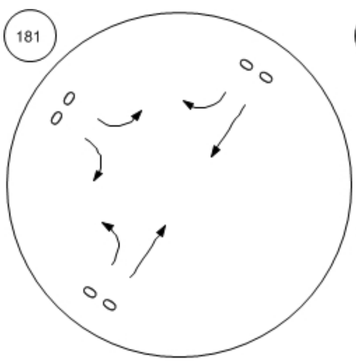


Bayfront Expy/Marsh Rd

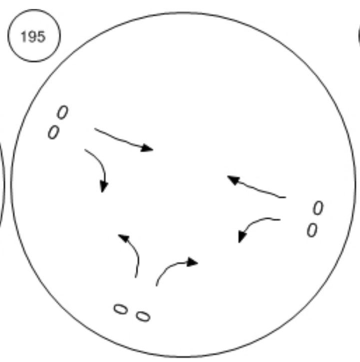


Traffic Volume - Other Volume

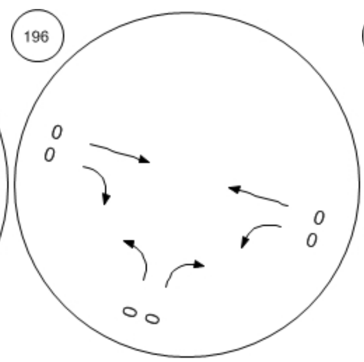
Santa Cruz Ave/Elder Ave



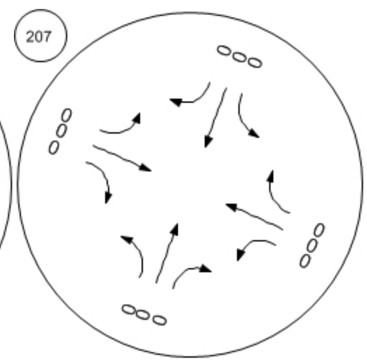
Bayfront Expy/Chilco St



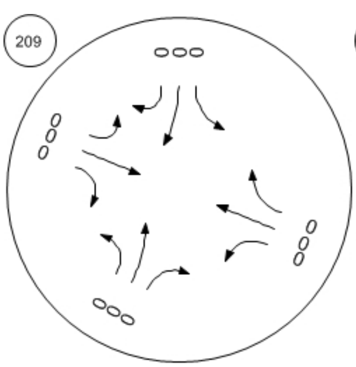
Bayfront Expy/Chrysler Drive



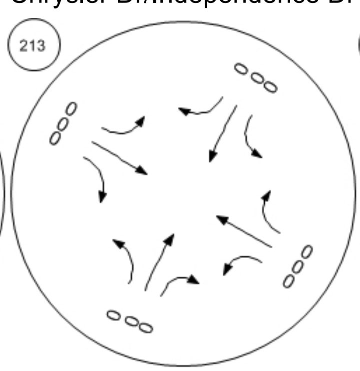
Chilco St/Constitution Dr



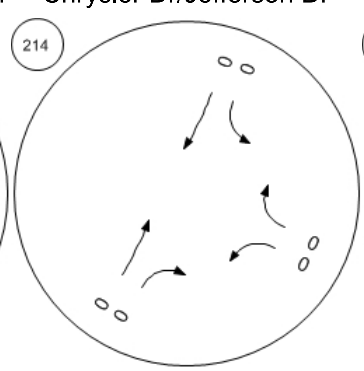
Jefferson Dr/Constitution Dr



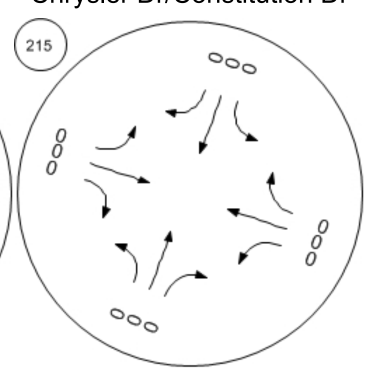
Chrysler Dr/Independence Dr



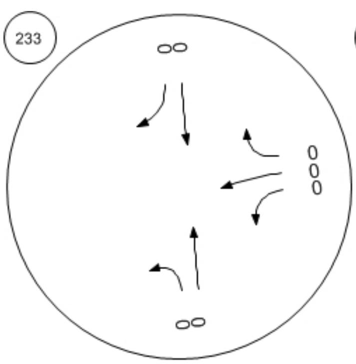
Chrysler Dr/Jefferson Dr

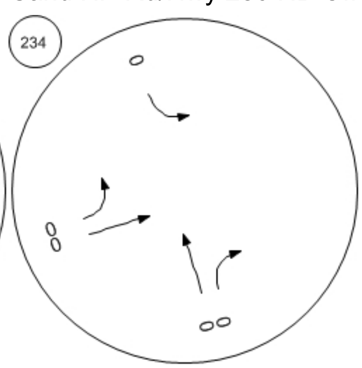


Chrysler Dr/Constitution Dr

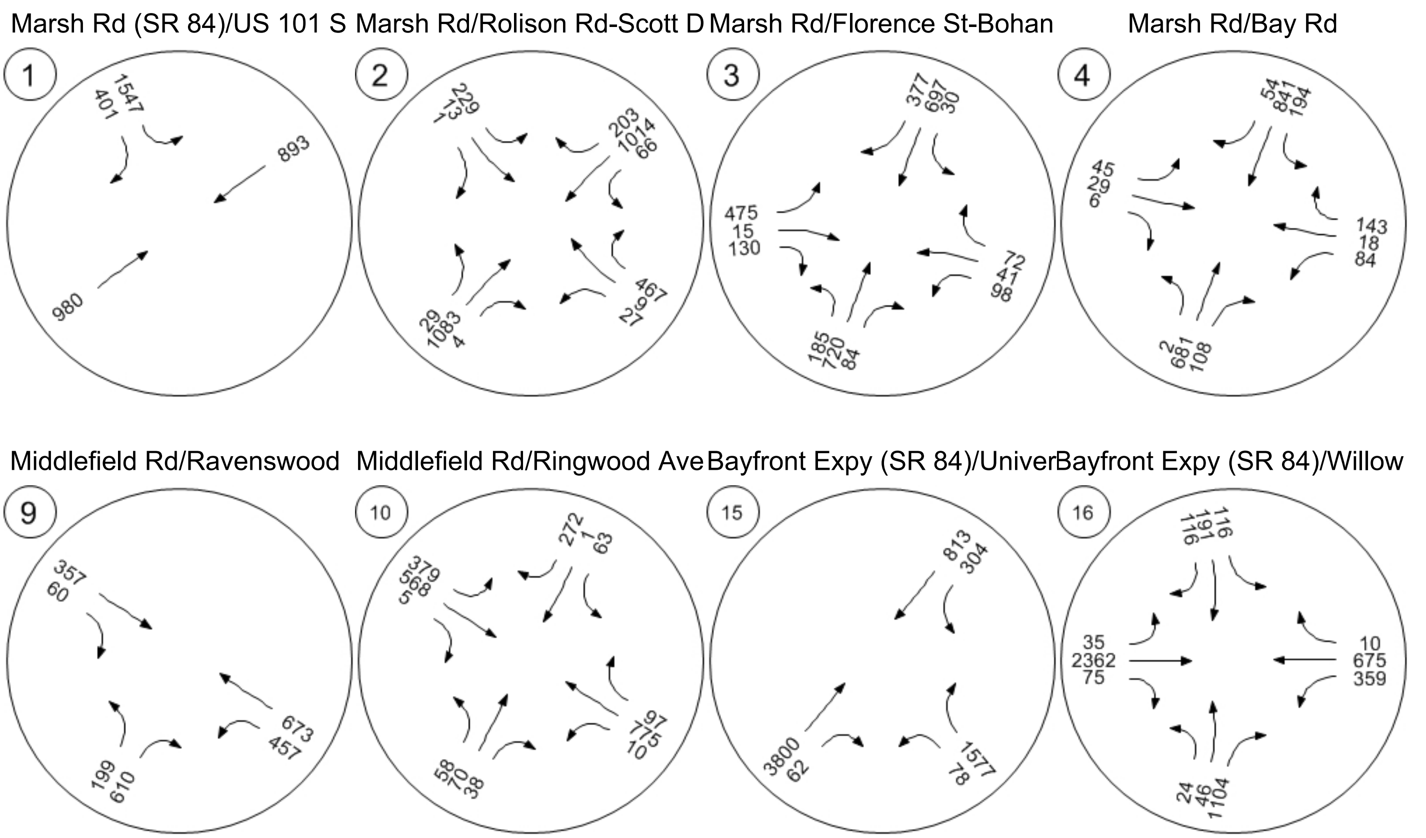


Traffic Volume - Other Volume



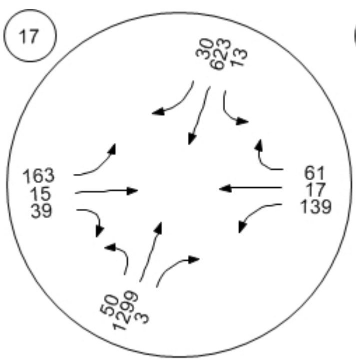


Traffic Volume - Future Total Volume

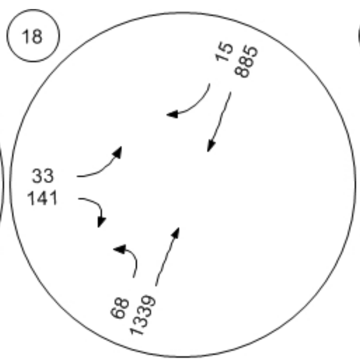


Traffic Volume - Future Total Volume

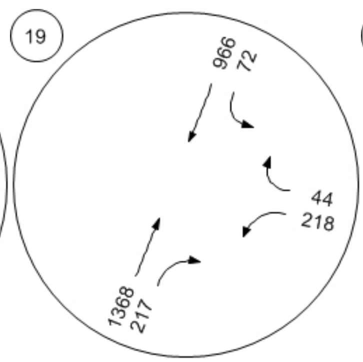
Willow Rd (SR 114)/Hamilton



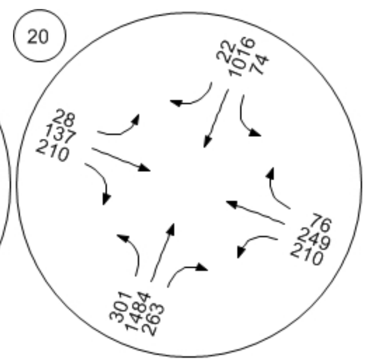
Willow Rd (SR 114)/Ivy Dr



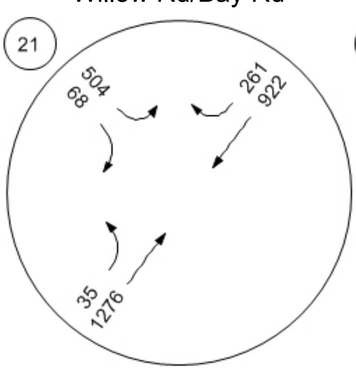
Willow Rd (SR 114)/O'Brien



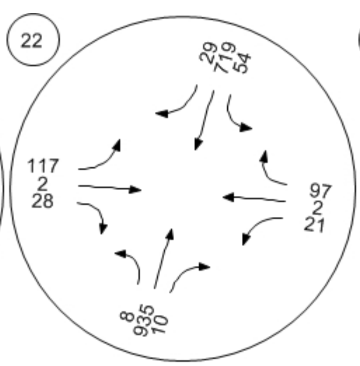
Willow Rd (SR 114)/Newbrid



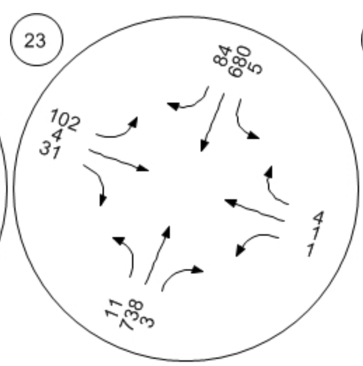
Willow Rd/Bay Rd



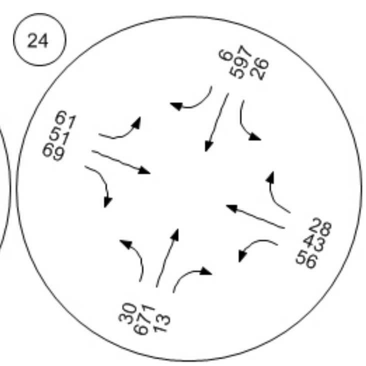
Willow Rd/Durham St-VA Me



Willow Rd/Coleman Ave

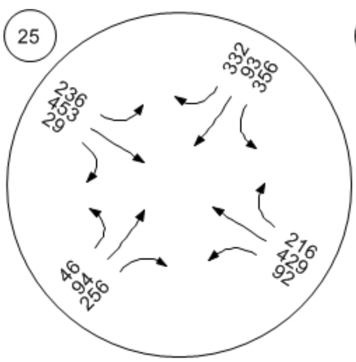


Willow Rd/Gilbert Ave

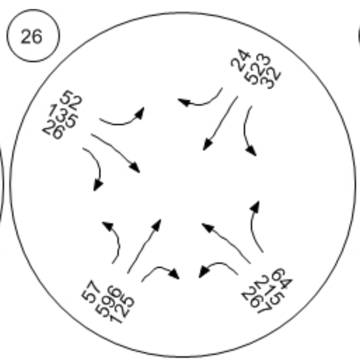


Traffic Volume - Future Total Volume

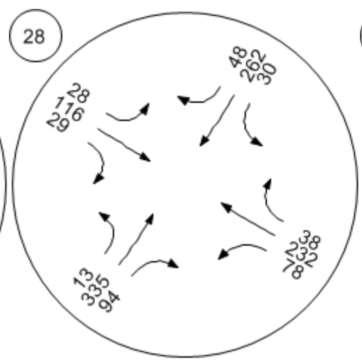
Middlefield Rd-Willow Rd



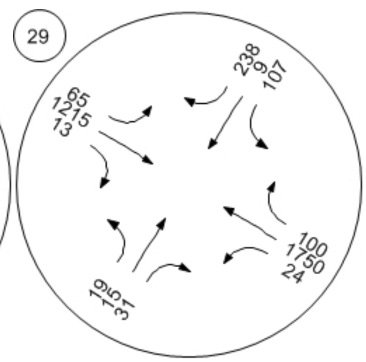
Ravenswood Ave/Laurel St



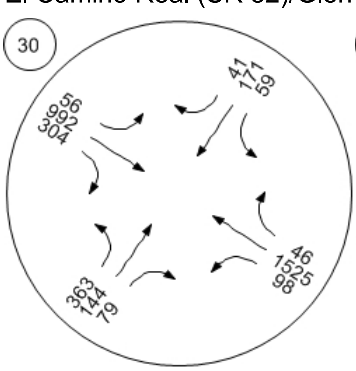
Oak Grove Ave/Laurel St



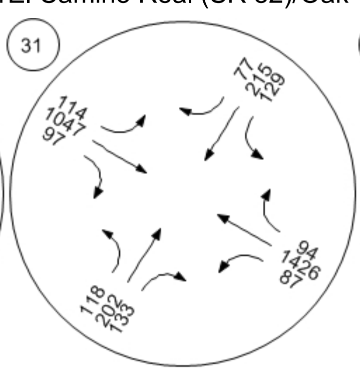
El Camino Real (SR 82)/Enci



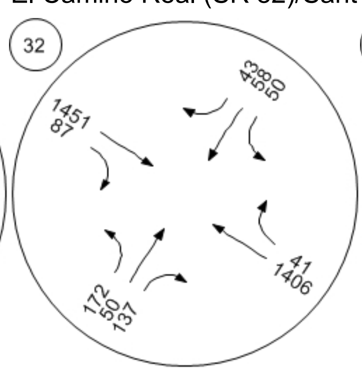
El Camino Real (SR 82)/Glen



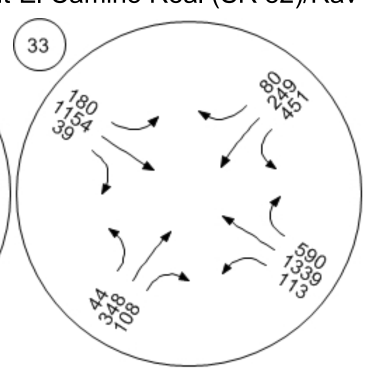
El Camino Real (SR 82)/Oak



El Camino Real (SR 82)/Sant

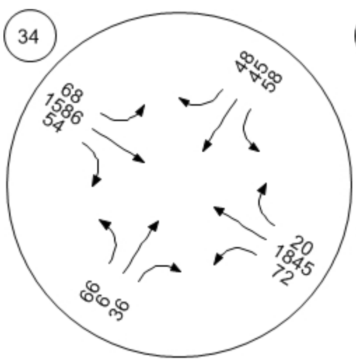


El Camino Real (SR 82)/Rav

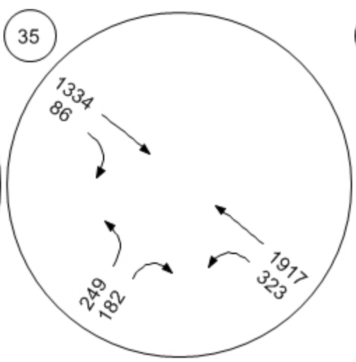


Traffic Volume - Future Total Volume

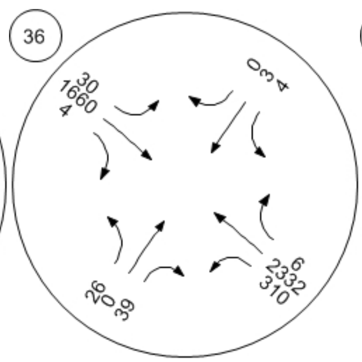
El Camino Real (SR 82)/Robl



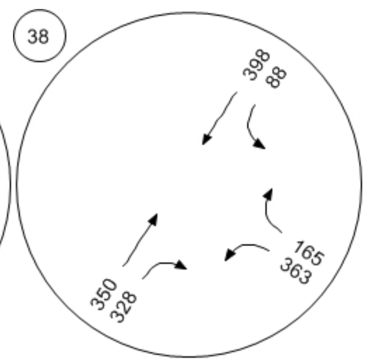
El Camino Real (SR 82)/Midd



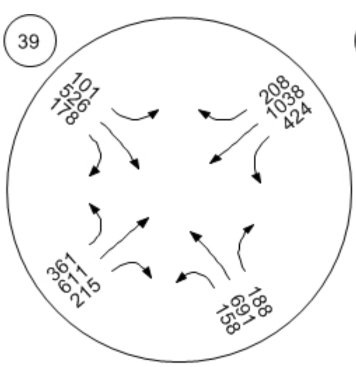
El Camino Real (SR 82)/Cam



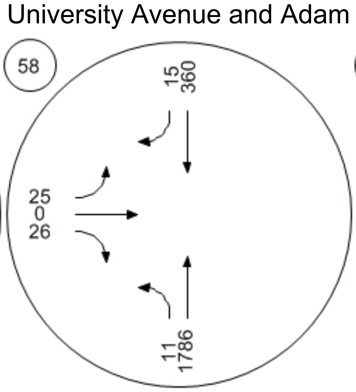
Santa Cruz Ave/University Dr



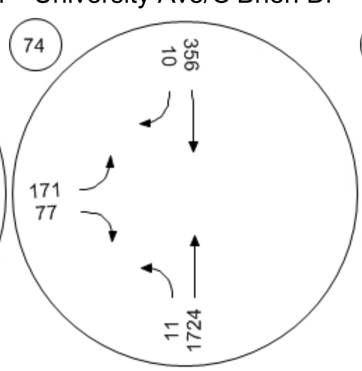
Sand Hill Rd/Santa Cruz Ave



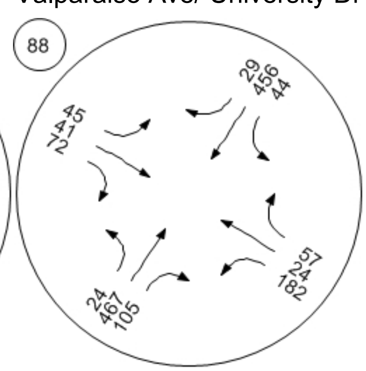
University Avenue and Adam



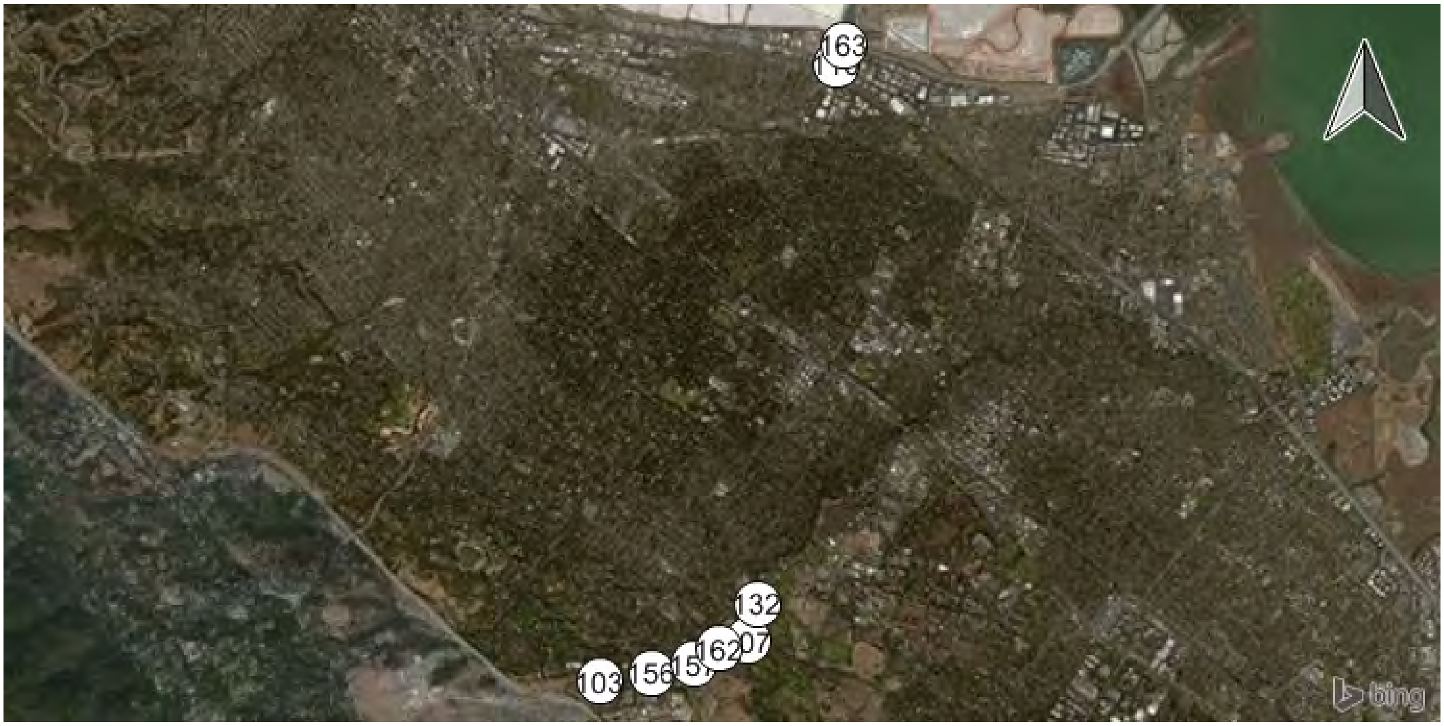
University Ave/O'Brien Dr

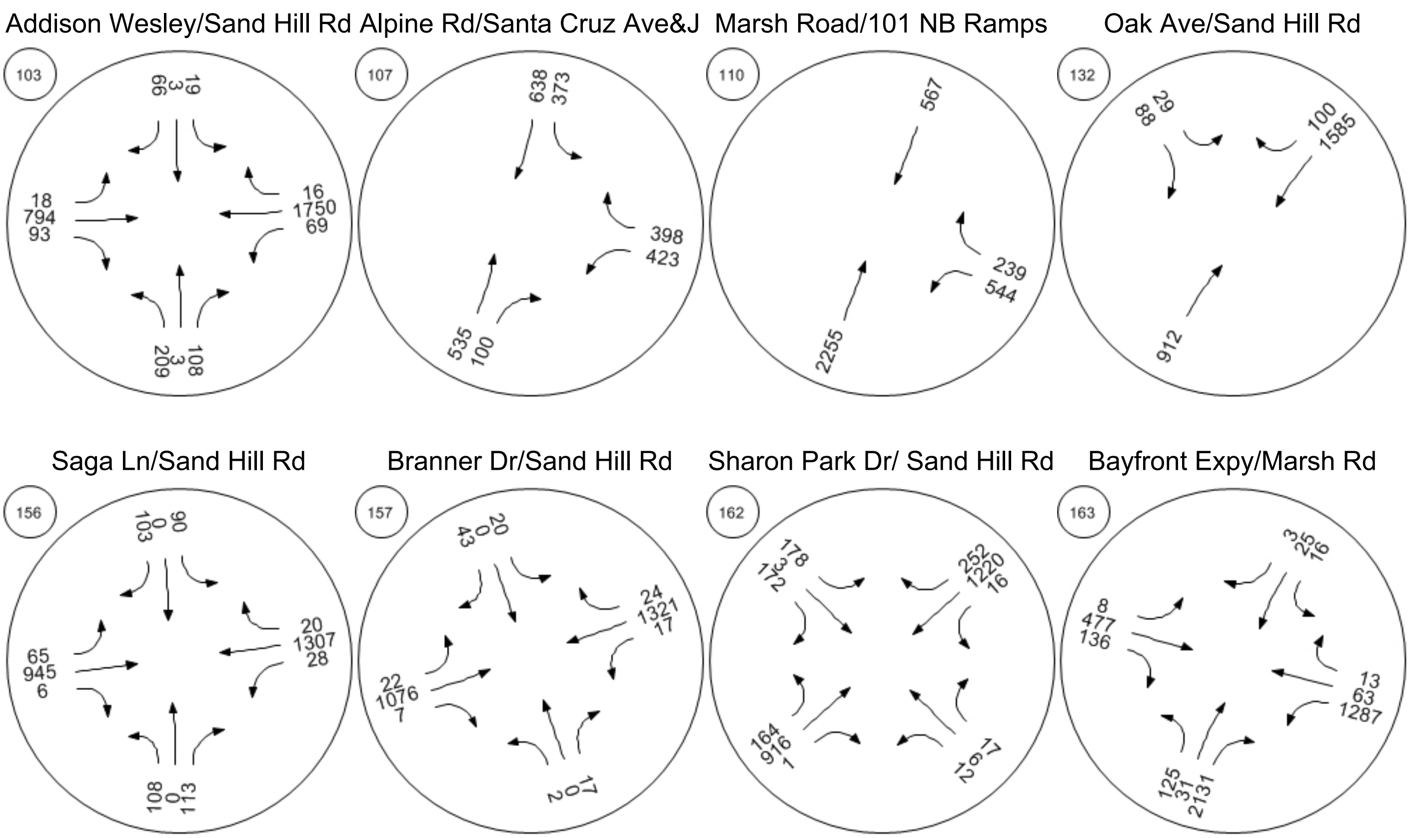


Valparaiso Ave/ University Dr



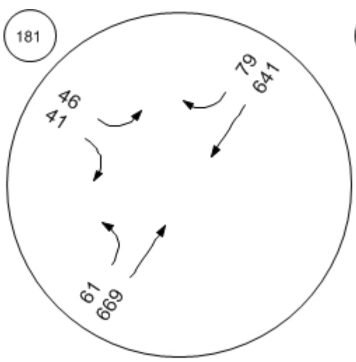
Traffic Volume - Future Total Volume



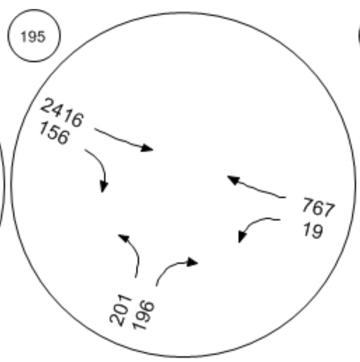


Traffic Volume - Future Total Volume

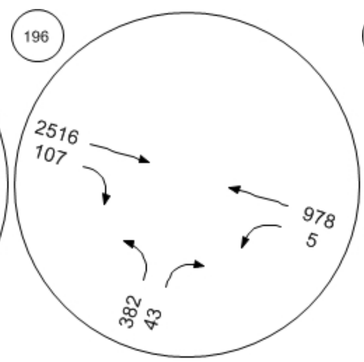
Santa Cruz Ave/Elder Ave



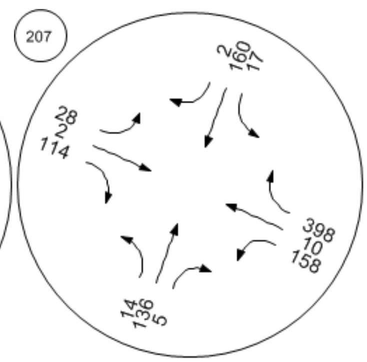
Bayfront Expy/Chilco St



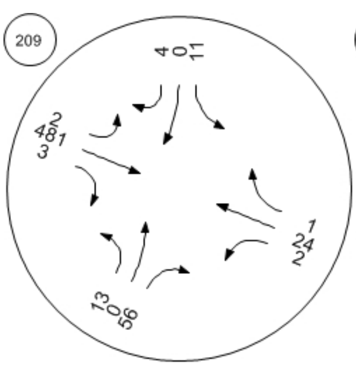
Bayfront Expy/Chrysler Drive



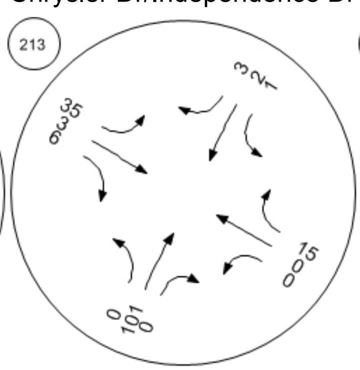
Chilco St/Constitution Dr



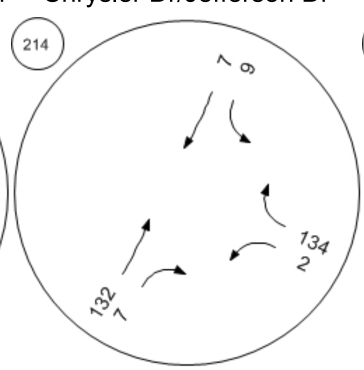
Jefferson Dr/Constitution Dr



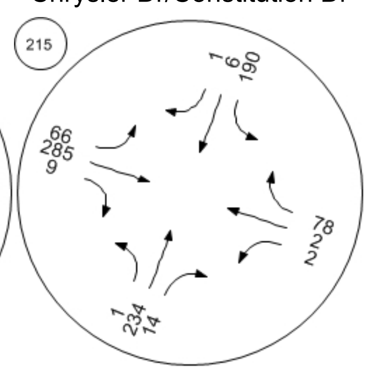
Chrysler Dr/Independence Dr



Chrysler Dr/Jefferson Dr

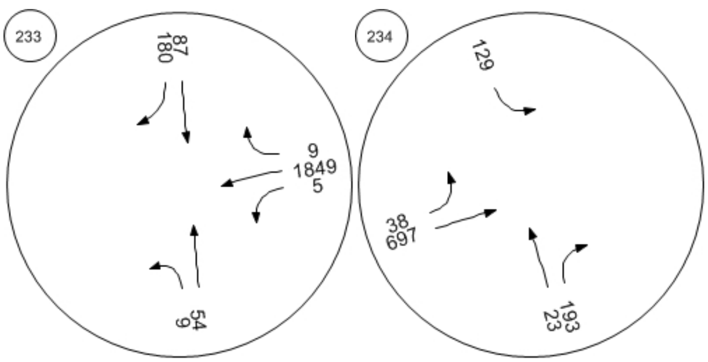


Chrysler Dr/Constitution Dr

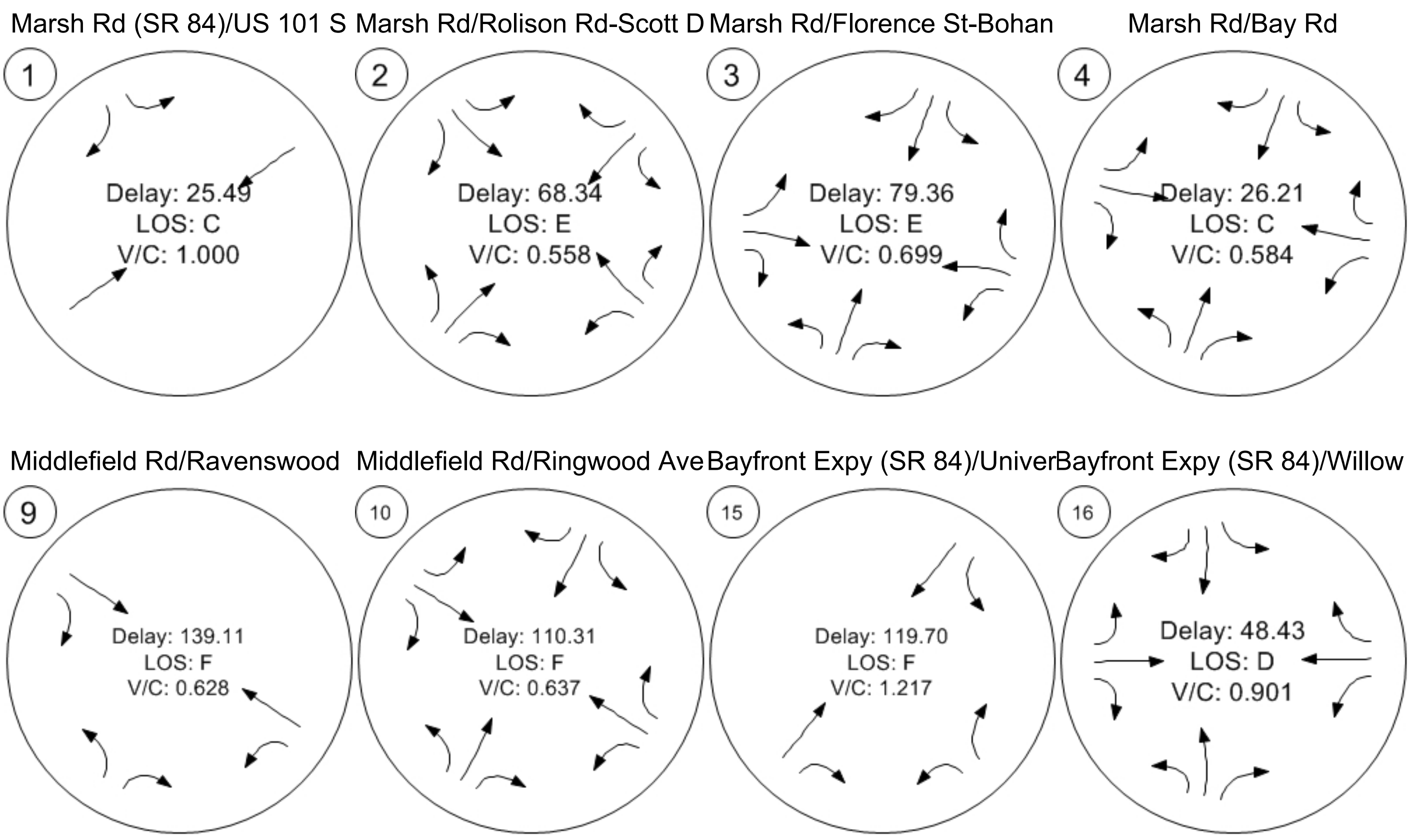


Traffic Volume - Future Total Volume

Sand Hill Circle/Sand Hill Ro Sand Hill Rd/Hwy 280 NB Off

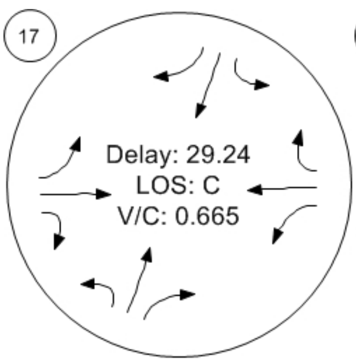


Traffic Conditions

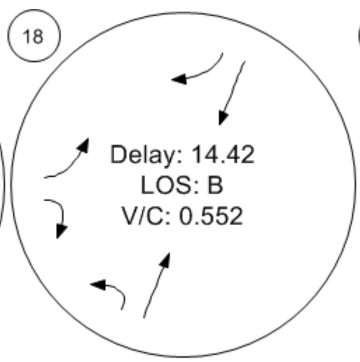


Traffic Conditions

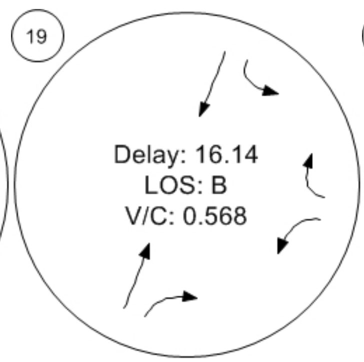
Willow Rd (SR 114)/Hamilton



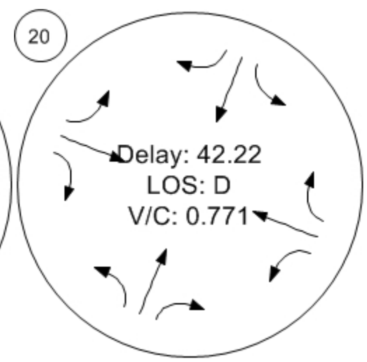
Willow Rd (SR 114)/Ivy Dr



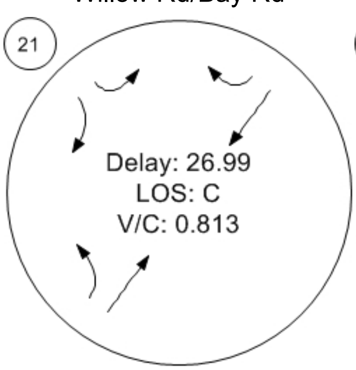
Willow Rd (SR 114)/O'Brien



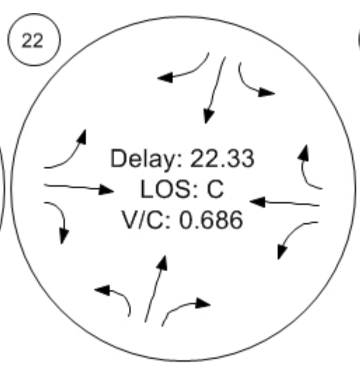
Willow Rd (SR 114)/Newbrid



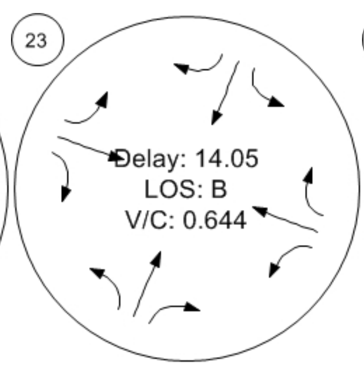
Willow Rd/Bay Rd



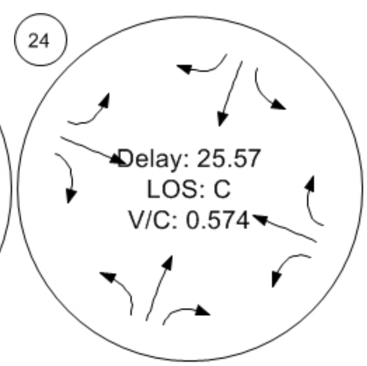
Willow Rd/Durham St-VA Me



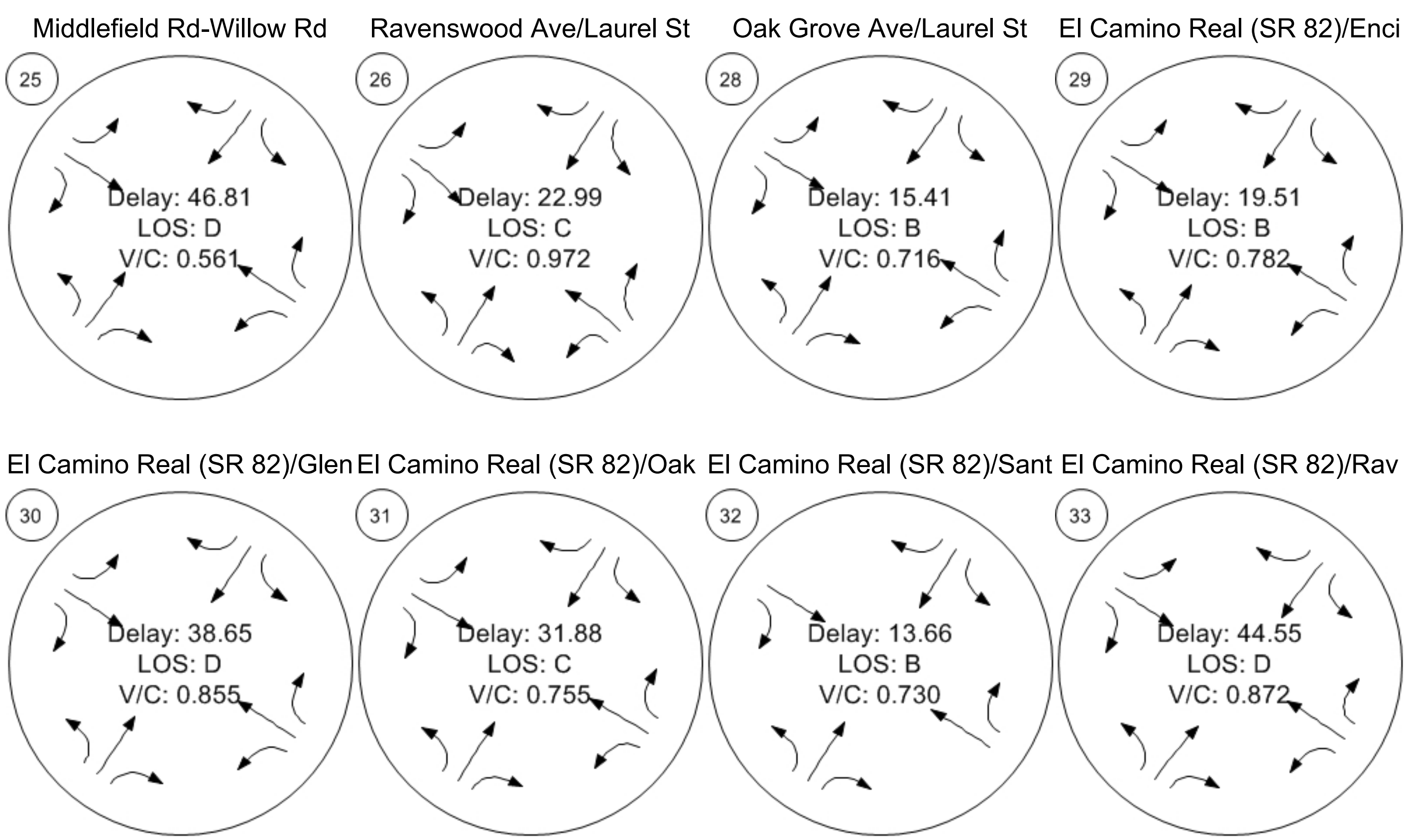
Willow Rd/Coleman Ave



Willow Rd/Gilbert Ave

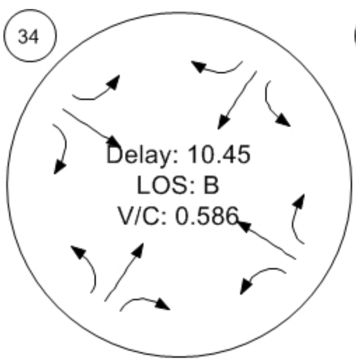


Traffic Conditions

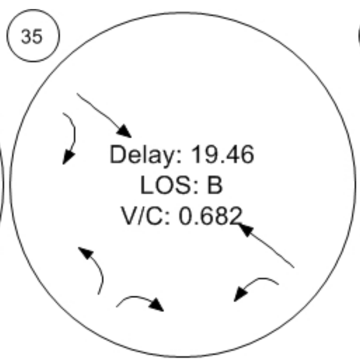


Traffic Conditions

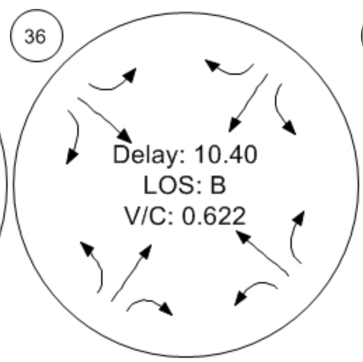
El Camino Real (SR 82)/Robl



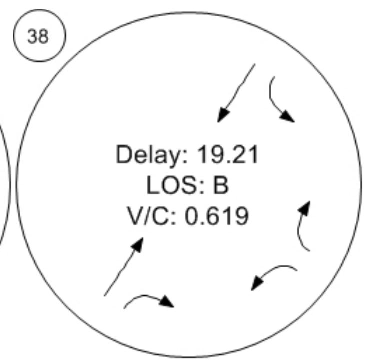
El Camino Real (SR 82)/Midd



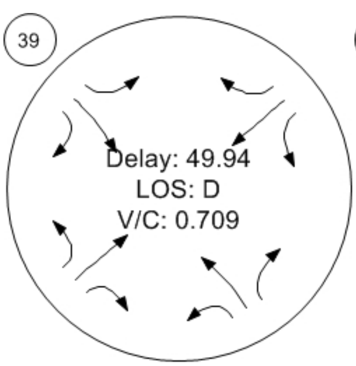
El Camino Real (SR 82)/Cam



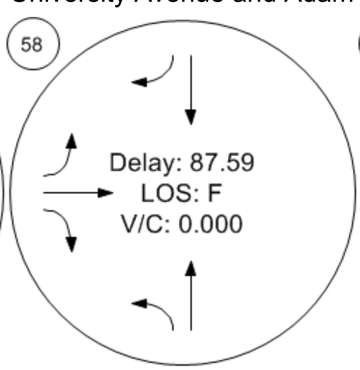
Santa Cruz Ave/University Dr



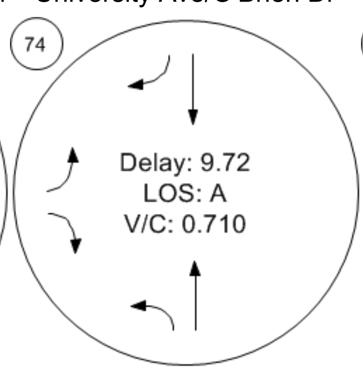
Sand Hill Rd/Santa Cruz Ave



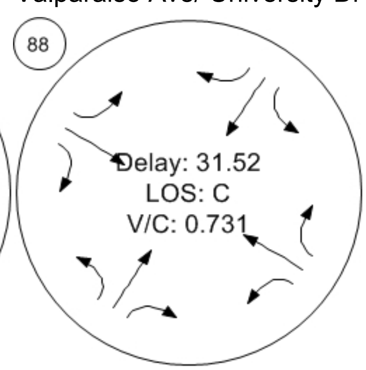
University Avenue and Adam



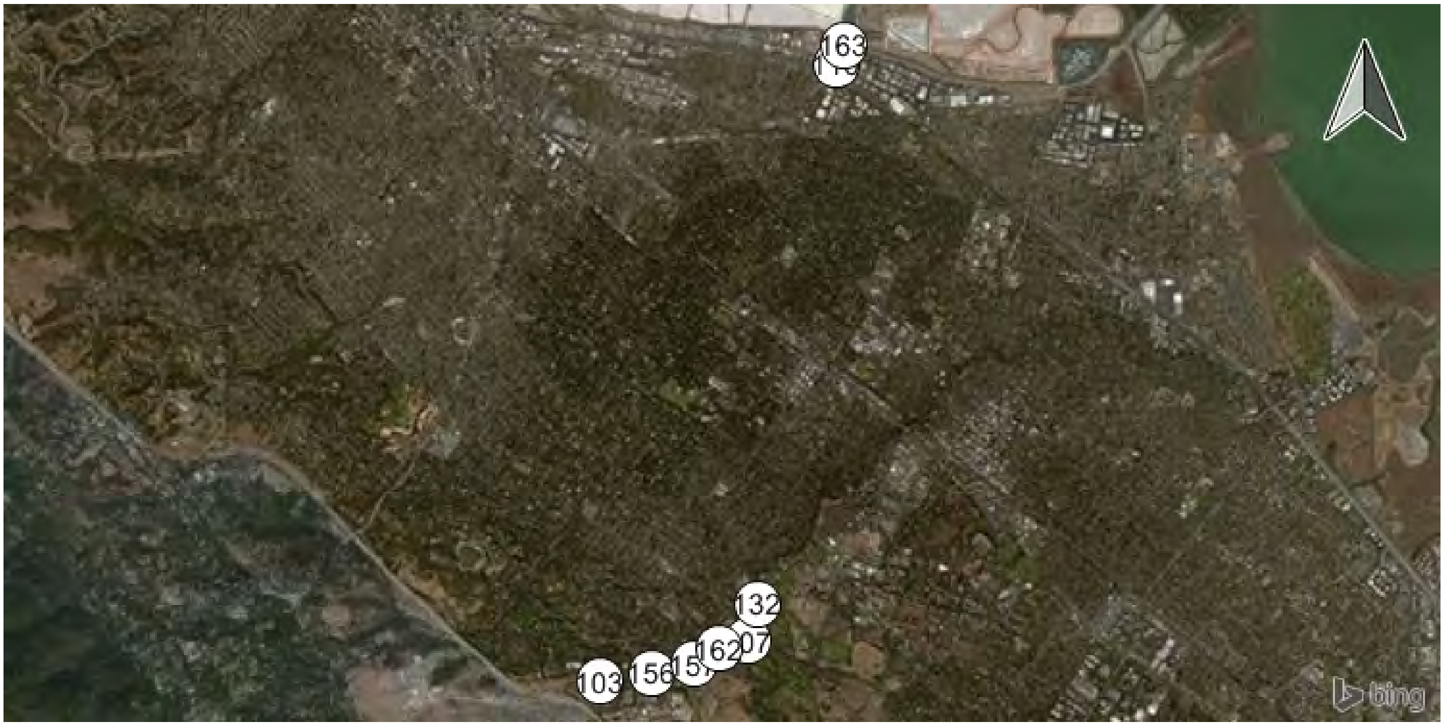
University Ave/O'Brien Dr



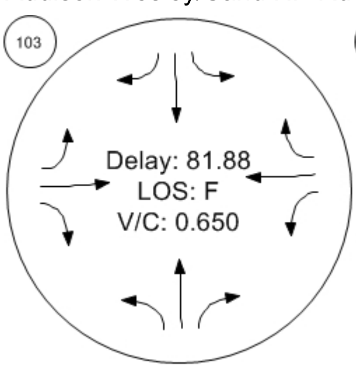
Valparaiso Ave/ University Dr



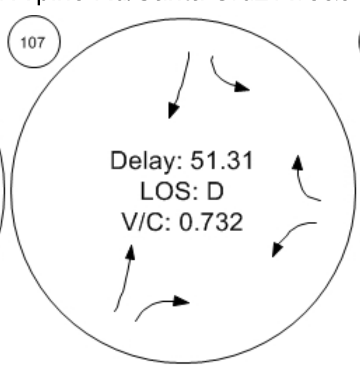
Traffic Conditions



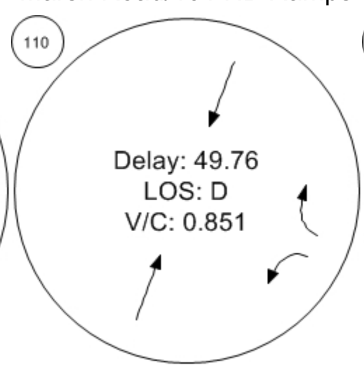
Addison Wesley/Sand Hill Rd



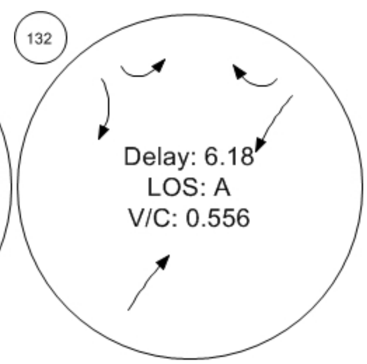
Alpine Rd/Santa Cruz Ave&J



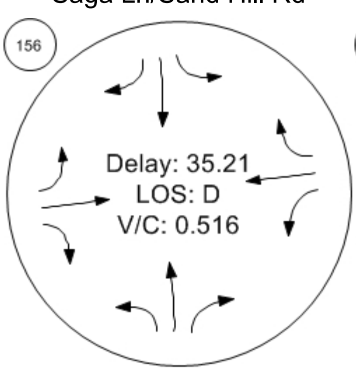
Marsh Road/101 NB Ramps



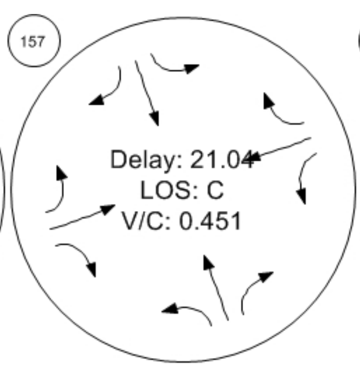
Oak Ave/Sand Hill Rd



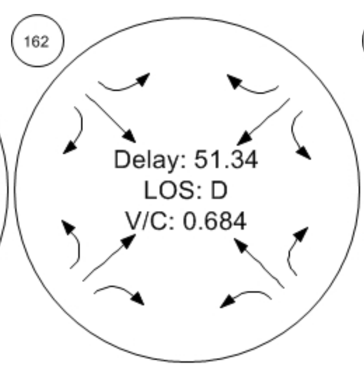
Saga Ln/Sand Hill Rd



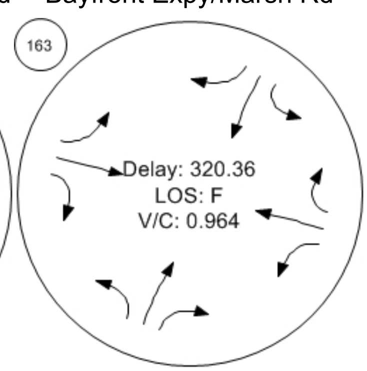
Branner Dr/Sand Hill Rd



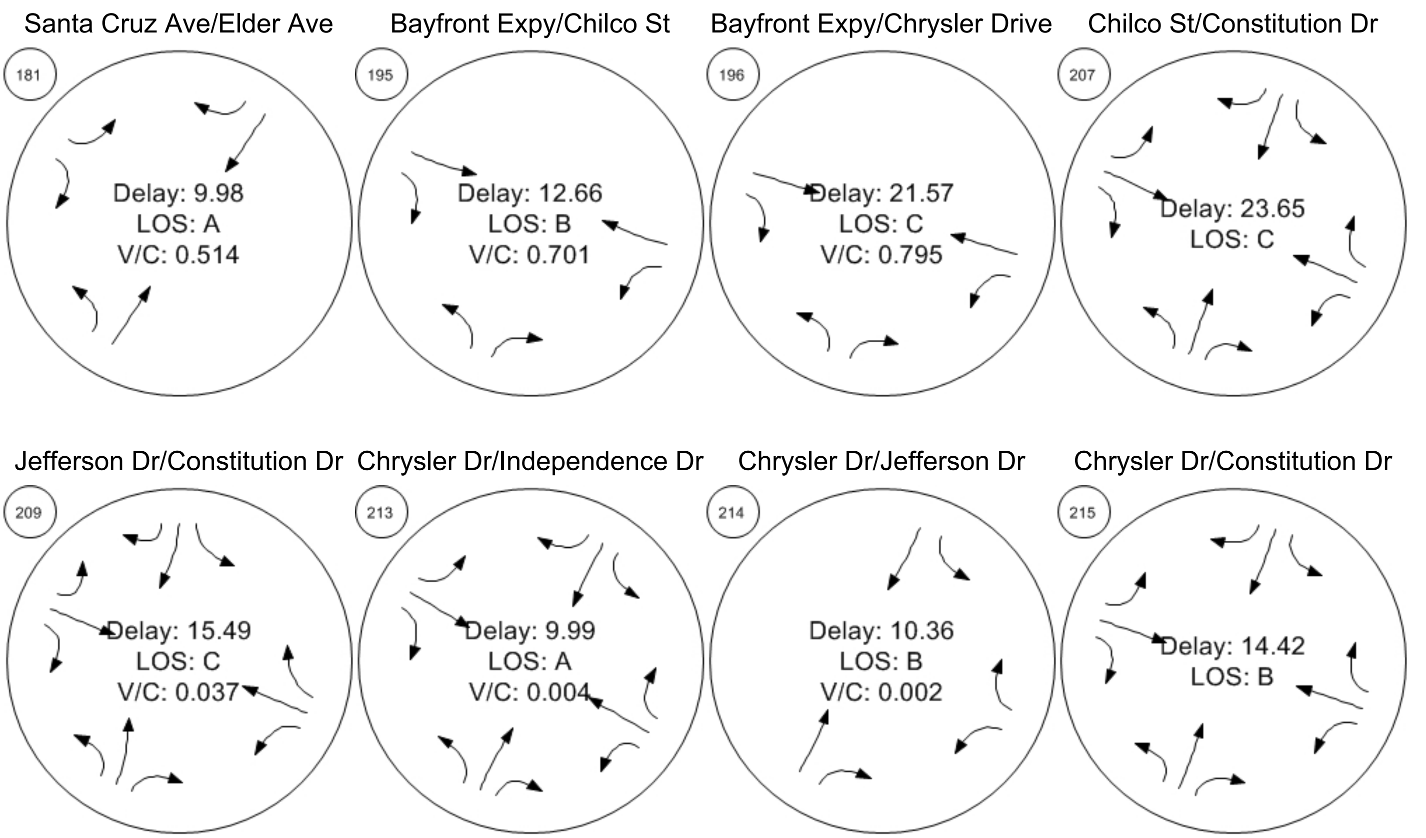
Sharon Park Dr/ Sand Hill Rd



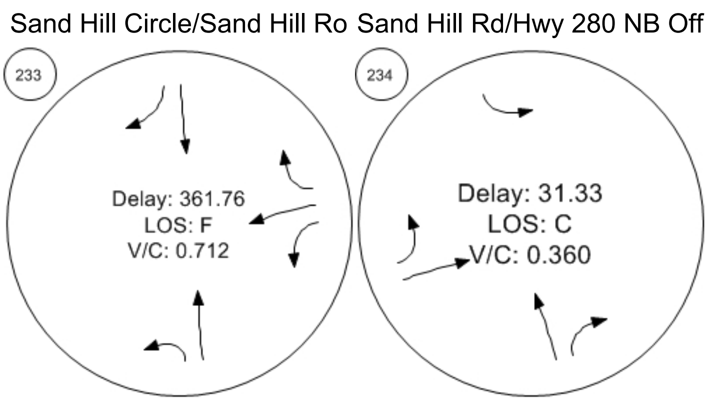
Bayfront Expy/Marsh Rd



Traffic Conditions



Traffic Conditions



Appendix C

ADT Data Sheets

LOCATION: 1. Alameda De Las Pulgas
SPECIFIC LOCATION: 100 ft from Avy Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899401
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		39				39			39	
1:00 AM		12				12			12	
2:00 AM		11				11			11	
3:00 AM		10				10			10	
4:00 AM		26				26			26	
5:00 AM		91				91			91	
6:00 AM		252				252			252	
7:00 AM		844				844			844	
8:00 AM		**1067**				**1067**			**1067**	
9:00 AM		829				829			829	
10:00 AM		677				677			677	
11:00 AM		749				749			749	
12:00 PM		829				829			829	
1:00 PM		742				742			742	
2:00 PM		754				754			754	
3:00 PM		976				976			976	
4:00 PM		949				949			949	
5:00 PM		**1052**				**1052**			**1052**	
6:00 PM		1024				1024			1024	
7:00 PM		629				629			629	
8:00 PM		408				408			408	
9:00 PM		257				257			257	
10:00 PM		145				145			145	
11:00 PM		77				77			77	
Day Total		12449				12449			12449	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
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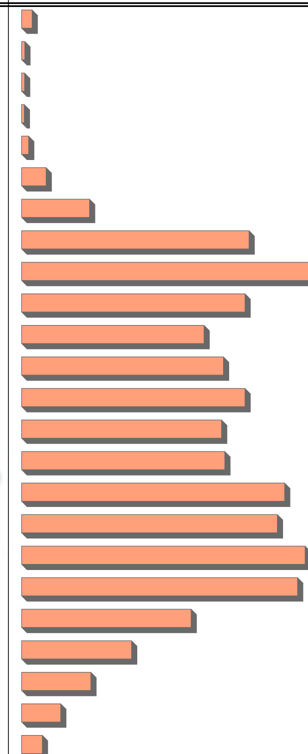
PM Peak Volume		5:00 PM 1052				5:00 PM 1052			5:00 PM 1052	



Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 2. Alameda De Las Pulgas **QC JOB #:** 12899402
SPECIFIC LOCATION: 100 ft from Valparaiso Ave **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
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1:00 AM		13				13			13	
2:00 AM		9				9			9	
3:00 AM		13				13			13	
4:00 AM		41				41			41	
5:00 AM		113				113			113	
6:00 AM		311				311			311	
7:00 AM		1026				1026			1026	
8:00 AM		**1274**				**1274**			**1274**	
9:00 AM		1031				1031			1031	
10:00 AM		871				871			871	
11:00 AM		893				893			893	
12:00 PM		977				977			977	
1:00 PM		907				907			907	
2:00 PM		989				989			989	
3:00 PM		1279				1279			1279	
4:00 PM		1207				1207			1207	
5:00 PM		**1338**				**1338**			**1338**	
6:00 PM		1202				1202			1202	
7:00 PM		757				757			757	
8:00 PM		490				490			490	
9:00 PM		304				304			304	
10:00 PM		147				147			147	
11:00 PM		91				91			91	
Day Total		15329				15329			15329	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
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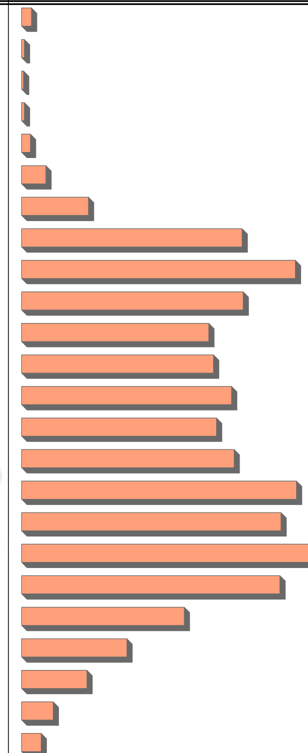
PM Peak Volume		5:00 PM 1338				5:00 PM 1338			5:00 PM 1338	



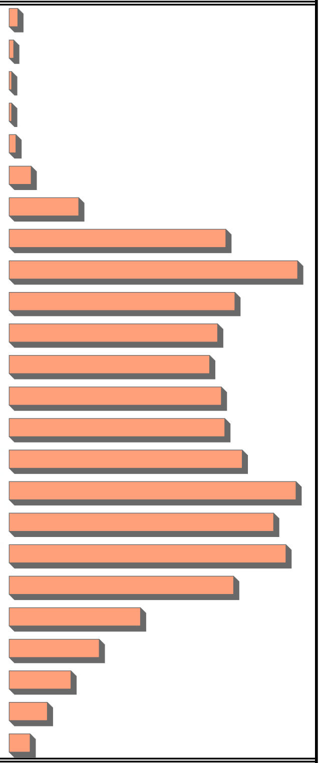
Comments: none

Report generated on 10/24/2014 2:46 PM SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 3. Alameda De Las Pulgas
SPECIFIC LOCATION: 100 ft from City Limits
CITY/STATE: Menlo Park, CA

QC JOB #: 12899403
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				42		42			42	
1:00 AM				22		22			22	
2:00 AM				12		12			12	
3:00 AM				12		12			12	
4:00 AM				33		33			33	
5:00 AM				107		107			107	
6:00 AM				339		339			339	
7:00 AM				1056		1056			1056	
8:00 AM				**1406**		**1406**			**1406**	
9:00 AM				1100		1100			1100	
10:00 AM				1016		1016			1016	
11:00 AM				977		977			977	
12:00 PM				1034		1034			1034	
1:00 PM				1051		1051			1051	
2:00 PM				1136		1136			1136	
3:00 PM				**1398**		**1398**			**1398**	
4:00 PM				1289		1289			1289	
5:00 PM				1349		1349			1349	
6:00 PM				1094		1094			1094	
7:00 PM				640		640			640	
8:00 PM				439		439			439	
9:00 PM				301		301			301	
10:00 PM				186		186			186	
11:00 PM				102		102			102	
Day Total				16141		16141			16141	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak				8:00 AM		8:00 AM			8:00 AM	
Volume				1406		1406			1406	
PM Peak				3:00 PM		3:00 PM			3:00 PM	
Volume				1398		1398			1398	



Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 4. Alma St
SPECIFIC LOCATION: 100 ft from Ravenswood Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899404
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				6		6			6	
1:00 AM				3		3			3	
2:00 AM				7		7			7	
3:00 AM				3		3			3	
4:00 AM				12		12			12	
5:00 AM				21		21			21	
6:00 AM				40		40			40	
7:00 AM				82		82			82	
8:00 AM				89		89			89	
9:00 AM				94		94			94	
10:00 AM				93		93			93	
11:00 AM				**126**		**126**			**126**	
12:00 PM				106		106			106	
1:00 PM				122		122			122	
2:00 PM				107		107			107	
3:00 PM				**151**		**151**			**151**	
4:00 PM				135		135			135	
5:00 PM				123		123			123	
6:00 PM				115		115			115	
7:00 PM				70		70			70	
8:00 PM				46		46			46	
9:00 PM				39		39			39	
10:00 PM				36		36			36	
11:00 PM				14		14			14	
Day Total				1640		1640			1640	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
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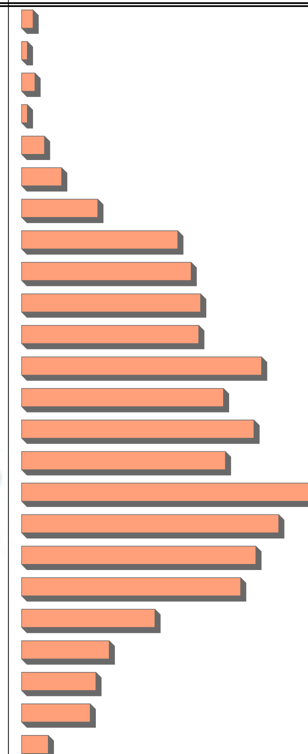
PM Peak Volume				3:00 PM 151		3:00 PM 151			3:00 PM 151	



Comments: none

Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: 5. Alma St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899405
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
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1:00 AM				3		3			3	
2:00 AM				2		2			2	
3:00 AM				2		2			2	
4:00 AM				2		2			2	
5:00 AM				23		23			23	
6:00 AM				52		52			52	
7:00 AM				134		134			134	
8:00 AM				**216**		**216**			**216**	
9:00 AM				190		190			190	
10:00 AM				171		171			171	
11:00 AM				169		169			169	
12:00 PM				210		210			210	
1:00 PM				249		249			249	
2:00 PM				224		224			224	
3:00 PM				265		265			265	
4:00 PM				316		316			316	
5:00 PM				**320**		**320**			**320**	
6:00 PM				240		240			240	
7:00 PM				150		150			150	
8:00 PM				151		151			151	
9:00 PM				79		79			79	
10:00 PM				48		48			48	
11:00 PM				20		20			20	
Day Total				3240		3240			3240	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
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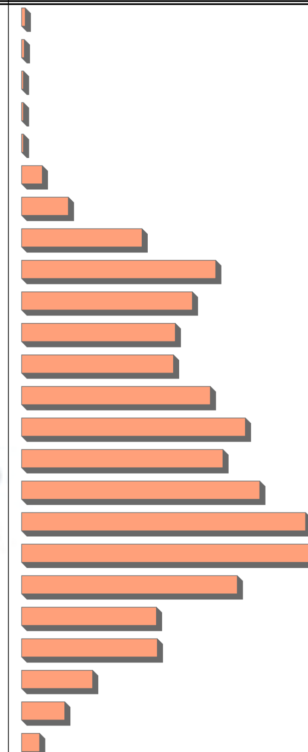
PM Peak Volume				5:00 PM 320		5:00 PM 320			5:00 PM 320	



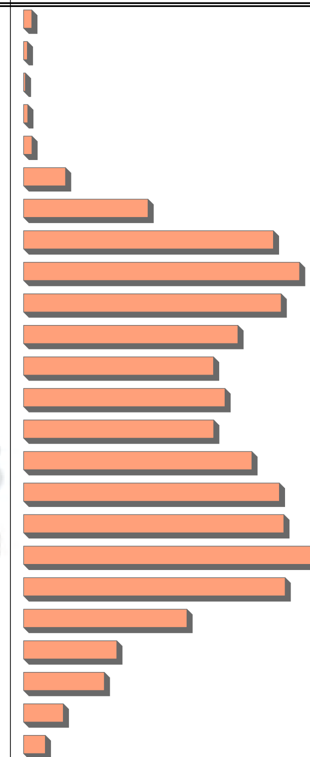
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 6. Alpine Rd
SPECIFIC LOCATION: 100 ft from City Limits
CITY/STATE: Menlo Park, CA

QC JOB #: 12899406
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		55				55			55	
1:00 AM		25				25			25	
2:00 AM		12				12			12	
3:00 AM		28				28			28	
4:00 AM		56				56			56	
5:00 AM		282				282			282	
6:00 AM		837				837			837	
7:00 AM		1681				1681			1681	
8:00 AM		**1857**				**1857**			**1857**	
9:00 AM		1733				1733			1733	
10:00 AM		1442				1442			1442	
11:00 AM		1278				1278			1278	
12:00 PM		1355				1355			1355	
1:00 PM		1279				1279			1279	
2:00 PM		1536				1536			1536	
3:00 PM		1721				1721			1721	
4:00 PM		1751				1751			1751	
5:00 PM		**1935**				**1935**			**1935**	
6:00 PM		1760				1760			1760	
7:00 PM		1099				1099			1099	
8:00 PM		627				627			627	
9:00 PM		543				543			543	
10:00 PM		267				267			267	
11:00 PM		146				146			146	
Day Total		23305				23305			23305	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1857				8:00 AM 1857			8:00 AM 1857	
PM Peak Volume		5:00 PM 1935				5:00 PM 1935			5:00 PM 1935	

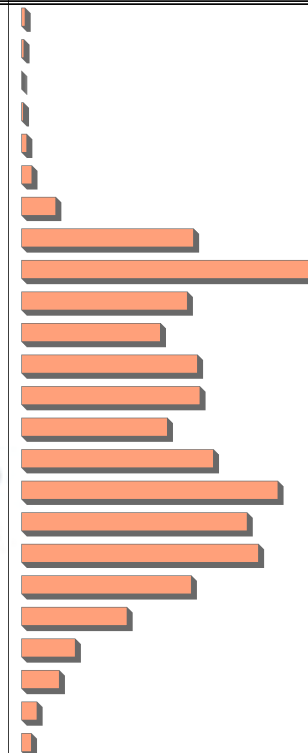


Comments: none

LOCATION: 7. Avy Ave
SPECIFIC LOCATION: 100 ft from City Limit
CITY/STATE: Menlo Park, CA

QC JOB #: 12899407
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		6				6			6	
1:00 AM		4				4			4	
2:00 AM		0				0			0	
3:00 AM		3				3			3	
4:00 AM		9				9			9	
5:00 AM		18				18			18	
6:00 AM		60				60			60	
7:00 AM		302				302			302	
8:00 AM		**505**				**505**			**505**	
9:00 AM		291				291			291	
10:00 AM		244				244			244	
11:00 AM		309				309			309	
12:00 PM		313				313			313	
1:00 PM		256				256			256	
2:00 PM		337				337			337	
3:00 PM		**450**				**450**			**450**	
4:00 PM		396				396			396	
5:00 PM		416				416			416	
6:00 PM		298				298			298	
7:00 PM		185				185			185	
8:00 PM		94				94			94	
9:00 PM		66				66			66	
10:00 PM		27				27			27	
11:00 PM		17				17			17	
Day Total		4606				4606			4606	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 505				8:00 AM 505			8:00 AM 505	
PM Peak Volume		3:00 PM 450				3:00 PM 450			3:00 PM 450	

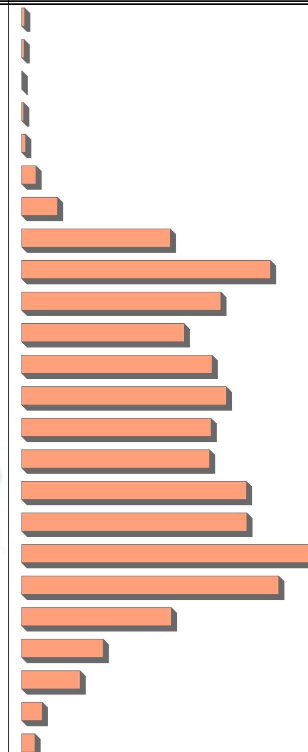


Comments: none

LOCATION: 8. Avy Ave
SPECIFIC LOCATION: 100 ft from Alameda de las Pulgas
CITY/STATE: Menlo Park, CA

QC JOB #: 12899408
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		6				6			6	
1:00 AM		5				5			5	
2:00 AM		1				1			1	
3:00 AM		4				4			4	
4:00 AM		8				8			8	
5:00 AM		29				29			29	
6:00 AM		73				73			73	
7:00 AM		303				303			303	
8:00 AM		**507**				**507**			**507**	
9:00 AM		406				406			406	
10:00 AM		331				331			331	
11:00 AM		388				388			388	
12:00 PM		417				417			417	
1:00 PM		386				386			386	
2:00 PM		383				383			383	
3:00 PM		458				458			458	
4:00 PM		459				459			459	
5:00 PM		**588**				**588**			**588**	
6:00 PM		524				524			524	
7:00 PM		305				305			305	
8:00 PM		166				166			166	
9:00 PM		119				119			119	
10:00 PM		42				42			42	
11:00 PM		27				27			27	
Day Total		5935				5935			5935	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 507				8:00 AM 507			8:00 AM 507	
PM Peak Volume		5:00 PM 588				5:00 PM 588			5:00 PM 588	

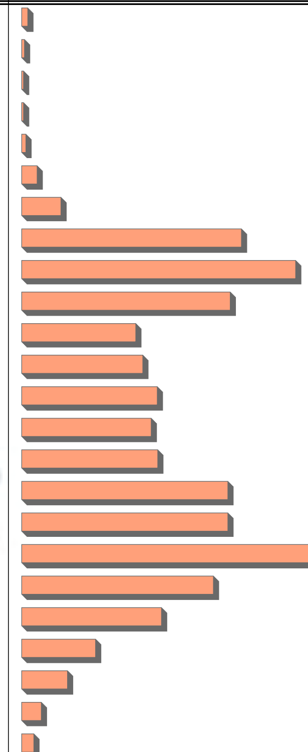


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 9. Bay Rd **QC JOB #:** 12899409
SPECIFIC LOCATION: 100 ft from Greenwood **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				13		13			13	
1:00 AM				6		6			6	
2:00 AM				4		4			4	
3:00 AM				4		4			4	
4:00 AM				9		9			9	
5:00 AM				33		33			33	
6:00 AM				84		84			84	
7:00 AM				470		470			470	
8:00 AM				**586**		**586**			**586**	
9:00 AM				446		446			446	
10:00 AM				244		244			244	
11:00 AM				259		259			259	
12:00 PM				290		290			290	
1:00 PM				277		277			277	
2:00 PM				291		291			291	
3:00 PM				441		441			441	
4:00 PM				441		441			441	
5:00 PM				**617**		**617**			**617**	
6:00 PM				410		410			410	
7:00 PM				299		299			299	
8:00 PM				158		158			158	
9:00 PM				98		98			98	
10:00 PM				42		42			42	
11:00 PM				26		26			26	
Day Total				5548		5548			5548	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 586		8:00 AM 586			8:00 AM 586	
PM Peak Volume				5:00 PM 617		5:00 PM 617			5:00 PM 617	

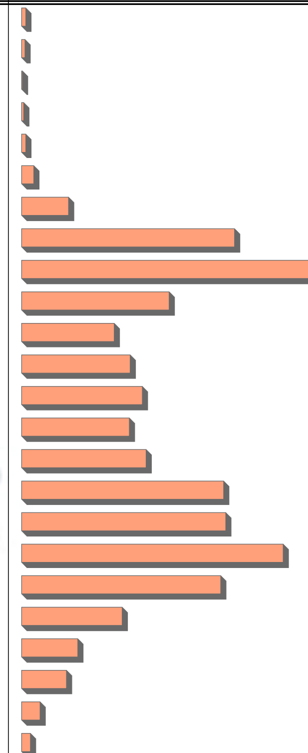


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 10. Bay Rd **QC JOB #:** 12899410
SPECIFIC LOCATION: 100 ft from Ringwood Ave **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		10				10			10	
1:00 AM		8				8			8	
2:00 AM		2				2			2	
3:00 AM		5				5			5	
4:00 AM		10				10			10	
5:00 AM		29				29			29	
6:00 AM		112				112			112	
7:00 AM		508				508			508	
8:00 AM		**686**				**686**			**686**	
9:00 AM		352				352			352	
10:00 AM		221				221			221	
11:00 AM		259				259			259	
12:00 PM		288				288			288	
1:00 PM		257				257			257	
2:00 PM		297				297			297	
3:00 PM		482				482			482	
4:00 PM		487				487			487	
5:00 PM		**624**				**624**			**624**	
6:00 PM		475				475			475	
7:00 PM		240				240			240	
8:00 PM		134				134			134	
9:00 PM		107				107			107	
10:00 PM		44				44			44	
11:00 PM		21				21			21	
Day Total		5658				5658			5658	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 686				8:00 AM 686			8:00 AM 686	
PM Peak Volume		5:00 PM 624				5:00 PM 624			5:00 PM 624	

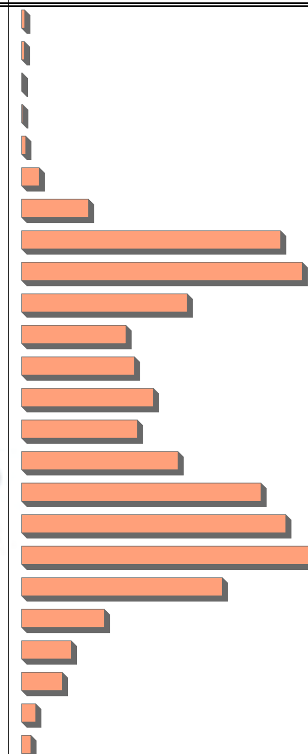


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 11. Bay Rd
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA
QC JOB #: 12899411
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		9				9			9	
1:00 AM		8				8			8	
2:00 AM		2				2			2	
3:00 AM		3				3			3	
4:00 AM		12				12			12	
5:00 AM		51				51			51	
6:00 AM		194				194			194	
7:00 AM		752				752			752	
8:00 AM		**815**				**815**			**815**	
9:00 AM		481				481			481	
10:00 AM		303				303			303	
11:00 AM		328				328			328	
12:00 PM		383				383			383	
1:00 PM		336				336			336	
2:00 PM		454				454			454	
3:00 PM		695				695			695	
4:00 PM		767				767			767	
5:00 PM		**835**				**835**			**835**	
6:00 PM		583				583			583	
7:00 PM		240				240			240	
8:00 PM		144				144			144	
9:00 PM		118				118			118	
10:00 PM		41				41			41	
11:00 PM		27				27			27	
Day Total		7581				7581			7581	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 815				8:00 AM 815			8:00 AM 815	
PM Peak Volume		5:00 PM 835				5:00 PM 835			5:00 PM 835	

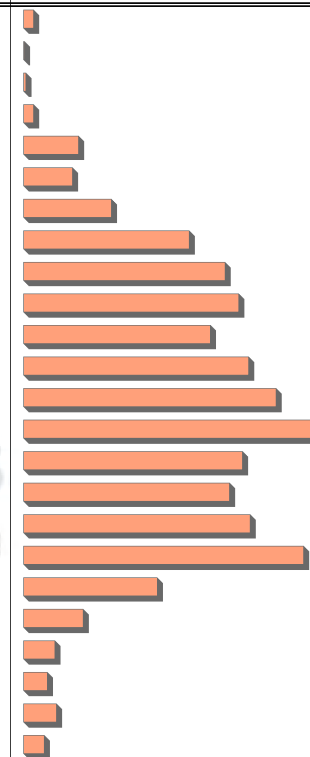


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 16. Bohannon Dr **QC JOB #:** 12899412
SPECIFIC LOCATION: 100 ft from Campell Ave **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				13		13			13	
1:00 AM				1		1			1	
2:00 AM				3		3			3	
3:00 AM				13		13			13	
4:00 AM				72		72			72	
5:00 AM				64		64			64	
6:00 AM				115		115			115	
7:00 AM				217		217			217	
8:00 AM				264		264			264	
9:00 AM				282		282			282	
10:00 AM				245		245			245	
11:00 AM				**295**		**295**			**295**	
12:00 PM				331		331			331	
1:00 PM				**377**		**377**			**377**	
2:00 PM				287		287			287	
3:00 PM				270		270			270	
4:00 PM				297		297			297	
5:00 PM				367		367			367	
6:00 PM				175		175			175	
7:00 PM				78		78			78	
8:00 PM				41		41			41	
9:00 PM				31		31			31	
10:00 PM				43		43			43	
11:00 PM				27		27			27	
Day Total				3908		3908			3908	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				11:00 AM 295		11:00 AM 295			11:00 AM 295	
PM Peak Volume				1:00 PM 377		1:00 PM 377			1:00 PM 377	



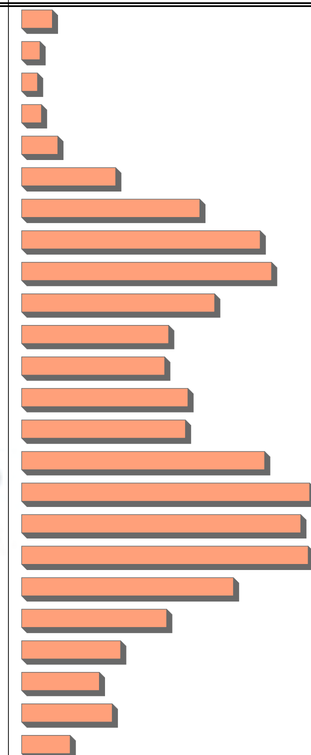
Comments: none

Report generated on 10/24/2014 2:46 PM SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 17. Chilco St
SPECIFIC LOCATION: 100 ft from Constitution Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899413
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		62				62			62	
1:00 AM		37				37			37	
2:00 AM		32				32			32	
3:00 AM		40				40			40	
4:00 AM		73				73			73	
5:00 AM		190				190			190	
6:00 AM		360				360			360	
7:00 AM		482				482			482	
8:00 AM		**505**				**505**			**505**	
9:00 AM		390				390			390	
10:00 AM		297				297			297	
11:00 AM		289				289			289	
12:00 PM		336				336			336	
1:00 PM		331				331			331	
2:00 PM		491				491			491	
3:00 PM		**582**				**582**			**582**	
4:00 PM		564				564			564	
5:00 PM		579				579			579	
6:00 PM		428				428			428	
7:00 PM		293				293			293	
8:00 PM		200				200			200	
9:00 PM		157				157			157	
10:00 PM		183				183			183	
11:00 PM		98				98			98	
Day Total		6999				6999			6999	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 505				8:00 AM 505			8:00 AM 505	
PM Peak Volume		3:00 PM 582				3:00 PM 582			3:00 PM 582	



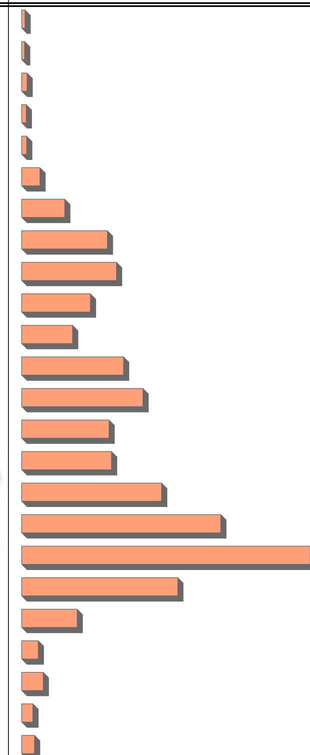
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 18. Chrysler Drive
SPECIFIC LOCATION: 100 ft from Constitution Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899414
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		8				8			8	
1:00 AM		7				7			7	
2:00 AM		13				13			13	
3:00 AM		11				11			11	
4:00 AM		12				12			12	
5:00 AM		44				44			44	
6:00 AM		104				104			104	
7:00 AM		207				207			207	
8:00 AM		229				229			229	
9:00 AM		166				166			166	
10:00 AM		123				123			123	
11:00 AM		**246**				**246**			**246**	
12:00 PM		293				293			293	
1:00 PM		211				211			211	
2:00 PM		217				217			217	
3:00 PM		338				338			338	
4:00 PM		481				481			481	
5:00 PM		**697**				**697**			**697**	
6:00 PM		377				377			377	
7:00 PM		134				134			134	
8:00 PM		40				40			40	
9:00 PM		52				52			52	
10:00 PM		27				27			27	
11:00 PM		31				31			31	
Day Total		4068				4068			4068	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		11:00 AM 246				11:00 AM 246			11:00 AM 246	
PM Peak Volume		5:00 PM 697				5:00 PM 697			5:00 PM 697	



Comments: none

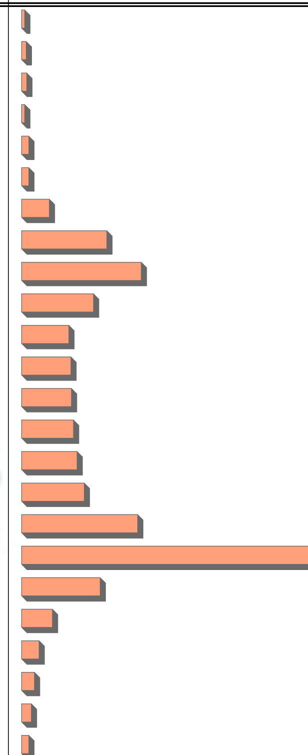
Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 19. Constitution Dr
SPECIFIC LOCATION: 100 ft from Chilco St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899415
DIRECTION: NB/SB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		6				6			6	
1:00 AM		9				9			9	
2:00 AM		10				10			10	
3:00 AM		6				6			6	
4:00 AM		14				14			14	
5:00 AM		14				14			14	
6:00 AM		54				54			54	
7:00 AM		166				166			166	
8:00 AM		**233**				**233**			**233**	
9:00 AM		140				140			140	
10:00 AM		92				92			92	
11:00 AM		96				96			96	
12:00 PM		97				97			97	
1:00 PM		101				101			101	
2:00 PM		108				108			108	
3:00 PM		122				122			122	
4:00 PM		226				226			226	
5:00 PM		**560**				**560**			**560**	
6:00 PM		153				153			153	
7:00 PM		60				60			60	
8:00 PM		34				34			34	
9:00 PM		25				25			25	
10:00 PM		19				19			19	
11:00 PM		14				14			14	
Day Total		2359				2359			2359	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 233				8:00 AM 233			8:00 AM 233	
PM Peak Volume		5:00 PM 560				5:00 PM 560			5:00 PM 560	

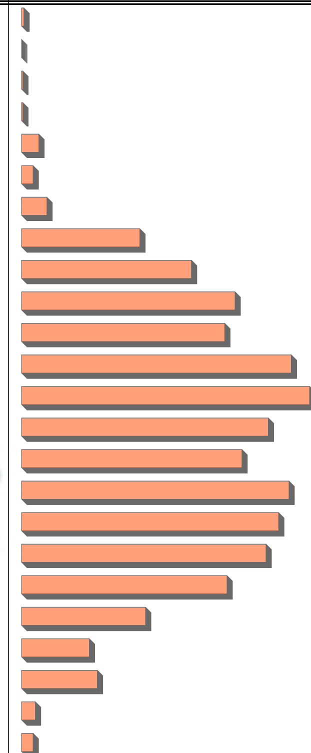


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 20. Crane St **QC JOB #:** 12899416
SPECIFIC LOCATION: 100 ft from Oak Grove Ave **DIRECTION:** EB/WB
CITY/STATE: Menlo Park, CA **DATE:** Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2				2			2	
1:00 AM		0				0			0	
2:00 AM		1				1			1	
3:00 AM		1				1			1	
4:00 AM		15				15			15	
5:00 AM		10				10			10	
6:00 AM		22				22			22	
7:00 AM		103				103			103	
8:00 AM		148				148			148	
9:00 AM		186				186			186	
10:00 AM		177				177			177	
11:00 AM		**235**				**235**			**235**	
12:00 PM		**251**				**251**			**251**	
1:00 PM		215				215			215	
2:00 PM		192				192			192	
3:00 PM		233				233			233	
4:00 PM		224				224			224	
5:00 PM		213				213			213	
6:00 PM		179				179			179	
7:00 PM		108				108			108	
8:00 PM		59				59			59	
9:00 PM		66				66			66	
10:00 PM		12				12			12	
11:00 PM		10				10			10	
Day Total		2662				2662			2662	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak		11:00 AM				11:00 AM			11:00 AM	
Volume		235				235			235	
PM Peak		12:00 PM				12:00 PM			12:00 PM	
Volume		251				251			251	

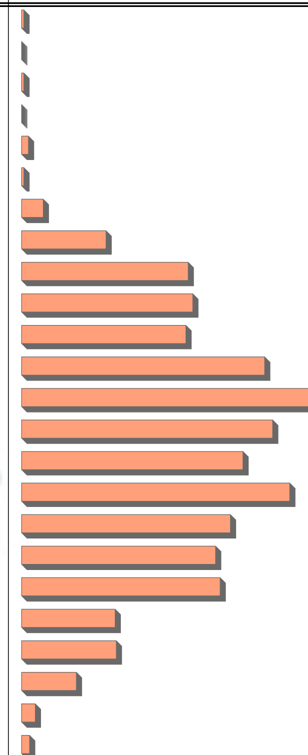


Comments: none

LOCATION: 21. Crane St
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899417
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

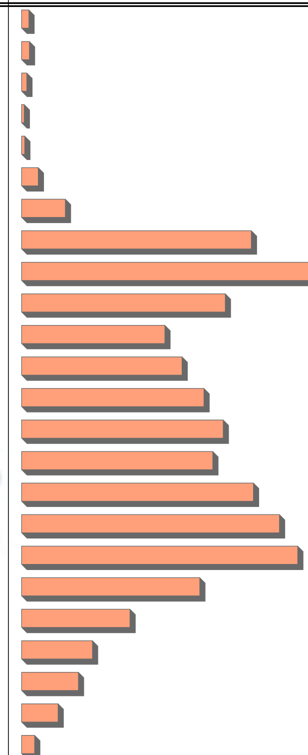
Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2				2			2	
1:00 AM		0				0			0	
2:00 AM		2				2			2	
3:00 AM		0				0			0	
4:00 AM		6				6			6	
5:00 AM		2				2			2	
6:00 AM		19				19			19	
7:00 AM		74				74			74	
8:00 AM		146				146			146	
9:00 AM		150				150			150	
10:00 AM		144				144			144	
11:00 AM		**213**				**213**			**213**	
12:00 PM		**252**				**252**			**252**	
1:00 PM		220				220			220	
2:00 PM		194				194			194	
3:00 PM		235				235			235	
4:00 PM		183				183			183	
5:00 PM		170				170			170	
6:00 PM		174				174			174	
7:00 PM		82				82			82	
8:00 PM		83				83			83	
9:00 PM		48				48			48	
10:00 PM		12				12			12	
11:00 PM		7				7			7	
Day Total		2418				2418			2418	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		11:00 AM 213				11:00 AM 213			11:00 AM 213	
PM Peak Volume		12:00 PM 252				12:00 PM 252			12:00 PM 252	



Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 27. Encinal Ave **QC JOB #:** 12899418
SPECIFIC LOCATION: 100 ft from El Camino Real **DIRECTION:** EB/WB
CITY/STATE: Menlo Park, CA **DATE:** Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				14		14			14	
1:00 AM				15		15			15	
2:00 AM				10		10			10	
3:00 AM				5		5			5	
4:00 AM				6		6			6	
5:00 AM				32		32			32	
6:00 AM				84		84			84	
7:00 AM				441		441			441	
8:00 AM				**552**		**552**			**552**	
9:00 AM				391		391			391	
10:00 AM				275		275			275	
11:00 AM				308		308			308	
12:00 PM				350		350			350	
1:00 PM				387		387			387	
2:00 PM				367		367			367	
3:00 PM				445		445			445	
4:00 PM				495		495			495	
5:00 PM				**530**		**530**			**530**	
6:00 PM				342		342			342	
7:00 PM				208		208			208	
8:00 PM				136		136			136	
9:00 PM				109		109			109	
10:00 PM				70		70			70	
11:00 PM				25		25			25	
Day Total				5597		5597			5597	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 552		8:00 AM 552			8:00 AM 552	
PM Peak Volume				5:00 PM 530		5:00 PM 530			5:00 PM 530	

Comments: none

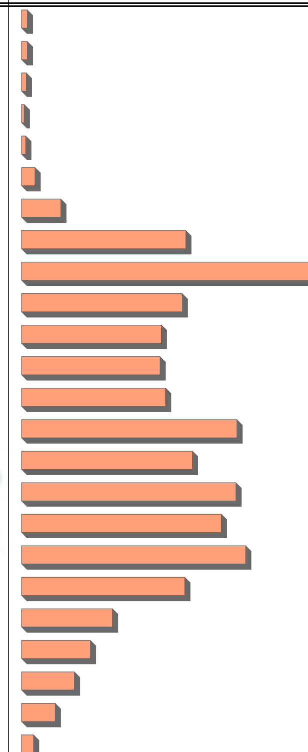
Report generated on 10/24/2014 2:46 PM SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: 28. Encinal Ave
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899419
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				11		11			11	
1:00 AM				11		11			11	
2:00 AM				9		9			9	
3:00 AM				5		5			5	
4:00 AM				8		8			8	
5:00 AM				26		26			26	
6:00 AM				76		76			76	
7:00 AM				318		318			318	
8:00 AM				**557**		**557**			**557**	
9:00 AM				311		311			311	
10:00 AM				271		271			271	
11:00 AM				268		268			268	
12:00 PM				279		279			279	
1:00 PM				417		417			417	
2:00 PM				331		331			331	
3:00 PM				415		415			415	
4:00 PM				387		387			387	
5:00 PM				**434**		**434**			**434**	
6:00 PM				316		316			316	
7:00 PM				176		176			176	
8:00 PM				133		133			133	
9:00 PM				102		102			102	
10:00 PM				65		65			65	
11:00 PM				23		23			23	
Day Total				4949		4949			4949	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 557		8:00 AM 557			8:00 AM 557	
PM Peak Volume				5:00 PM 434		5:00 PM 434			5:00 PM 434	

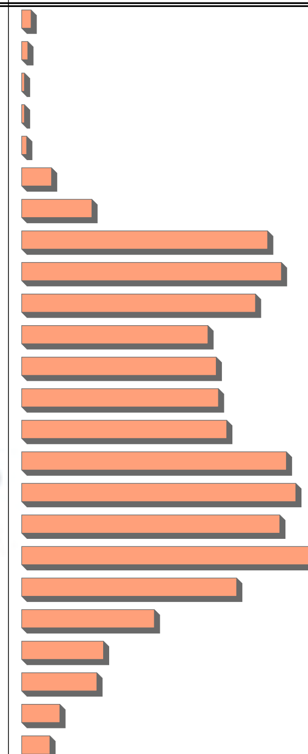


Comments: none

LOCATION: 29. Glenwood Ave
SPECIFIC LOCATION: 100 ft from El Camino Real
CITY/STATE: Menlo Park, CA

QC JOB #: 12899420
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				17		17			17	
1:00 AM				11		11			11	
2:00 AM				5		5			5	
3:00 AM				5		5			5	
4:00 AM				9		9			9	
5:00 AM				54		54			54	
6:00 AM				127		127			127	
7:00 AM				445		445			445	
8:00 AM				**470**		**470**			**470**	
9:00 AM				423		423			423	
10:00 AM				337		337			337	
11:00 AM				352		352			352	
12:00 PM				356		356			356	
1:00 PM				371		371			371	
2:00 PM				479		479			479	
3:00 PM				496		496			496	
4:00 PM				467		467			467	
5:00 PM				**522**		**522**			**522**	
6:00 PM				389		389			389	
7:00 PM				240		240			240	
8:00 PM				148		148			148	
9:00 PM				136		136			136	
10:00 PM				69		69			69	
11:00 PM				51		51			51	
Day Total				5979		5979			5979	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 470		8:00 AM 470			8:00 AM 470	
PM Peak Volume				5:00 PM 522		5:00 PM 522			5:00 PM 522	

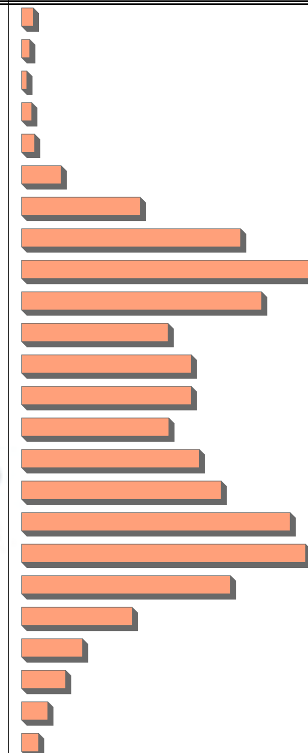


Comments: none

LOCATION: 31. Haven Avenue
SPECIFIC LOCATION: 100 ft from Bayfront Expy/Marsh Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899422
DIRECTION: NB/SB
DATE: Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				29		29			29	
1:00 AM				20		20			20	
2:00 AM				13		13			13	
3:00 AM				25		25			25	
4:00 AM				32		32			32	
5:00 AM				98		98			98	
6:00 AM				294		294			294	
7:00 AM				543		543			543	
8:00 AM				**713**		**713**			**713**	
9:00 AM				595		595			595	
10:00 AM				363		363			363	
11:00 AM				421		421			421	
12:00 PM				421		421			421	
1:00 PM				365		365			365	
2:00 PM				441		441			441	
3:00 PM				495		495			495	
4:00 PM				666		666			666	
5:00 PM				**704**		**704**			**704**	
6:00 PM				518		518			518	
7:00 PM				274		274			274	
8:00 PM				151		151			151	
9:00 PM				109		109			109	
10:00 PM				65		65			65	
11:00 PM				42		42			42	
Day Total				7397		7397			7397	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 713		8:00 AM 713			8:00 AM 713	
PM Peak Volume				5:00 PM 704		5:00 PM 704			5:00 PM 704	

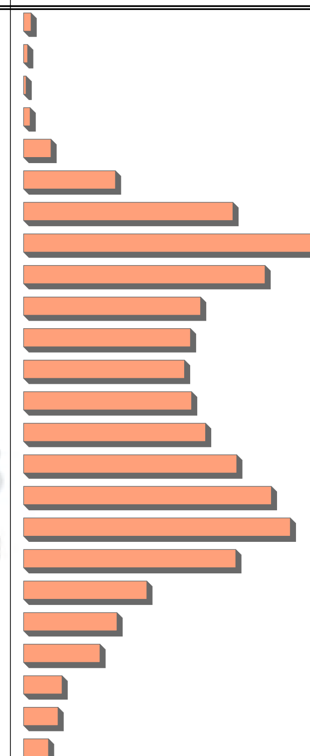


Comments: none

LOCATION: 35. Junipero Serra Blvd
SPECIFIC LOCATION: 100 ft from City Limit
CITY/STATE: Menlo Park, CA

QC JOB #: 12899423
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				39		39			39	
1:00 AM				21		21			21	
2:00 AM				13		13			13	
3:00 AM				34		34			34	
4:00 AM				143		143			143	
5:00 AM				480		480			480	
6:00 AM				1094		1094			1094	
7:00 AM				**1503**		**1503**			**1503**	
8:00 AM				1262		1262			1262	
9:00 AM				925		925			925	
10:00 AM				872		872			872	
11:00 AM				841		841			841	
12:00 PM				878		878			878	
1:00 PM				951		951			951	
2:00 PM				1114		1114			1114	
3:00 PM				1295		1295			1295	
4:00 PM				**1394**		**1394**			**1394**	
5:00 PM				1109		1109			1109	
6:00 PM				644		644			644	
7:00 PM				488		488			488	
8:00 PM				399		399			399	
9:00 PM				201		201			201	
10:00 PM				180		180			180	
11:00 PM				130		130			130	
Day Total				16010		16010			16010	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				7:00 AM 1503		7:00 AM 1503			7:00 AM 1503	
PM Peak Volume				4:00 PM 1394		4:00 PM 1394			4:00 PM 1394	

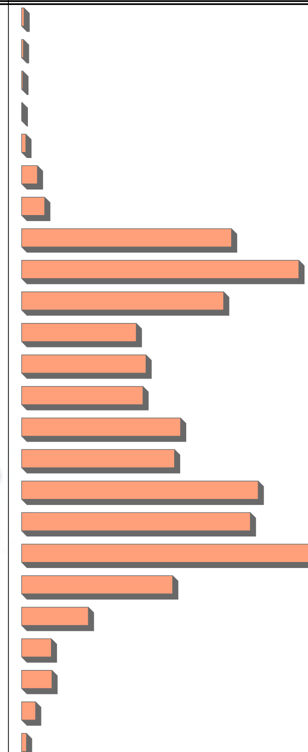


Comments: none

LOCATION: 36. Laurel St
SPECIFIC LOCATION: 100 ft from Oak Grove Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899424
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				4		4			4	
1:00 AM				3		3			3	
2:00 AM				2		2			2	
3:00 AM				1		1			1	
4:00 AM				7		7			7	
5:00 AM				26		26			26	
6:00 AM				38		38			38	
7:00 AM				346		346			346	
8:00 AM				**457**		**457**			**457**	
9:00 AM				333		333			333	
10:00 AM				189		189			189	
11:00 AM				205		205			205	
12:00 PM				200		200			200	
1:00 PM				262		262			262	
2:00 PM				252		252			252	
3:00 PM				390		390			390	
4:00 PM				377		377			377	
5:00 PM				**474**		**474**			**474**	
6:00 PM				249		249			249	
7:00 PM				110		110			110	
8:00 PM				49		49			49	
9:00 PM				50		50			50	
10:00 PM				23		23			23	
11:00 PM				8		8			8	
Day Total				4055		4055			4055	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 457		8:00 AM 457			8:00 AM 457	
PM Peak Volume				5:00 PM 474		5:00 PM 474			5:00 PM 474	



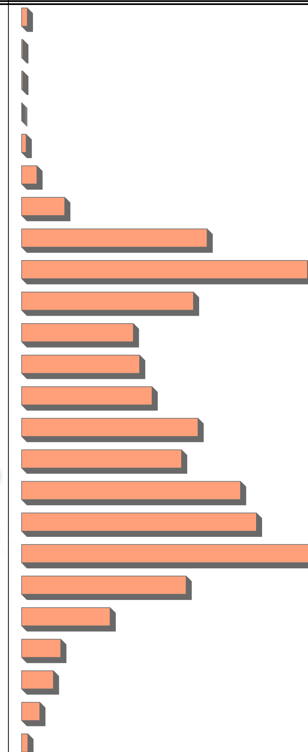
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 37. Laurel St
SPECIFIC LOCATION: 100 ft from Ravenswood Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899425
DIRECTION: NB/SB
DATE: Sep 24 2014 - Sep 24 2014

Start Time	Mon	Tue	Wed 24-Sep-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			10			10			10	
1:00 AM			2			2			2	
2:00 AM			2			2			2	
3:00 AM			0			0			0	
4:00 AM			8			8			8	
5:00 AM			27			27			27	
6:00 AM			76			76			76	
7:00 AM			327			327			327	
8:00 AM			**504**			**504**			**504**	
9:00 AM			303			303			303	
10:00 AM			197			197			197	
11:00 AM			208			208			208	
12:00 PM			230			230			230	
1:00 PM			311			311			311	
2:00 PM			282			282			282	
3:00 PM			386			386			386	
4:00 PM			414			414			414	
5:00 PM			**507**			**507**			**507**	
6:00 PM			290			290			290	
7:00 PM			156			156			156	
8:00 PM			69			69			69	
9:00 PM			56			56			56	
10:00 PM			32			32			32	
11:00 PM			11			11			11	
Day Total			4408			4408			4408	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 504			8:00 AM 504			8:00 AM 504	
PM Peak Volume			5:00 PM 507			5:00 PM 507			5:00 PM 507	



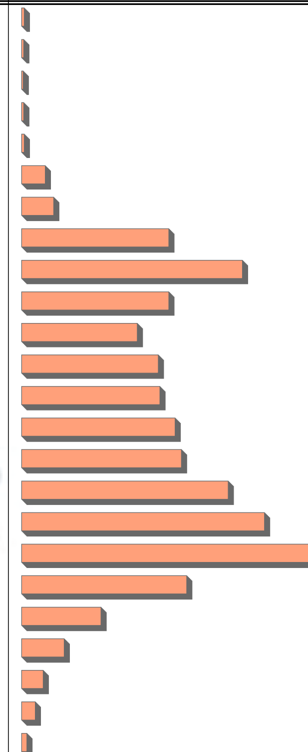
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 38. Laurel St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899426
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				5		5			5	
1:00 AM				4		4			4	
2:00 AM				3		3			3	
3:00 AM				4		4			4	
4:00 AM				5		5			5	
5:00 AM				45		45			45	
6:00 AM				61		61			61	
7:00 AM				280		280			280	
8:00 AM				**420**		**420**			**420**	
9:00 AM				280		280			280	
10:00 AM				220		220			220	
11:00 AM				260		260			260	
12:00 PM				263		263			263	
1:00 PM				292		292			292	
2:00 PM				304		304			304	
3:00 PM				393		393			393	
4:00 PM				462		462			462	
5:00 PM				**547**		**547**			**547**	
6:00 PM				314		314			314	
7:00 PM				151		151			151	
8:00 PM				81		81			81	
9:00 PM				41		41			41	
10:00 PM				26		26			26	
11:00 PM				10		10			10	
Day Total				4471		4471			4471	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 420		8:00 AM 420			8:00 AM 420	
PM Peak Volume				5:00 PM 547		5:00 PM 547			5:00 PM 547	



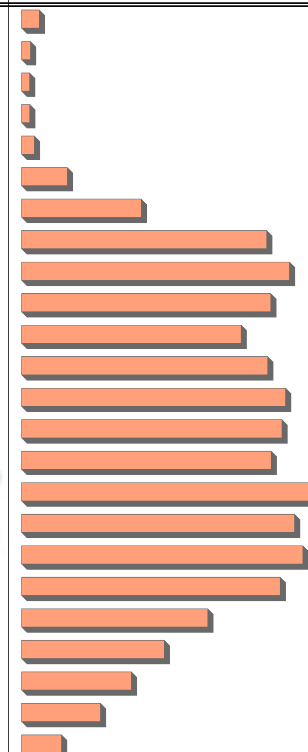
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 39. Marsh Rd
SPECIFIC LOCATION: 100 ft from City Limit
CITY/STATE: Menlo Park, CA

QC JOB #: 12899427
DIRECTION: EB/WB
DATE: Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				104		104			104	
1:00 AM				52		52			52	
2:00 AM				47		47			47	
3:00 AM				48		48			48	
4:00 AM				75		75			75	
5:00 AM				269		269			269	
6:00 AM				704		704			704	
7:00 AM				1443		1443			1443	
8:00 AM				**1577**		**1577**			**1577**	
9:00 AM				1467		1467			1467	
10:00 AM				1293		1293			1293	
11:00 AM				1449		1449			1449	
12:00 PM				1554		1554			1554	
1:00 PM				1533		1533			1533	
2:00 PM				1470		1470			1470	
3:00 PM				**1693**		**1693**			**1693**	
4:00 PM				1607		1607			1607	
5:00 PM				1656		1656			1656	
6:00 PM				1523		1523			1523	
7:00 PM				1096		1096			1096	
8:00 PM				840		840			840	
9:00 PM				646		646			646	
10:00 PM				464		464			464	
11:00 PM				235		235			235	
Day Total				22845		22845			22845	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1577		8:00 AM 1577			8:00 AM 1577	
PM Peak Volume				3:00 PM 1693		3:00 PM 1693			3:00 PM 1693	



Comments: none

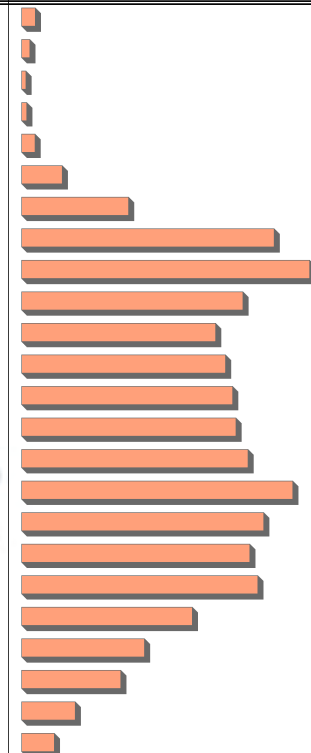
Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 40. Marsh Rd
SPECIFIC LOCATION: 100 ft from Bay Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899428
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		102				102			102	
1:00 AM		61				61			61	
2:00 AM		32				32			32	
3:00 AM		38				38			38	
4:00 AM		100				100			100	
5:00 AM		303				303			303	
6:00 AM		798				798			798	
7:00 AM		1885				1885			1885	
8:00 AM		**2150**				**2150**			**2150**	
9:00 AM		1652				1652			1652	
10:00 AM		1448				1448			1448	
11:00 AM		1522				1522			1522	
12:00 PM		1575				1575			1575	
1:00 PM		1600				1600			1600	
2:00 PM		1690				1690			1690	
3:00 PM		**2024**				**2024**			**2024**	
4:00 PM		1807				1807			1807	
5:00 PM		1703				1703			1703	
6:00 PM		1763				1763			1763	
7:00 PM		1274				1274			1274	
8:00 PM		917				917			917	
9:00 PM		740				740			740	
10:00 PM		400				400			400	
11:00 PM		244				244			244	
Day Total		25828				25828			25828	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2150				8:00 AM 2150			8:00 AM 2150	
PM Peak Volume		3:00 PM 2024				3:00 PM 2024			3:00 PM 2024	

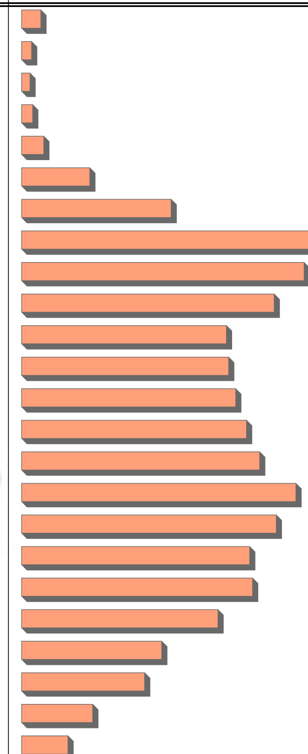


Comments: none

LOCATION: 41. Marsh Rd
SPECIFIC LOCATION: 100 ft from Bohannon Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899429
DIRECTION: NB/SB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		166				166			166	
1:00 AM		86				86			86	
2:00 AM		72				72			72	
3:00 AM		95				95			95	
4:00 AM		191				191			191	
5:00 AM		587				587			587	
6:00 AM		1287				1287			1287	
7:00 AM		**2475**				**2475**			**2475**	
8:00 AM		2432				2432			2432	
9:00 AM		2174				2174			2174	
10:00 AM		1763				1763			1763	
11:00 AM		1782				1782			1782	
12:00 PM		1843				1843			1843	
1:00 PM		1936				1936			1936	
2:00 PM		2049				2049			2049	
3:00 PM		**2361**				**2361**			**2361**	
4:00 PM		2192				2192			2192	
5:00 PM		1963				1963			1963	
6:00 PM		1988				1988			1988	
7:00 PM		1690				1690			1690	
8:00 PM		1206				1206			1206	
9:00 PM		1059				1059			1059	
10:00 PM		612				612			612	
11:00 PM		399				399			399	
Day Total		32408				32408			32408	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		7:00 AM 2475				7:00 AM 2475			7:00 AM 2475	
PM Peak Volume		3:00 PM 2361				3:00 PM 2361			3:00 PM 2361	



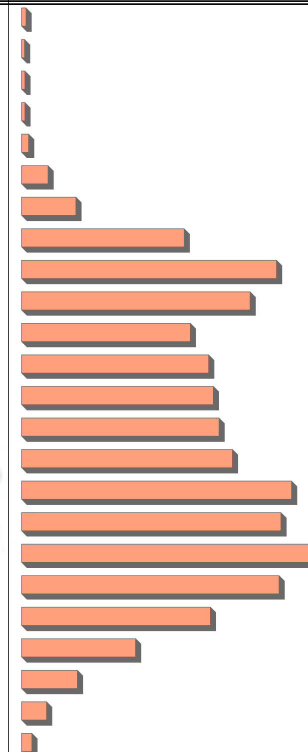
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 44. Menlo Ave
SPECIFIC LOCATION: 100 ft from Crane St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899431
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		12				12			12	
1:00 AM		8				8			8	
2:00 AM		9				9			9	
3:00 AM		9				9			9	
4:00 AM		19				19			19	
5:00 AM		72				72			72	
6:00 AM		148				148			148	
7:00 AM		443				443			443	
8:00 AM		**695**				**695**			**695**	
9:00 AM		623				623			623	
10:00 AM		460				460			460	
11:00 AM		510				510			510	
12:00 PM		523				523			523	
1:00 PM		538				538			538	
2:00 PM		575				575			575	
3:00 PM		736				736			736	
4:00 PM		707				707			707	
5:00 PM		**784**				**784**			**784**	
6:00 PM		702				702			702	
7:00 PM		515				515			515	
8:00 PM		311				311			311	
9:00 PM		152				152			152	
10:00 PM		68				68			68	
11:00 PM		28				28			28	
Day Total		8647				8647			8647	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 695				8:00 AM 695			8:00 AM 695	
PM Peak Volume		5:00 PM 784				5:00 PM 784			5:00 PM 784	



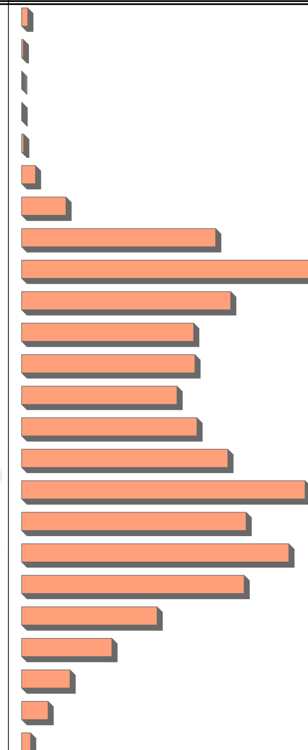
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 45. Middle Ave
SPECIFIC LOCATION: 100 ft from Olive St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899432
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		15				15			15	
1:00 AM		4				4			4	
2:00 AM		0				0			0	
3:00 AM		1				1			1	
4:00 AM		5				5			5	
5:00 AM		34				34			34	
6:00 AM		109				109			109	
7:00 AM		477				477			477	
8:00 AM		**707**				**707**			**707**	
9:00 AM		514				514			514	
10:00 AM		423				423			423	
11:00 AM		426				426			426	
12:00 PM		382				382			382	
1:00 PM		431				431			431	
2:00 PM		507				507			507	
3:00 PM		**697**				**697**			**697**	
4:00 PM		552				552			552	
5:00 PM		657				657			657	
6:00 PM		547				547			547	
7:00 PM		333				333			333	
8:00 PM		222				222			222	
9:00 PM		119				119			119	
10:00 PM		65				65			65	
11:00 PM		22				22			22	
Day Total		7249				7249			7249	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 707				8:00 AM 707			8:00 AM 707	
PM Peak Volume		3:00 PM 697				3:00 PM 697			3:00 PM 697	



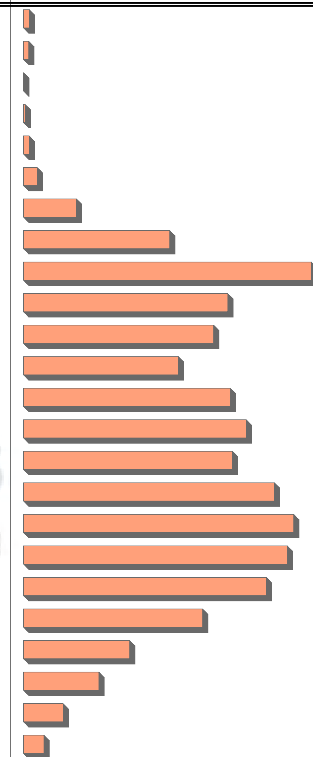
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 46. Middle Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899433
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		17				17			17	
1:00 AM		15				15			15	
2:00 AM		1				1			1	
3:00 AM		5				5			5	
4:00 AM		16				16			16	
5:00 AM		39				39			39	
6:00 AM		150				150			150	
7:00 AM		413				413			413	
8:00 AM		**813**				**813**			**813**	
9:00 AM		577				577			577	
10:00 AM		537				537			537	
11:00 AM		438				438			438	
12:00 PM		584				584			584	
1:00 PM		629				629			629	
2:00 PM		590				590			590	
3:00 PM		709				709			709	
4:00 PM		**763**				**763**			**763**	
5:00 PM		745				745			745	
6:00 PM		686				686			686	
7:00 PM		506				506			506	
8:00 PM		300				300			300	
9:00 PM		213				213			213	
10:00 PM		112				112			112	
11:00 PM		58				58			58	
Day Total		8916				8916			8916	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 813				8:00 AM 813			8:00 AM 813	
PM Peak Volume		4:00 PM 763				4:00 PM 763			4:00 PM 763	



Comments: none

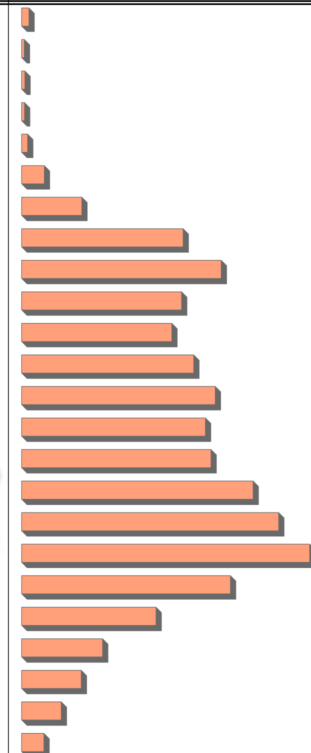
Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 47. Middlefield Rd
SPECIFIC LOCATION: 100 ft from Ravenswood Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899434
DIRECTION: NB/SB
DATE: Sep 30 2014 - Sep 30 2014

Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		38				38			38	
1:00 AM		14				14			14	
2:00 AM		17				17			17	
3:00 AM		15				15			15	
4:00 AM		31				31			31	
5:00 AM		118				118			118	
6:00 AM		313				313			313	
7:00 AM		840				840			840	
8:00 AM		**1038**				**1038**			**1038**	
9:00 AM		832				832			832	
10:00 AM		781				781			781	
11:00 AM		895				895			895	
12:00 PM		1007				1007			1007	
1:00 PM		956				956			956	
2:00 PM		985				985			985	
3:00 PM		1204				1204			1204	
4:00 PM		1337				1337			1337	
5:00 PM		**1498**				**1498**			**1498**	
6:00 PM		1086				1086			1086	
7:00 PM		699				699			699	
8:00 PM		421				421			421	
9:00 PM		310				310			310	
10:00 PM		206				206			206	
11:00 PM		116				116			116	
Day Total		14757				14757			14757	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1038				8:00 AM 1038			8:00 AM 1038	
PM Peak Volume		5:00 PM 1498				5:00 PM 1498			5:00 PM 1498	

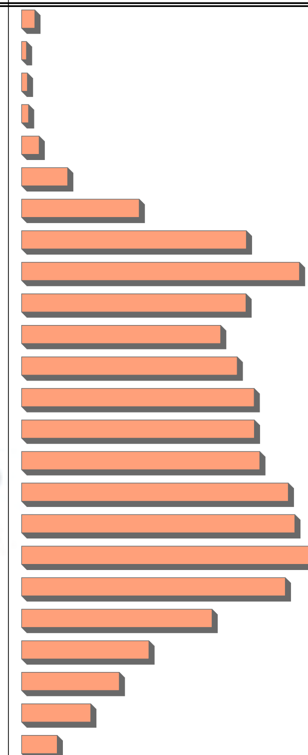


Comments: none

LOCATION: 48. Middlefield Rd
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899435
DIRECTION: NB/SB
DATE: Sep 30 2014 - Sep 30 2014

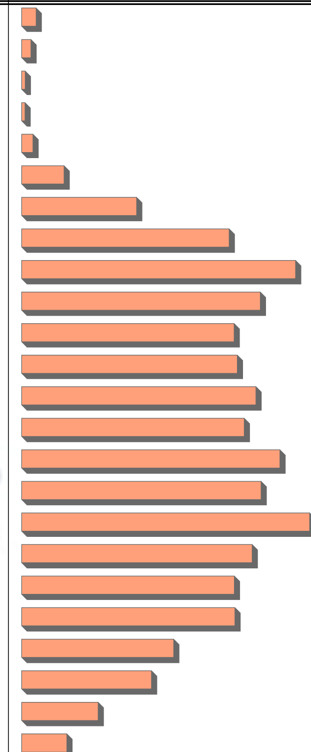
Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		71				71			71	
1:00 AM		26				26			26	
2:00 AM		31				31			31	
3:00 AM		37				37			37	
4:00 AM		94				94			94	
5:00 AM		247				247			247	
6:00 AM		631				631			631	
7:00 AM		1206				1206			1206	
8:00 AM		**1491**				**1491**			**1491**	
9:00 AM		1204				1204			1204	
10:00 AM		1068				1068			1068	
11:00 AM		1157				1157			1157	
12:00 PM		1248				1248			1248	
1:00 PM		1249				1249			1249	
2:00 PM		1278				1278			1278	
3:00 PM		1431				1431			1431	
4:00 PM		1466				1466			1466	
5:00 PM		**1543**				**1543**			**1543**	
6:00 PM		1415				1415			1415	
7:00 PM		1022				1022			1022	
8:00 PM		683				683			683	
9:00 PM		524				524			524	
10:00 PM		371				371			371	
11:00 PM		191				191			191	
Day Total		19684				19684			19684	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1491				8:00 AM 1491			8:00 AM 1491	
PM Peak Volume		5:00 PM 1543				5:00 PM 1543			5:00 PM 1543	



Comments: none

LOCATION: 49. Middlefield Rd
SPECIFIC LOCATION: 100 ft from City Limits
CITY/STATE: Menlo Park, CA
QC JOB #: 12899436
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		73				73			73	
1:00 AM		47				47			47	
2:00 AM		18				18			18	
3:00 AM		17				17			17	
4:00 AM		57				57			57	
5:00 AM		214				214			214	
6:00 AM		580				580			580	
7:00 AM		1047				1047			1047	
8:00 AM		**1382**				**1382**			**1382**	
9:00 AM		1204				1204			1204	
10:00 AM		1072				1072			1072	
11:00 AM		1088				1088			1088	
12:00 PM		1182				1182			1182	
1:00 PM		1123				1123			1123	
2:00 PM		1303				1303			1303	
3:00 PM		1208				1208			1208	
4:00 PM		**1453**				**1453**			**1453**	
5:00 PM		1163				1163			1163	
6:00 PM		1073				1073			1073	
7:00 PM		1076				1076			1076	
8:00 PM		767				767			767	
9:00 PM		655				655			655	
10:00 PM		386				386			386	
11:00 PM		228				228			228	
Day Total		18416				18416			18416	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1382				8:00 AM 1382			8:00 AM 1382	
PM Peak Volume		4:00 PM 1453				4:00 PM 1453			4:00 PM 1453	

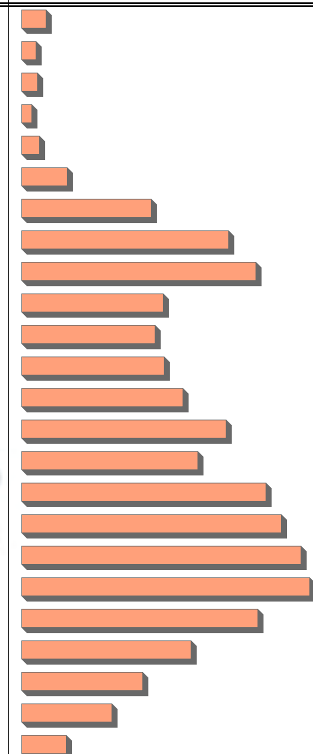


Comments: none

LOCATION: 50. Newbridge St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899437
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			51			51			51	
1:00 AM			30			30			30	
2:00 AM			33			33			33	
3:00 AM			21			21			21	
4:00 AM			37			37			37	
5:00 AM			95			95			95	
6:00 AM			270			270			270	
7:00 AM			431			431			431	
8:00 AM			**488**			**488**			**488**	
9:00 AM			295			295			295	
10:00 AM			278			278			278	
11:00 AM			297			297			297	
12:00 PM			336			336			336	
1:00 PM			426			426			426	
2:00 PM			367			367			367	
3:00 PM			509			509			509	
4:00 PM			541			541			541	
5:00 PM			582			582			582	
6:00 PM			**600**			**600**			**600**	
7:00 PM			492			492			492	
8:00 PM			353			353			353	
9:00 PM			252			252			252	
10:00 PM			188			188			188	
11:00 PM			93			93			93	
Day Total			7065			7065			7065	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 488			8:00 AM 488			8:00 AM 488	
PM Peak Volume			6:00 PM 600			6:00 PM 600			6:00 PM 600	



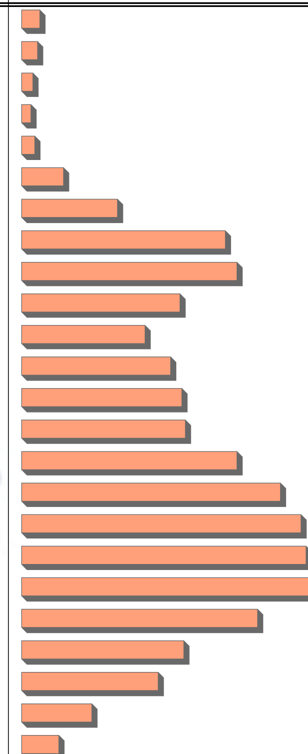
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 51. Newbridge St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899438
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		47				47			47	
1:00 AM		41				41			41	
2:00 AM		29				29			29	
3:00 AM		24				24			24	
4:00 AM		34				34			34	
5:00 AM		108				108			108	
6:00 AM		247				247			247	
7:00 AM		525				525			525	
8:00 AM		**555**				**555**			**555**	
9:00 AM		408				408			408	
10:00 AM		318				318			318	
11:00 AM		384				384			384	
12:00 PM		413				413			413	
1:00 PM		422				422			422	
2:00 PM		555				555			555	
3:00 PM		667				667			667	
4:00 PM		720				720			720	
5:00 PM		733				733			733	
6:00 PM		**741**				**741**			**741**	
7:00 PM		608				608			608	
8:00 PM		418				418			418	
9:00 PM		352				352			352	
10:00 PM		181				181			181	
11:00 PM		96				96			96	
Day Total		8626				8626			8626	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 555				8:00 AM 555			8:00 AM 555	
PM Peak Volume		6:00 PM 741				6:00 PM 741			6:00 PM 741	

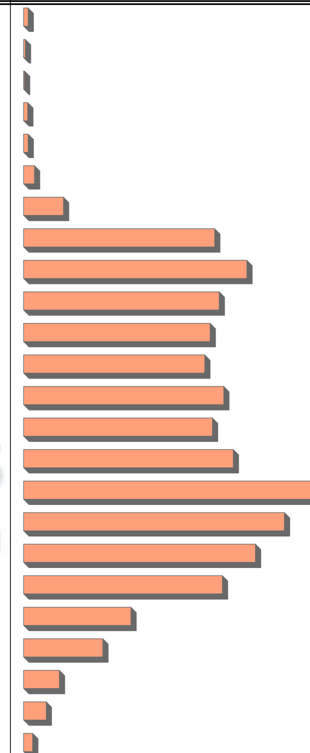


Comments: none

LOCATION: 52. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899439
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		10				10			10	
1:00 AM		4				4			4	
2:00 AM		2				2			2	
3:00 AM		9				9			9	
4:00 AM		10				10			10	
5:00 AM		24				24			24	
6:00 AM		88				88			88	
7:00 AM		422				422			422	
8:00 AM		**493**				**493**			**493**	
9:00 AM		432				432			432	
10:00 AM		412				412			412	
11:00 AM		400				400			400	
12:00 PM		442				442			442	
1:00 PM		417				417			417	
2:00 PM		463				463			463	
3:00 PM		**635**				**635**			**635**	
4:00 PM		576				576			576	
5:00 PM		512				512			512	
6:00 PM		439				439			439	
7:00 PM		237				237			237	
8:00 PM		175				175			175	
9:00 PM		79				79			79	
10:00 PM		50				50			50	
11:00 PM		20				20			20	
Day Total		6351				6351			6351	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 493				8:00 AM 493			8:00 AM 493	
PM Peak Volume		3:00 PM 635				3:00 PM 635			3:00 PM 635	

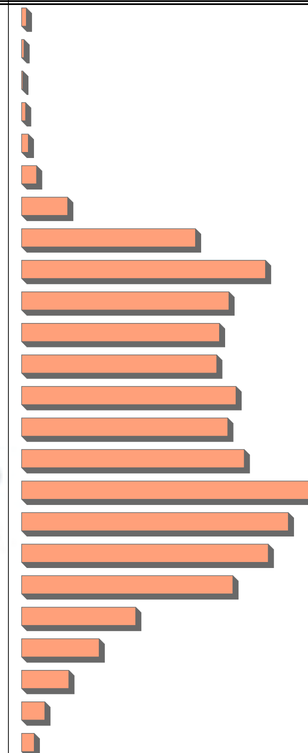


Comments: none

LOCATION: 53. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from Crane St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899440
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		12				12			12	
1:00 AM		6				6			6	
2:00 AM		3				3			3	
3:00 AM		10				10			10	
4:00 AM		17				17			17	
5:00 AM		38				38			38	
6:00 AM		117				117			117	
7:00 AM		442				442			442	
8:00 AM		**620**				**620**			**620**	
9:00 AM		527				527			527	
10:00 AM		503				503			503	
11:00 AM		496				496			496	
12:00 PM		545				545			545	
1:00 PM		524				524			524	
2:00 PM		566				566			566	
3:00 PM		**731**				**731**			**731**	
4:00 PM		678				678			678	
5:00 PM		627				627			627	
6:00 PM		537				537			537	
7:00 PM		290				290			290	
8:00 PM		197				197			197	
9:00 PM		120				120			120	
10:00 PM		59				59			59	
11:00 PM		32				32			32	
Day Total		7697				7697			7697	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 620				8:00 AM 620			8:00 AM 620	
PM Peak Volume		3:00 PM 731				3:00 PM 731			3:00 PM 731	



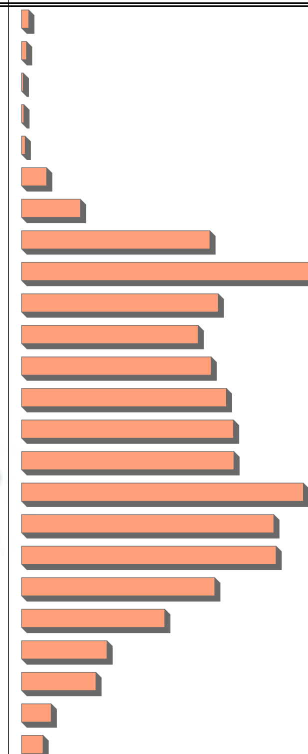
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 54. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from El Camino Real
CITY/STATE: Menlo Park, CA

QC JOB #: 12899441
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		22				22			22	
1:00 AM		15				15			15	
2:00 AM		5				5			5	
3:00 AM		7				7			7	
4:00 AM		11				11			11	
5:00 AM		77				77			77	
6:00 AM		181				181			181	
7:00 AM		580				580			580	
8:00 AM		**886**				**886**			**886**	
9:00 AM		606				606			606	
10:00 AM		544				544			544	
11:00 AM		584				584			584	
12:00 PM		631				631			631	
1:00 PM		653				653			653	
2:00 PM		654				654			654	
3:00 PM		**868**				**868**			**868**	
4:00 PM		777				777			777	
5:00 PM		784				784			784	
6:00 PM		595				595			595	
7:00 PM		441				441			441	
8:00 PM		263				263			263	
9:00 PM		229				229			229	
10:00 PM		91				91			91	
11:00 PM		66				66			66	
Day Total		9570				9570			9570	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 886				8:00 AM 886			8:00 AM 886	
PM Peak Volume		3:00 PM 868				3:00 PM 868			3:00 PM 868	



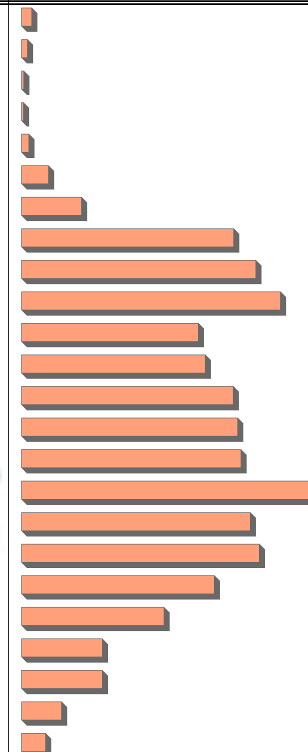
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 55. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899442
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				28		28			28	
1:00 AM				16		16			16	
2:00 AM				6		6			6	
3:00 AM				5		5			5	
4:00 AM				20		20			20	
5:00 AM				74		74			74	
6:00 AM				165		165			165	
7:00 AM				584		584			584	
8:00 AM				645		645			645	
9:00 AM				**713**		**713**			**713**	
10:00 AM				487		487			487	
11:00 AM				506		506			506	
12:00 PM				583		583			583	
1:00 PM				595		595			595	
2:00 PM				604		604			604	
3:00 PM				**792**		**792**			**792**	
4:00 PM				630		630			630	
5:00 PM				655		655			655	
6:00 PM				531		531			531	
7:00 PM				392		392			392	
8:00 PM				222		222			222	
9:00 PM				222		222			222	
10:00 PM				110		110			110	
11:00 PM				66		66			66	
Day Total				8651		8651			8651	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				9:00 AM 713		9:00 AM 713			9:00 AM 713	
PM Peak Volume				3:00 PM 792		3:00 PM 792			3:00 PM 792	

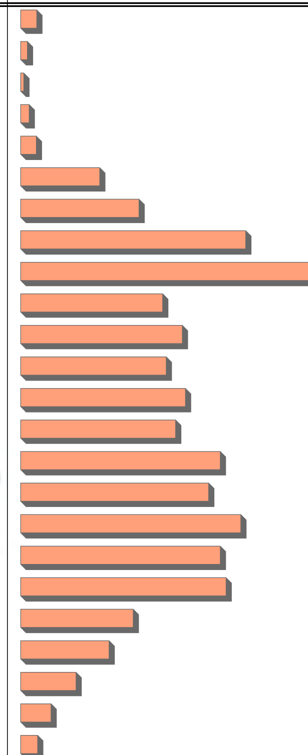


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 56. O'Brien Dr **QC JOB #:** 12899443
SPECIFIC LOCATION: 100 ft from Kavanaugh Dr **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			36			36			36	
1:00 AM			15			15			15	
2:00 AM			7			7			7	
3:00 AM			19			19			19	
4:00 AM			35			35			35	
5:00 AM			177			177			177	
6:00 AM			265			265			265	
7:00 AM			504			504			504	
8:00 AM			**646**			**646**			**646**	
9:00 AM			318			318			318	
10:00 AM			362			362			362	
11:00 AM			326			326			326	
12:00 PM			369			369			369	
1:00 PM			347			347			347	
2:00 PM			447			447			447	
3:00 PM			421			421			421	
4:00 PM			**493**			**493**			**493**	
5:00 PM			447			447			447	
6:00 PM			460			460			460	
7:00 PM			252			252			252	
8:00 PM			198			198			198	
9:00 PM			124			124			124	
10:00 PM			68			68			68	
11:00 PM			38			38			38	
Day Total			6374			6374			6374	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 646			8:00 AM 646			8:00 AM 646	
PM Peak Volume			4:00 PM 493			4:00 PM 493			4:00 PM 493	



Comments: none

Report generated on 10/24/2014 2:46 PM SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

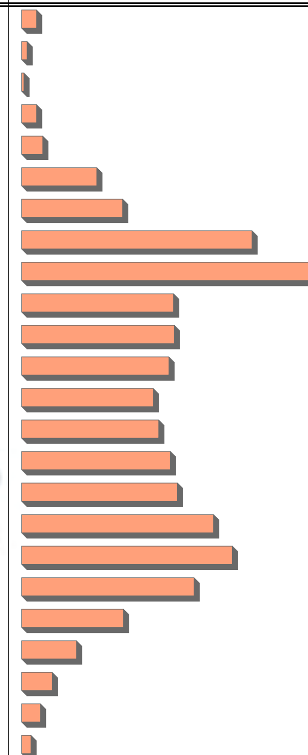
Type of report: Tube Count - Volume Data

LOCATION: 57. O'Brien Dr
SPECIFIC LOCATION: 100 ft from University Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899444
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM			19			19			19
1:00 AM			7			7			7
2:00 AM			3			3			3
3:00 AM			19			19			19
4:00 AM			27			27			27
5:00 AM			96			96			96
6:00 AM			129			129			129
7:00 AM			294			294			294
8:00 AM			**367**			**367**			**367**
9:00 AM			194			194			194
10:00 AM			195			195			195
11:00 AM			188			188			188
12:00 PM			168			168			168
1:00 PM			175			175			175
2:00 PM			190			190			190
3:00 PM			199			199			199
4:00 PM			245			245			245
5:00 PM			**269**			**269**			**269**
6:00 PM			220			220			220
7:00 PM			130			130			130
8:00 PM			70			70			70
9:00 PM			39			39			39
10:00 PM			24			24			24
11:00 PM			12			12			12
Day Total			3279			3279			3279
% Weekday Average			100.0%						
% Week Average			100.0%			100.0%			
AM Peak Volume			8:00 AM 367			8:00 AM 367			8:00 AM 367
PM Peak Volume			5:00 PM 269			5:00 PM 269			5:00 PM 269

Average Week Profile



Comments: none

Report generated on 10/24/2014 2:46 PM

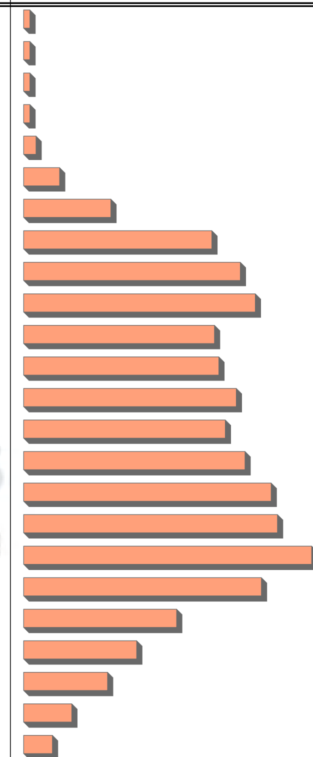
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: 60. Ravenswood Ave
SPECIFIC LOCATION: 100 ft from Alma St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899446
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				36		36			36	
1:00 AM				36		36			36	
2:00 AM				36		36			36	
3:00 AM				36		36			36	
4:00 AM				71		71			71	
5:00 AM				206		206			206	
6:00 AM				500		500			500	
7:00 AM				1079		1079			1079	
8:00 AM				1242		1242			1242	
9:00 AM				**1328**		**1328**			**1328**	
10:00 AM				1094		1094			1094	
11:00 AM				1119		1119			1119	
12:00 PM				1219		1219			1219	
1:00 PM				1156		1156			1156	
2:00 PM				1269		1269			1269	
3:00 PM				1419		1419			1419	
4:00 PM				1455		1455			1455	
5:00 PM				**1651**		**1651**			**1651**	
6:00 PM				1363		1363			1363	
7:00 PM				877		877			877	
8:00 PM				648		648			648	
9:00 PM				481		481			481	
10:00 PM				276		276			276	
11:00 PM				165		165			165	
Day Total				18762		18762			18762	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				9:00 AM 1328		9:00 AM 1328			9:00 AM 1328	
PM Peak Volume				5:00 PM 1651		5:00 PM 1651			5:00 PM 1651	

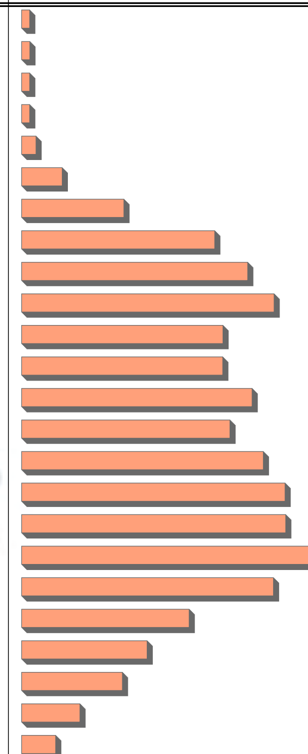


Comments: none

LOCATION: 61. Ravenswood Ave
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899447
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				38		38			38	
1:00 AM				39		39			39	
2:00 AM				38		38			38	
3:00 AM				38		38			38	
4:00 AM				68		68			68	
5:00 AM				192		192			192	
6:00 AM				484		484			484	
7:00 AM				914		914			914	
8:00 AM				1070		1070			1070	
9:00 AM				**1195**		**1195**			**1195**	
10:00 AM				953		953			953	
11:00 AM				952		952			952	
12:00 PM				1091		1091			1091	
1:00 PM				986		986			986	
2:00 PM				1144		1144			1144	
3:00 PM				1247		1247			1247	
4:00 PM				1250		1250			1250	
5:00 PM				**1361**		**1361**			**1361**	
6:00 PM				1192		1192			1192	
7:00 PM				793		793			793	
8:00 PM				594		594			594	
9:00 PM				477		477			477	
10:00 PM				276		276			276	
11:00 PM				161		161			161	
Day Total				16553		16553			16553	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				9:00 AM 1195		9:00 AM 1195			9:00 AM 1195	
PM Peak Volume				5:00 PM 1361		5:00 PM 1361			5:00 PM 1361	

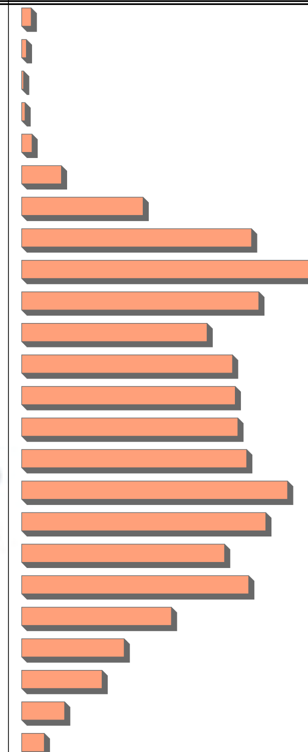


Comments: none

LOCATION: 63. Sand Hill Rd
SPECIFIC LOCATION: 100 ft from I-280
CITY/STATE: Menlo Park, CA

QC JOB #: 12899449
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		80				80			80	
1:00 AM		39				39			39	
2:00 AM		16				16			16	
3:00 AM		28				28			28	
4:00 AM		87				87			87	
5:00 AM		334				334			334	
6:00 AM		1021				1021			1021	
7:00 AM		1933				1933			1933	
8:00 AM		**2426**				**2426**			**2426**	
9:00 AM		1994				1994			1994	
10:00 AM		1559				1559			1559	
11:00 AM		1773				1773			1773	
12:00 PM		1796				1796			1796	
1:00 PM		1818				1818			1818	
2:00 PM		1892				1892			1892	
3:00 PM		**2236**				**2236**			**2236**	
4:00 PM		2053				2053			2053	
5:00 PM		1706				1706			1706	
6:00 PM		1909				1909			1909	
7:00 PM		1259				1259			1259	
8:00 PM		862				862			862	
9:00 PM		676				676			676	
10:00 PM		361				361			361	
11:00 PM		190				190			190	
Day Total		28048				28048			28048	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2426				8:00 AM 2426			8:00 AM 2426	
PM Peak Volume		3:00 PM 2236				3:00 PM 2236			3:00 PM 2236	

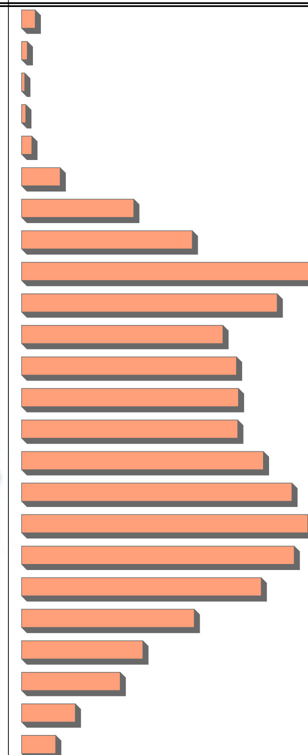


Comments: none

LOCATION: 64. Sand Hill Rd
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899450
DIRECTION: EB/WB
DATE: Sep 25 2014 - Sep 25 2014

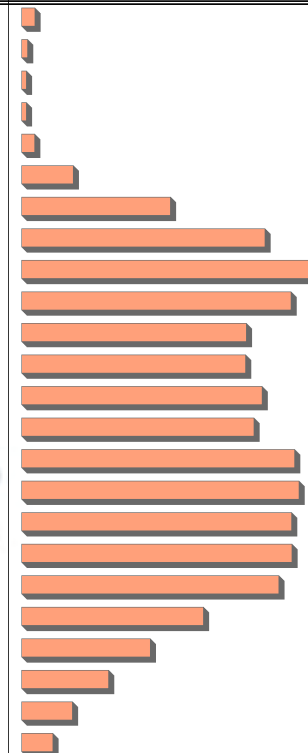
Start Time	Mon	Tue	Wed	Thu 25-Sep-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				118		118			118	
1:00 AM				49		49			49	
2:00 AM				27		27			27	
3:00 AM				36		36			36	
4:00 AM				89		89			89	
5:00 AM				335		335			335	
6:00 AM				975		975			975	
7:00 AM				1484		1484			1484	
8:00 AM				**2500**		**2500**			**2500**	
9:00 AM				2222		2222			2222	
10:00 AM				1750		1750			1750	
11:00 AM				1868		1868			1868	
12:00 PM				1885		1885			1885	
1:00 PM				1879		1879			1879	
2:00 PM				2102		2102			2102	
3:00 PM				2350		2350			2350	
4:00 PM				**2488**		**2488**			**2488**	
5:00 PM				2370		2370			2370	
6:00 PM				2083		2083			2083	
7:00 PM				1501		1501			1501	
8:00 PM				1054		1054			1054	
9:00 PM				857		857			857	
10:00 PM				467		467			467	
11:00 PM				296		296			296	
Day Total				30785		30785			30785	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 2500		8:00 AM 2500			8:00 AM 2500	
PM Peak Volume				4:00 PM 2488		4:00 PM 2488			4:00 PM 2488	



Comments: none

LOCATION: 65. Sand Hill Rd **QC JOB #:** 12899451
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave **DIRECTION:** EB/WB
CITY/STATE: Menlo Park, CA **DATE:** Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		114				114			114	
1:00 AM		51				51			51	
2:00 AM		41				41			41	
3:00 AM		41				41			41	
4:00 AM		112				112			112	
5:00 AM		446				446			446	
6:00 AM		1286				1286			1286	
7:00 AM		2101				2101			2101	
8:00 AM		**2491**				**2491**			**2491**	
9:00 AM		2326				2326			2326	
10:00 AM		1940				1940			1940	
11:00 AM		1934				1934			1934	
12:00 PM		2076				2076			2076	
1:00 PM		2006				2006			2006	
2:00 PM		2357				2357			2357	
3:00 PM		**2395**				**2395**			**2395**	
4:00 PM		2331				2331			2331	
5:00 PM		2334				2334			2334	
6:00 PM		2221				2221			2221	
7:00 PM		1570				1570			1570	
8:00 PM		1110				1110			1110	
9:00 PM		751				751			751	
10:00 PM		439				439			439	
11:00 PM		269				269			269	
Day Total		32742				32742			32742	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2491				8:00 AM 2491			8:00 AM 2491	
PM Peak Volume		3:00 PM 2395				3:00 PM 2395			3:00 PM 2395	

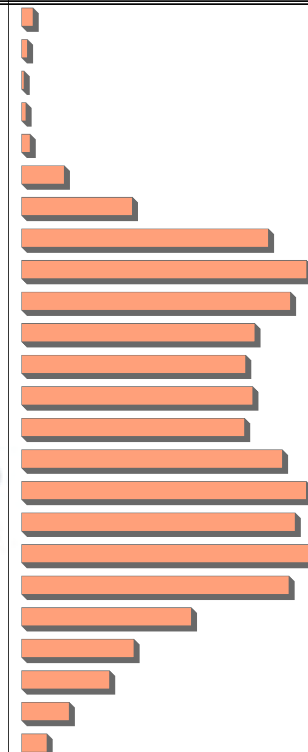


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 66. Santa Cruz Ave **QC JOB #:** 12899452
SPECIFIC LOCATION: 100 ft from Junipero Serra Blvd **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		81				81			81	
1:00 AM		41				41			41	
2:00 AM		17				17			17	
3:00 AM		30				30			30	
4:00 AM		60				60			60	
5:00 AM		304				304			304	
6:00 AM		790				790			790	
7:00 AM		1759				1759			1759	
8:00 AM		**2032**				**2032**			**2032**	
9:00 AM		1916				1916			1916	
10:00 AM		1663				1663			1663	
11:00 AM		1597				1597			1597	
12:00 PM		1648				1648			1648	
1:00 PM		1589				1589			1589	
2:00 PM		1859				1859			1859	
3:00 PM		2030				2030			2030	
4:00 PM		1950				1950			1950	
5:00 PM		**2057**				**2057**			**2057**	
6:00 PM		1906				1906			1906	
7:00 PM		1209				1209			1209	
8:00 PM		800				800			800	
9:00 PM		627				627			627	
10:00 PM		339				339			339	
11:00 PM		180				180			180	
Day Total		26484				26484			26484	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2032				8:00 AM 2032			8:00 AM 2032	
PM Peak Volume		5:00 PM 2057				5:00 PM 2057			5:00 PM 2057	



Comments: none

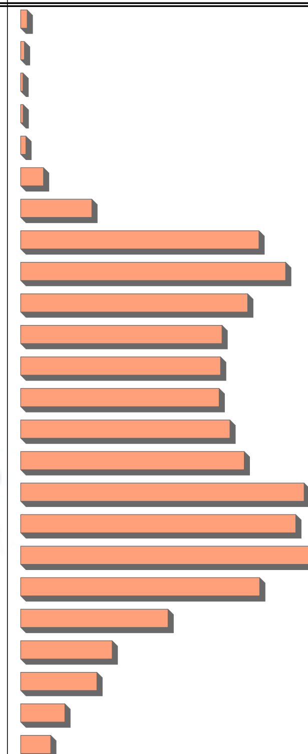
Report generated on 10/24/2014 2:46 PM

Type of report: Tube Count - Volume Data

LOCATION: 67. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Sand Hill Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899453
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				45		45			45	
1:00 AM				26		26			26	
2:00 AM				16		16			16	
3:00 AM				17		17			17	
4:00 AM				36		36			36	
5:00 AM				158		158			158	
6:00 AM				493		493			493	
7:00 AM				1651		1651			1651	
8:00 AM				**1836**		**1836**			**1836**	
9:00 AM				1573		1573			1573	
10:00 AM				1395		1395			1395	
11:00 AM				1385		1385			1385	
12:00 PM				1375		1375			1375	
1:00 PM				1450		1450			1450	
2:00 PM				1549		1549			1549	
3:00 PM				1964		1964			1964	
4:00 PM				1906		1906			1906	
5:00 PM				**1999**		**1999**			**1999**	
6:00 PM				1656		1656			1656	
7:00 PM				1021		1021			1021	
8:00 PM				634		634			634	
9:00 PM				528		528			528	
10:00 PM				306		306			306	
11:00 PM				208		208			208	
Day Total				23227		23227			23227	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1836		8:00 AM 1836			8:00 AM 1836	
PM Peak Volume				5:00 PM 1999		5:00 PM 1999			5:00 PM 1999	



Comments: none

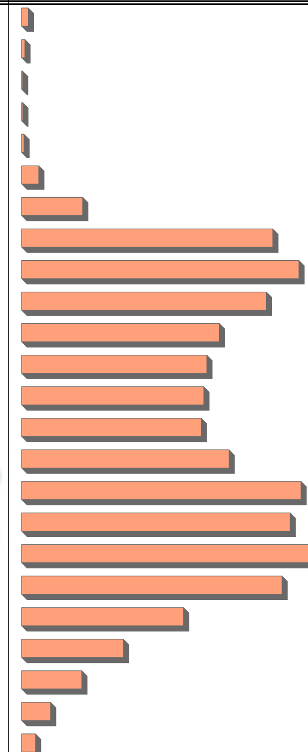
Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 68. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Alameda de las Pulgas
CITY/STATE: Menlo Park, CA

QC JOB #: 12899454
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		22				22			22	
1:00 AM		11				11			11	
2:00 AM		3				3			3	
3:00 AM		4				4			4	
4:00 AM		8				8			8	
5:00 AM		57				57			57	
6:00 AM		203				203			203	
7:00 AM		834				834			834	
8:00 AM		**921**				**921**			**921**	
9:00 AM		813				813			813	
10:00 AM		657				657			657	
11:00 AM		615				615			615	
12:00 PM		605				605			605	
1:00 PM		597				597			597	
2:00 PM		689				689			689	
3:00 PM		928				928			928	
4:00 PM		892				892			892	
5:00 PM		**955**				**955**			**955**	
6:00 PM		865				865			865	
7:00 PM		538				538			538	
8:00 PM		338				338			338	
9:00 PM		200				200			200	
10:00 PM		96				96			96	
11:00 PM		46				46			46	
Day Total		10897				10897			10897	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 921				8:00 AM 921			8:00 AM 921	
PM Peak Volume		5:00 PM 955				5:00 PM 955			5:00 PM 955	

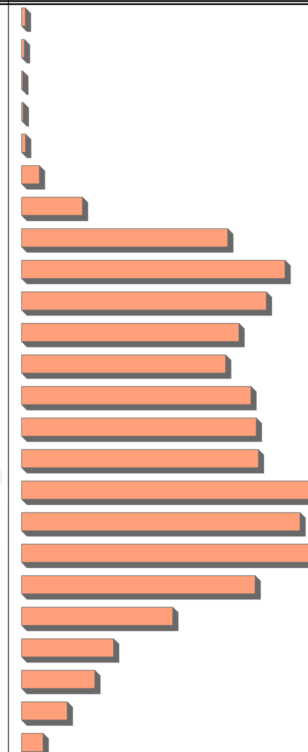


Comments: none

LOCATION: 69. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Avy/Orange Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899455
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				16		16			16	
1:00 AM				12		12			12	
2:00 AM				5		5			5	
3:00 AM				7		7			7	
4:00 AM				17		17			17	
5:00 AM				76		76			76	
6:00 AM				260		260			260	
7:00 AM				881		881			881	
8:00 AM				**1126**		**1126**			**1126**	
9:00 AM				1046		1046			1046	
10:00 AM				929		929			929	
11:00 AM				872		872			872	
12:00 PM				980		980			980	
1:00 PM				1003		1003			1003	
2:00 PM				1012		1012			1012	
3:00 PM				1226		1226			1226	
4:00 PM				1190		1190			1190	
5:00 PM				**1229**		**1229**			**1229**	
6:00 PM				998		998			998	
7:00 PM				646		646			646	
8:00 PM				393		393			393	
9:00 PM				313		313			313	
10:00 PM				195		195			195	
11:00 PM				92		92			92	
Day Total				14524		14524			14524	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1126		8:00 AM 1126			8:00 AM 1126	
PM Peak Volume				5:00 PM 1229		5:00 PM 1229			5:00 PM 1229	

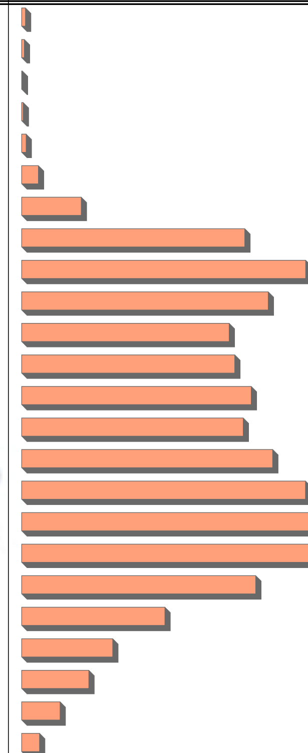


Comments: none

LOCATION: 70. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Olive St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899456
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				17		17			17	
1:00 AM				12		12			12	
2:00 AM				3		3			3	
3:00 AM				7		7			7	
4:00 AM				20		20			20	
5:00 AM				75		75			75	
6:00 AM				267		267			267	
7:00 AM				1000		1000			1000	
8:00 AM				**1273**		**1273**			**1273**	
9:00 AM				1105		1105			1105	
10:00 AM				930		930			930	
11:00 AM				955		955			955	
12:00 PM				1029		1029			1029	
1:00 PM				993		993			993	
2:00 PM				1125		1125			1125	
3:00 PM				1272		1272			1272	
4:00 PM				**1293**		**1293**			**1293**	
5:00 PM				1286		1286			1286	
6:00 PM				1049		1049			1049	
7:00 PM				642		642			642	
8:00 PM				408		408			408	
9:00 PM				301		301			301	
10:00 PM				172		172			172	
11:00 PM				80		80			80	
Day Total				15314		15314			15314	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1273		8:00 AM 1273			8:00 AM 1273	
PM Peak Volume				4:00 PM 1293		4:00 PM 1293			4:00 PM 1293	

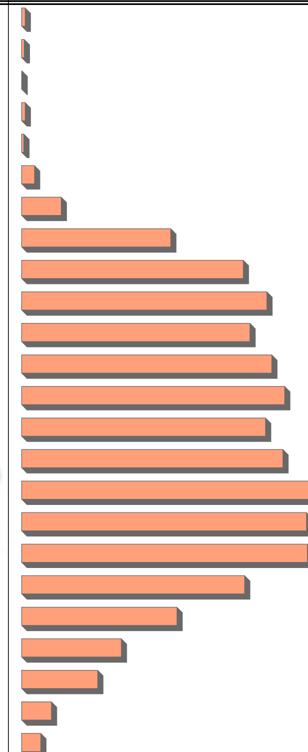


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 71. Santa Cruz Ave **QC JOB #:** 12899457
SPECIFIC LOCATION: 100 ft from University Dr **DIRECTION:** EB/WB
CITY/STATE: Menlo Park, CA **DATE:** Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				8		8			8	
1:00 AM				6		6			6	
2:00 AM				1		1			1	
3:00 AM				8		8			8	
4:00 AM				5		5			5	
5:00 AM				29		29			29	
6:00 AM				89		89			89	
7:00 AM				335		335			335	
8:00 AM				498		498			498	
9:00 AM				551		551			551	
10:00 AM				513		513			513	
11:00 AM				**562**		**562**			**562**	
12:00 PM				591		591			591	
1:00 PM				548		548			548	
2:00 PM				587		587			587	
3:00 PM				**646**		**646**			**646**	
4:00 PM				640		640			640	
5:00 PM				642		642			642	
6:00 PM				501		501			501	
7:00 PM				349		349			349	
8:00 PM				224		224			224	
9:00 PM				171		171			171	
10:00 PM				67		67			67	
11:00 PM				43		43			43	
Day Total				7614		7614			7614	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				11:00 AM 562		11:00 AM 562			11:00 AM 562	
PM Peak Volume				3:00 PM 646		3:00 PM 646			3:00 PM 646	

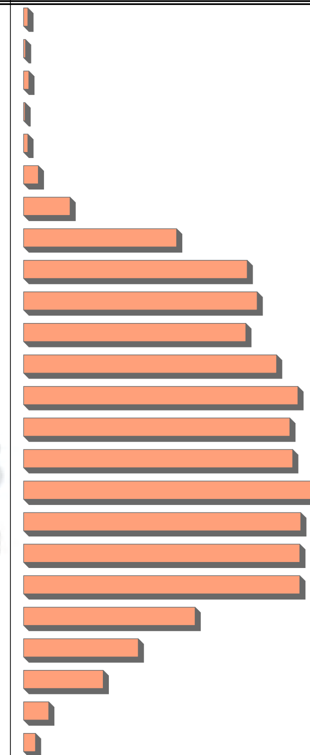


Comments: none

LOCATION: 72. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Crane St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899458
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		9				9			9	
1:00 AM		4				4			4	
2:00 AM		11				11			11	
3:00 AM		3				3			3	
4:00 AM		9				9			9	
5:00 AM		31				31			31	
6:00 AM		98				98			98	
7:00 AM		323				323			323	
8:00 AM		472				472			472	
9:00 AM		493				493			493	
10:00 AM		469				469			469	
11:00 AM		**534**				**534**			**534**	
12:00 PM		579				579			579	
1:00 PM		562				562			562	
2:00 PM		568				568			568	
3:00 PM		**607**				**607**			**607**	
4:00 PM		585				585			585	
5:00 PM		583				583			583	
6:00 PM		583				583			583	
7:00 PM		362				362			362	
8:00 PM		242				242			242	
9:00 PM		168				168			168	
10:00 PM		53				53			53	
11:00 PM		25				25			25	
Day Total		7373				7373			7373	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		11:00 AM 534				11:00 AM 534			11:00 AM 534	
PM Peak Volume		3:00 PM 607				3:00 PM 607			3:00 PM 607	

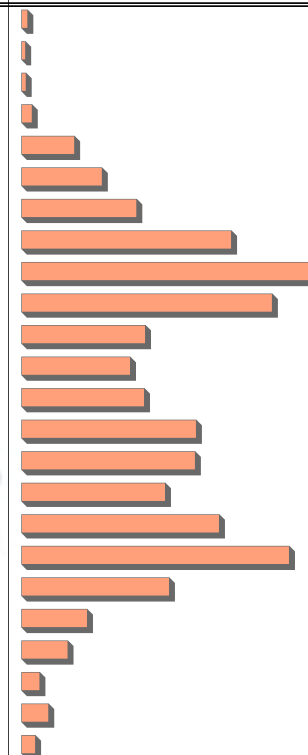


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 73. Scott Dr **QC JOB #:** 12899459
SPECIFIC LOCATION: 100 ft from Marsh Rd **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		11				11			11	
1:00 AM		7				7			7	
2:00 AM		8				8			8	
3:00 AM		19				19			19	
4:00 AM		96				96			96	
5:00 AM		146				146			146	
6:00 AM		209				209			209	
7:00 AM		381				381			381	
8:00 AM		**522**				**522**			**522**	
9:00 AM		455				455			455	
10:00 AM		225				225			225	
11:00 AM		197				197			197	
12:00 PM		223				223			223	
1:00 PM		317				317			317	
2:00 PM		315				315			315	
3:00 PM		261				261			261	
4:00 PM		359				359			359	
5:00 PM		**486**				**486**			**486**	
6:00 PM		268				268			268	
7:00 PM		119				119			119	
8:00 PM		84				84			84	
9:00 PM		33				33			33	
10:00 PM		49				49			49	
11:00 PM		25				25			25	
Day Total		4815				4815			4815	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 522				8:00 AM 522			8:00 AM 522	
PM Peak Volume		5:00 PM 486				5:00 PM 486			5:00 PM 486	

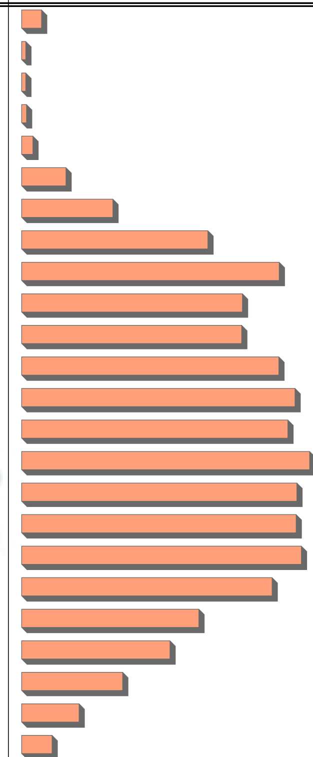


Comments: none

LOCATION: 74. Sharon Park Dr
SPECIFIC LOCATION: 100 ft from Sand Hill Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899460
DIRECTION: NB/SB
DATE: Sep 24 2014 - Sep 24 2014

Start Time	Mon	Tue	Wed 24-Sep-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			53			53			53	
1:00 AM			11			11			11	
2:00 AM			11			11			11	
3:00 AM			13			13			13	
4:00 AM			30			30			30	
5:00 AM			118			118			118	
6:00 AM			243			243			243	
7:00 AM			496			496			496	
8:00 AM			**686**			**686**			**686**	
9:00 AM			588			588			588	
10:00 AM			586			586			586	
11:00 AM			685			685			685	
12:00 PM			728			728			728	
1:00 PM			709			709			709	
2:00 PM			**767**			**767**			**767**	
3:00 PM			733			733			733	
4:00 PM			731			731			731	
5:00 PM			745			745			745	
6:00 PM			667			667			667	
7:00 PM			472			472			472	
8:00 PM			395			395			395	
9:00 PM			269			269			269	
10:00 PM			153			153			153	
11:00 PM			81			81			81	
Day Total			9970			9970			9970	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 686			8:00 AM 686			8:00 AM 686	
PM Peak Volume			2:00 PM 767			2:00 PM 767			2:00 PM 767	

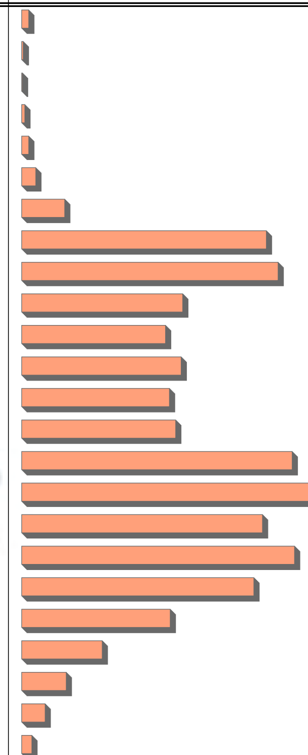


Comments: none

LOCATION: 75. Sharon Rd
SPECIFIC LOCATION: 100 ft from Sharon Park Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899461
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		9				9			9	
1:00 AM		2				2			2	
2:00 AM		1				1			1	
3:00 AM		4				4			4	
4:00 AM		9				9			9	
5:00 AM		18				18			18	
6:00 AM		55				55			55	
7:00 AM		313				313			313	
8:00 AM		**328**				**328**			**328**	
9:00 AM		206				206			206	
10:00 AM		184				184			184	
11:00 AM		204				204			204	
12:00 PM		189				189			189	
1:00 PM		197				197			197	
2:00 PM		346				346			346	
3:00 PM		**369**				**369**			**369**	
4:00 PM		308				308			308	
5:00 PM		349				349			349	
6:00 PM		297				297			297	
7:00 PM		190				190			190	
8:00 PM		103				103			103	
9:00 PM		57				57			57	
10:00 PM		30				30			30	
11:00 PM		13				13			13	
Day Total		3781				3781			3781	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 328				8:00 AM 328			8:00 AM 328	
PM Peak Volume		3:00 PM 369				3:00 PM 369			3:00 PM 369	



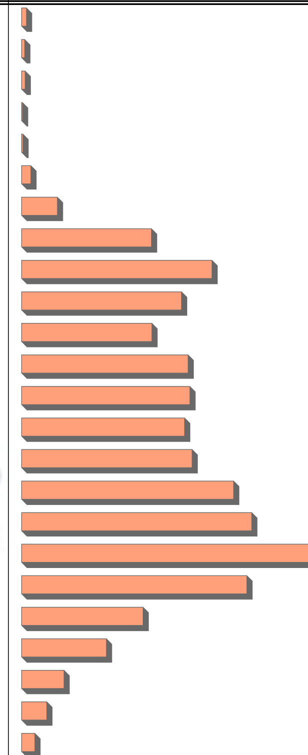
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 76. University Dr
SPECIFIC LOCATION: 100 ft from Middle Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899462
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		11				11			11	
1:00 AM		7				7			7	
2:00 AM		8				8			8	
3:00 AM		2				2			2	
4:00 AM		3				3			3	
5:00 AM		21				21			21	
6:00 AM		81				81			81	
7:00 AM		294				294			294	
8:00 AM		**431**				**431**			**431**	
9:00 AM		362				362			362	
10:00 AM		295				295			295	
11:00 AM		377				377			377	
12:00 PM		381				381			381	
1:00 PM		369				369			369	
2:00 PM		386				386			386	
3:00 PM		480				480			480	
4:00 PM		521				521			521	
5:00 PM		**651**				**651**			**651**	
6:00 PM		510				510			510	
7:00 PM		275				275			275	
8:00 PM		192				192			192	
9:00 PM		96				96			96	
10:00 PM		57				57			57	
11:00 PM		30				30			30	
Day Total		5840				5840			5840	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 431				8:00 AM 431			8:00 AM 431	
PM Peak Volume		5:00 PM 651				5:00 PM 651			5:00 PM 651	



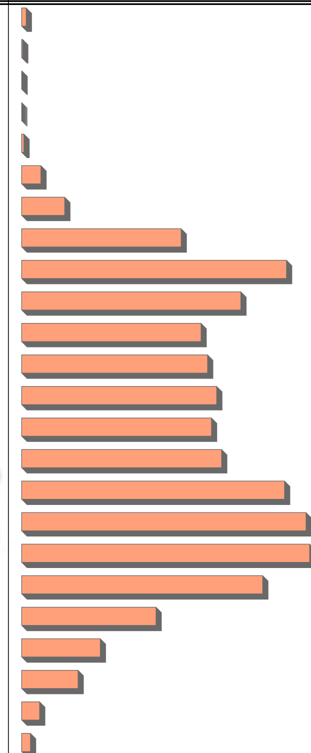
Comments: none

LOCATION: 77. University Dr
SPECIFIC LOCATION: 100 ft from Menlo Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899463
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		14				14			14
1:00 AM		3				3			3
2:00 AM		1				1			1
3:00 AM		0				0			0
4:00 AM		7				7			7
5:00 AM		59				59			59
6:00 AM		132				132			132
7:00 AM		489				489			489
8:00 AM		**812**				**812**			**812**
9:00 AM		672				672			672
10:00 AM		550				550			550
11:00 AM		570				570			570
12:00 PM		598				598			598
1:00 PM		582				582			582
2:00 PM		613				613			613
3:00 PM		806				806			806
4:00 PM		872				872			872
5:00 PM		**883**				**883**			**883**
6:00 PM		739				739			739
7:00 PM		412				412			412
8:00 PM		241				241			241
9:00 PM		173				173			173
10:00 PM		55				55			55
11:00 PM		27				27			27
Day Total		9310				9310			9310
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 812				8:00 AM 812			8:00 AM 812
PM Peak Volume		5:00 PM 883				5:00 PM 883			5:00 PM 883

Average Week Profile



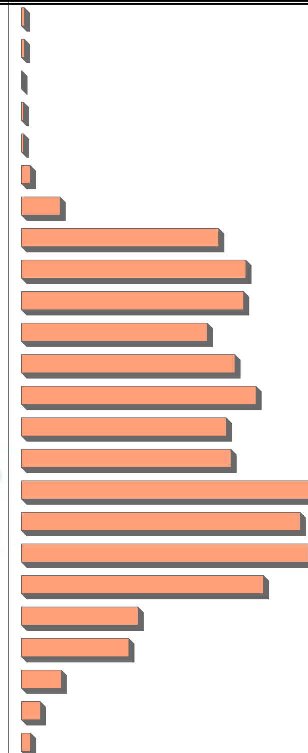
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 78. University Dr
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899464
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		7				7			7	
1:00 AM		7				7			7	
2:00 AM		1				1			1	
3:00 AM		5				5			5	
4:00 AM		5				5			5	
5:00 AM		20				20			20	
6:00 AM		88				88			88	
7:00 AM		450				450			450	
8:00 AM		**512**				**512**			**512**	
9:00 AM		507				507			507	
10:00 AM		424				424			424	
11:00 AM		487				487			487	
12:00 PM		535				535			535	
1:00 PM		467				467			467	
2:00 PM		478				478			478	
3:00 PM		**657**				**657**			**657**	
4:00 PM		636				636			636	
5:00 PM		654				654			654	
6:00 PM		552				552			552	
7:00 PM		266				266			266	
8:00 PM		245				245			245	
9:00 PM		91				91			91	
10:00 PM		43				43			43	
11:00 PM		21				21			21	
Day Total		7158				7158			7158	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 512				8:00 AM 512			8:00 AM 512	
PM Peak Volume		3:00 PM 657				3:00 PM 657			3:00 PM 657	

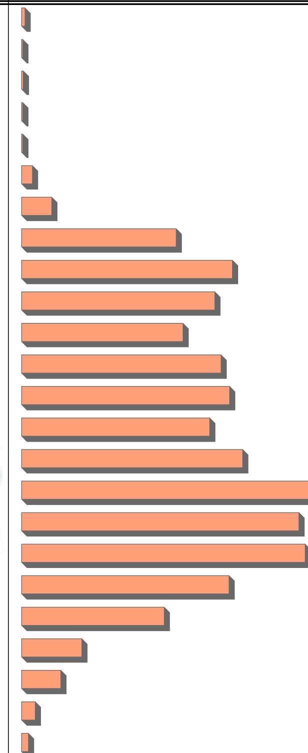


Comments: none

LOCATION: 79. University Dr
SPECIFIC LOCATION: 100 ft from Oak Grove Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899465
DIRECTION: NB/SB
DATE: Oct 23 2014 - Oct 23 2014

Start Time	Mon	Tue	Wed	Thu 23-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				6		6			6	
1:00 AM				2		2			2	
2:00 AM				3		3			3	
3:00 AM				2		2			2	
4:00 AM				2		2			2	
5:00 AM				19		19			19	
6:00 AM				53		53			53	
7:00 AM				272		272			272	
8:00 AM				**371**		**371**			**371**	
9:00 AM				340		340			340	
10:00 AM				284		284			284	
11:00 AM				351		351			351	
12:00 PM				366		366			366	
1:00 PM				331		331			331	
2:00 PM				389		389			389	
3:00 PM				**506**		**506**			**506**	
4:00 PM				488		488			488	
5:00 PM				499		499			499	
6:00 PM				365		365			365	
7:00 PM				251		251			251	
8:00 PM				106		106			106	
9:00 PM				69		69			69	
10:00 PM				24		24			24	
11:00 PM				12		12			12	
Day Total				5111		5111			5111	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 371		8:00 AM 371			8:00 AM 371	
PM Peak Volume				3:00 PM 506		3:00 PM 506			3:00 PM 506	

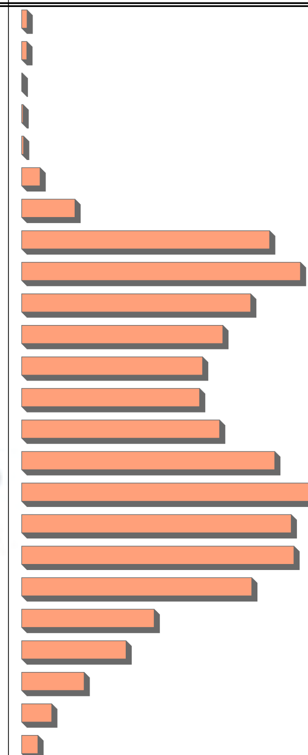


Comments: none

LOCATION: 84. Valparaiso Ave
SPECIFIC LOCATION: 100 ft from Alameda de las Pulgas
CITY/STATE: Menlo Park, CA

QC JOB #: 12899466
DIRECTION: EB/WB
DATE: Oct 15 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed 15-Oct-14	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				20		20			20	
1:00 AM				19		19			19	
2:00 AM				2		2			2	
3:00 AM				5		5			5	
4:00 AM				7		7			7	
5:00 AM				68		68			68	
6:00 AM				197		197			197	
7:00 AM				917		917			917	
8:00 AM				**1031**		**1031**			**1031**	
9:00 AM				847		847			847	
10:00 AM				744		744			744	
11:00 AM				669		669			669	
12:00 PM				658		658			658	
1:00 PM				732		732			732	
2:00 PM				936		936			936	
3:00 PM				**1067**		**1067**			**1067**	
4:00 PM				997		997			997	
5:00 PM				1007		1007			1007	
6:00 PM				851		851			851	
7:00 PM				490		490			490	
8:00 PM			**386**			386			386	
9:00 PM			231			231			231	
10:00 PM			111			111			111	
11:00 PM			60			60			60	
Day Total			788	11264		12052			12052	
% Weekday Average			6.5%	93.5%						
% Week Average			6.5%	93.5%		100.0%				
AM Peak Volume				8:00 AM 1031		8:00 AM 1031			8:00 AM 1031	
PM Peak Volume			8:00 PM 386	3:00 PM 1067		3:00 PM 1067			3:00 PM 1067	

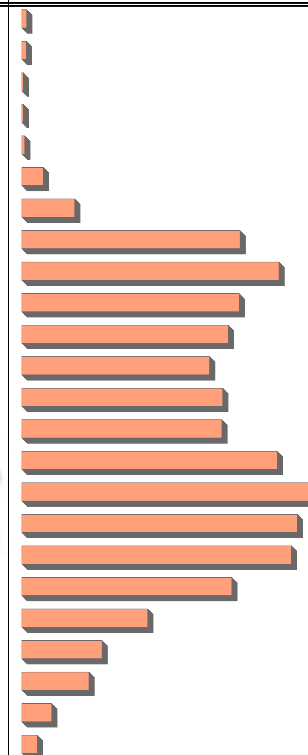


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 85. Valparaiso Ave **QC JOB #:** 12899467
SPECIFIC LOCATION: 100 ft from Cotton St **DIRECTION:** EB/WB
CITY/STATE: Menlo Park, CA **DATE:** Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				22		22			22	
1:00 AM				21		21			21	
2:00 AM				6		6			6	
3:00 AM				6		6			6	
4:00 AM				13		13			13	
5:00 AM				98		98			98	
6:00 AM				239		239			239	
7:00 AM				986		986			986	
8:00 AM				**1162**		**1162**			**1162**	
9:00 AM				982		982			982	
10:00 AM				932		932			932	
11:00 AM				849		849			849	
12:00 PM				908		908			908	
1:00 PM				904		904			904	
2:00 PM				1154		1154			1154	
3:00 PM				**1302**		**1302**			**1302**	
4:00 PM				1246		1246			1246	
5:00 PM				1219		1219			1219	
6:00 PM				949		949			949	
7:00 PM				569		569			569	
8:00 PM				362		362			362	
9:00 PM				303		303			303	
10:00 PM				135		135			135	
11:00 PM				69		69			69	
Day Total				14436		14436			14436	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1162		8:00 AM 1162			8:00 AM 1162	
PM Peak Volume				3:00 PM 1302		3:00 PM 1302			3:00 PM 1302	

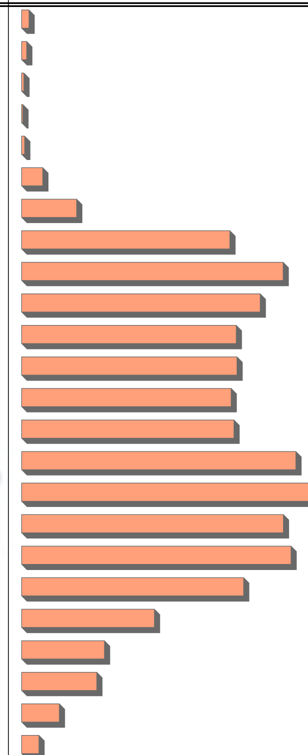


Comments: none

LOCATION: 86. Valparaiso Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899468
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				29		29			29	
1:00 AM				20		20			20	
2:00 AM				9		9			9	
3:00 AM				5		5			5	
4:00 AM				12		12			12	
5:00 AM				83		83			83	
6:00 AM				216		216			216	
7:00 AM				817		817			817	
8:00 AM				**1026**		**1026**			**1026**	
9:00 AM				936		936			936	
10:00 AM				842		842			842	
11:00 AM				845		845			845	
12:00 PM				822		822			822	
1:00 PM				833		833			833	
2:00 PM				1076		1076			1076	
3:00 PM				**1128**		**1128**			**1128**	
4:00 PM				1027		1027			1027	
5:00 PM				1057		1057			1057	
6:00 PM				871		871			871	
7:00 PM				521		521			521	
8:00 PM				325		325			325	
9:00 PM				295		295			295	
10:00 PM				148		148			148	
11:00 PM				68		68			68	
Day Total				13011		13011			13011	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1026		8:00 AM 1026			8:00 AM 1026	
PM Peak Volume				3:00 PM 1128		3:00 PM 1128			3:00 PM 1128	

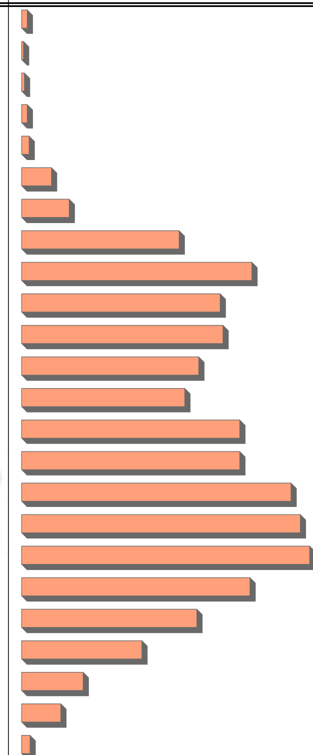


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 87. Willow Rd **QC JOB #:** 12899469
SPECIFIC LOCATION: 100 ft from Alma St **DIRECTION:** EB/WB
CITY/STATE: Menlo Park, CA **DATE:** Sep 30 2014 - Sep 30 2014

Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		6				6			6	
1:00 AM		2				2			2	
2:00 AM		3				3			3	
3:00 AM		6				6			6	
4:00 AM		8				8			8	
5:00 AM		32				32			32	
6:00 AM		51				51			51	
7:00 AM		169				169			169	
8:00 AM		**247**				**247**			**247**	
9:00 AM		213				213			213	
10:00 AM		216				216			216	
11:00 AM		190				190			190	
12:00 PM		175				175			175	
1:00 PM		234				234			234	
2:00 PM		234				234			234	
3:00 PM		289				289			289	
4:00 PM		299				299			299	
5:00 PM		**309**				**309**			**309**	
6:00 PM		245				245			245	
7:00 PM		188				188			188	
8:00 PM		129				129			129	
9:00 PM		66				66			66	
10:00 PM		42				42			42	
11:00 PM		9				9			9	
Day Total		3362				3362			3362	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 247				8:00 AM 247			8:00 AM 247	
PM Peak Volume		5:00 PM 309				5:00 PM 309			5:00 PM 309	

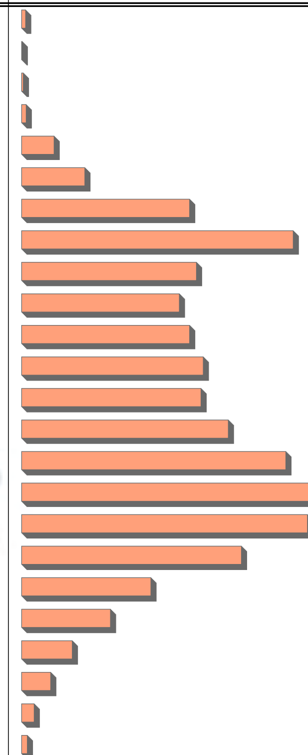


Comments: none

LOCATION: 88. Willow Rd
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899470
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		7				7			7	
1:00 AM		1				1			1	
2:00 AM		3				3			3	
3:00 AM		8				8			8	
4:00 AM		57				57			57	
5:00 AM		111				111			111	
6:00 AM		295				295			295	
7:00 AM		**477**				**477**			**477**	
8:00 AM		307				307			307	
9:00 AM		277				277			277	
10:00 AM		295				295			295	
11:00 AM		319				319			319	
12:00 PM		315				315			315	
1:00 PM		363				363			363	
2:00 PM		464				464			464	
3:00 PM		**505**				**505**			**505**	
4:00 PM		502				502			502	
5:00 PM		386				386			386	
6:00 PM		227				227			227	
7:00 PM		156				156			156	
8:00 PM		89				89			89	
9:00 PM		51				51			51	
10:00 PM		22				22			22	
11:00 PM		10				10			10	
Day Total		5247				5247			5247	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		7:00 AM 477				7:00 AM 477			7:00 AM 477	
PM Peak Volume		3:00 PM 505				3:00 PM 505			3:00 PM 505	



Comments: none

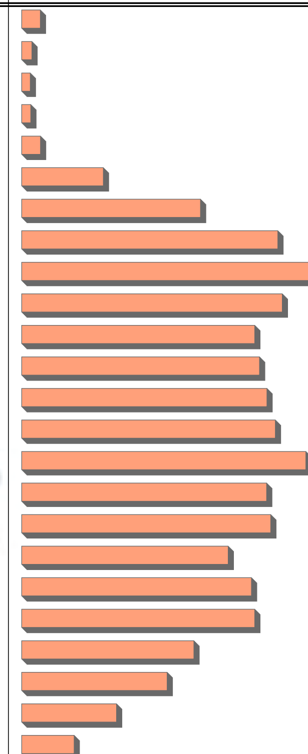
Type of report: Tube Count - Volume Data

LOCATION: 89. Willow Rd
SPECIFIC LOCATION: 100 ft from Middlefield Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899471
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		113				113			113
1:00 AM		62				62			62
2:00 AM		52				52			52
3:00 AM		55				55			55
4:00 AM		114				114			114
5:00 AM		495				495			495
6:00 AM		1084				1084			1084
7:00 AM		1553				1553			1553
8:00 AM		**1749**				**1749**			**1749**
9:00 AM		1580				1580			1580
10:00 AM		1413				1413			1413
11:00 AM		1442				1442			1442
12:00 PM		1487				1487			1487
1:00 PM		1538				1538			1538
2:00 PM		**1723**				**1723**			**1723**
3:00 PM		1485				1485			1485
4:00 PM		1510				1510			1510
5:00 PM		1252				1252			1252
6:00 PM		1393				1393			1393
7:00 PM		1413				1413			1413
8:00 PM		1044				1044			1044
9:00 PM		882				882			882
10:00 PM		575				575			575
11:00 PM		318				318			318
Day Total		24332				24332			24332
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 1749				8:00 AM 1749			8:00 AM 1749
PM Peak Volume		2:00 PM 1723				2:00 PM 1723			2:00 PM 1723

Average Week Profile

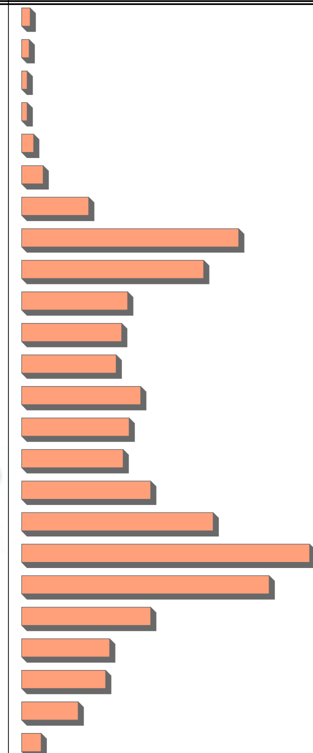


Comments: none

LOCATION: 112. Chilco St
SPECIFIC LOCATION: 100 ft from Hamilton Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899483
DIRECTION: EB/WB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			17			17			17	
1:00 AM			15			15			15	
2:00 AM			11			11			11	
3:00 AM			11			11			11	
4:00 AM			24			24			24	
5:00 AM			43			43			43	
6:00 AM			134			134			134	
7:00 AM			**434**			**434**			**434**	
8:00 AM			364			364			364	
9:00 AM			212			212			212	
10:00 AM			200			200			200	
11:00 AM			189			189			189	
12:00 PM			238			238			238	
1:00 PM			215			215			215	
2:00 PM			203			203			203	
3:00 PM			258			258			258	
4:00 PM			383			383			383	
5:00 PM			**576**			**576**			**576**	
6:00 PM			495			495			495	
7:00 PM			258			258			258	
8:00 PM			176			176			176	
9:00 PM			168			168			168	
10:00 PM			113			113			113	
11:00 PM			39			39			39	
Day Total			4776			4776			4776	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			7:00 AM 434			7:00 AM 434			7:00 AM 434	
PM Peak Volume			5:00 PM 576			5:00 PM 576			5:00 PM 576	



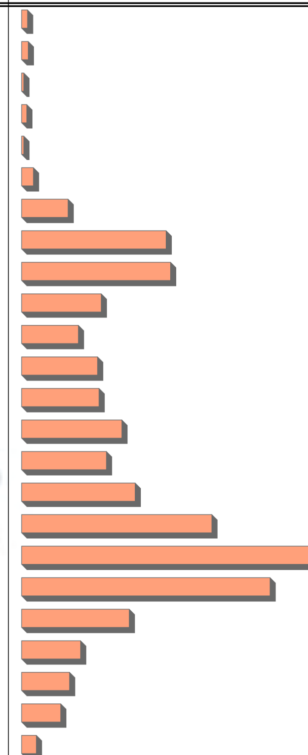
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 113. Chilco St
SPECIFIC LOCATION: 100 ft from Ivy Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899484
DIRECTION: EB/WB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			8			8			8	
1:00 AM			9			9			9	
2:00 AM			3			3			3	
3:00 AM			7			7			7	
4:00 AM			3			3			3	
5:00 AM			16			16			16	
6:00 AM			63			63			63	
7:00 AM			196			196			196	
8:00 AM			**202**			**202**			**202**	
9:00 AM			108			108			108	
10:00 AM			77			77			77	
11:00 AM			103			103			103	
12:00 PM			105			105			105	
1:00 PM			136			136			136	
2:00 PM			115			115			115	
3:00 PM			154			154			154	
4:00 PM			258			258			258	
5:00 PM			**390**			**390**			**390**	
6:00 PM			337			337			337	
7:00 PM			146			146			146	
8:00 PM			80			80			80	
9:00 PM			65			65			65	
10:00 PM			53			53			53	
11:00 PM			20			20			20	
Day Total			2654			2654			2654	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 202			8:00 AM 202			8:00 AM 202	
PM Peak Volume			5:00 PM 390			5:00 PM 390			5:00 PM 390	



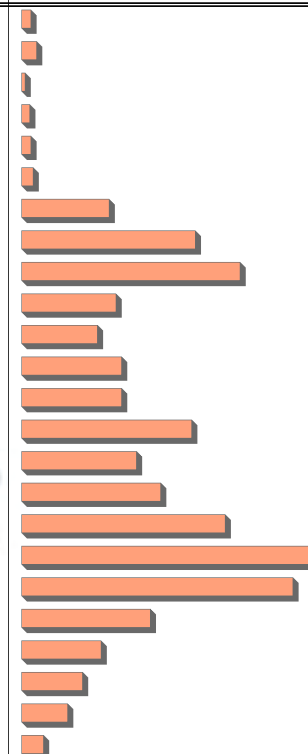
Comments: none

Report generated on 10/24/2014 2:47 PM

LOCATION: 114. Chilco St
SPECIFIC LOCATION: 100 ft from Newbridge St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899485
DIRECTION: EB/WB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			8			8			8	
1:00 AM			13			13			13	
2:00 AM			3			3			3	
3:00 AM			7			7			7	
4:00 AM			8			8			8	
5:00 AM			10			10			10	
6:00 AM			76			76			76	
7:00 AM			151			151			151	
8:00 AM			**190**			**190**			**190**	
9:00 AM			82			82			82	
10:00 AM			66			66			66	
11:00 AM			87			87			87	
12:00 PM			87			87			87	
1:00 PM			148			148			148	
2:00 PM			100			100			100	
3:00 PM			121			121			121	
4:00 PM			177			177			177	
5:00 PM			**251**			**251**			**251**	
6:00 PM			236			236			236	
7:00 PM			112			112			112	
8:00 PM			69			69			69	
9:00 PM			53			53			53	
10:00 PM			40			40			40	
11:00 PM			19			19			19	
Day Total			2114			2114			2114	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 190			8:00 AM 190			8:00 AM 190	
PM Peak Volume			5:00 PM 251			5:00 PM 251			5:00 PM 251	

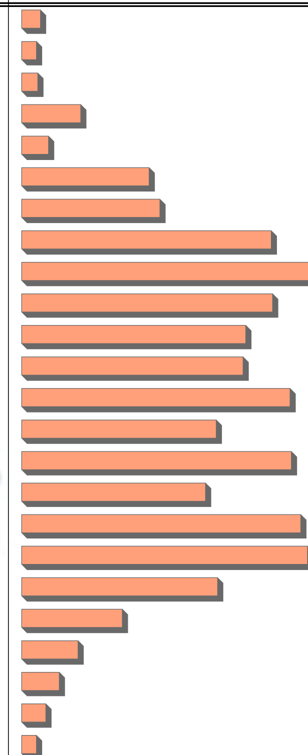


Comments: none

LOCATION: 119. Hamilton Ave
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899486
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			14			14			14	
1:00 AM			11			11			11	
2:00 AM			12			12			12	
3:00 AM			44			44			44	
4:00 AM			20			20			20	
5:00 AM			95			95			95	
6:00 AM			103			103			103	
7:00 AM			186			186			186	
8:00 AM			**215**			**215**			**215**	
9:00 AM			187			187			187	
10:00 AM			167			167			167	
11:00 AM			165			165			165	
12:00 PM			200			200			200	
1:00 PM			145			145			145	
2:00 PM			201			201			201	
3:00 PM			137			137			137	
4:00 PM			208			208			208	
5:00 PM			**213**			**213**			**213**	
6:00 PM			146			146			146	
7:00 PM			75			75			75	
8:00 PM			42			42			42	
9:00 PM			28			28			28	
10:00 PM			18			18			18	
11:00 PM			11			11			11	
Day Total			2643			2643			2643	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 215			8:00 AM 215			8:00 AM 215	
PM Peak Volume			5:00 PM 213			5:00 PM 213			5:00 PM 213	

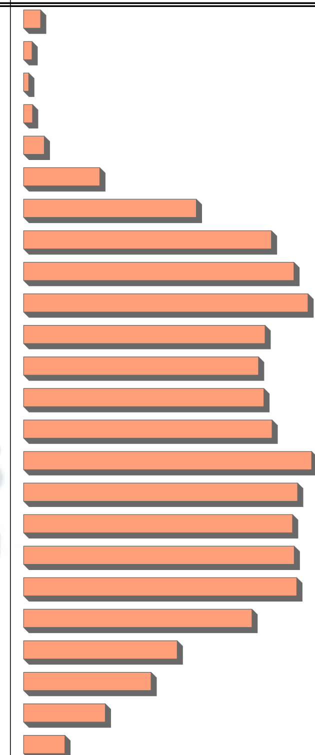


Comments: none

LOCATION: 120. Willow Rd
SPECIFIC LOCATION: 100 ft from Gilbert Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899487
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		101				101			101	
1:00 AM		50				50			50	
2:00 AM		30				30			30	
3:00 AM		53				53			53	
4:00 AM		123				123			123	
5:00 AM		454				454			454	
6:00 AM		1030				1030			1030	
7:00 AM		1478				1478			1478	
8:00 AM		1612				1612			1612	
9:00 AM		**1696**				**1696**			**1696**	
10:00 AM		1440				1440			1440	
11:00 AM		1401				1401			1401	
12:00 PM		1433				1433			1433	
1:00 PM		1482				1482			1482	
2:00 PM		**1718**				**1718**			**1718**	
3:00 PM		1634				1634			1634	
4:00 PM		1604				1604			1604	
5:00 PM		1614				1614			1614	
6:00 PM		1629				1629			1629	
7:00 PM		1362				1362			1362	
8:00 PM		916				916			916	
9:00 PM		760				760			760	
10:00 PM		487				487			487	
11:00 PM		246				246			246	
Day Total		24353				24353			24353	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		9:00 AM 1696				9:00 AM 1696			9:00 AM 1696	
PM Peak Volume		2:00 PM 1718				2:00 PM 1718			2:00 PM 1718	

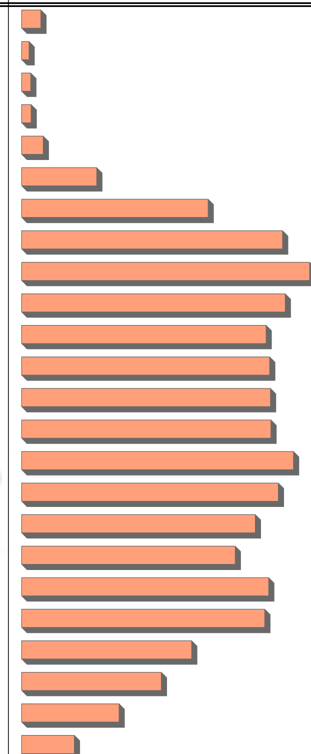


Comments: none

LOCATION: 121. Willow Rd
SPECIFIC LOCATION: 100 ft from Coleman Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899488
DIRECTION: EB/WB
DATE: Sep 30 2014 - Sep 30 2014

Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		195				195			195	
1:00 AM		75				75			75	
2:00 AM		92				92			92	
3:00 AM		96				96			96	
4:00 AM		219				219			219	
5:00 AM		762				762			762	
6:00 AM		1893				1893			1893	
7:00 AM		2649				2649			2649	
8:00 AM		**2924**				**2924**			**2924**	
9:00 AM		2676				2676			2676	
10:00 AM		2482				2482			2482	
11:00 AM		2518				2518			2518	
12:00 PM		2526				2526			2526	
1:00 PM		2531				2531			2531	
2:00 PM		**2760**				**2760**			**2760**	
3:00 PM		2606				2606			2606	
4:00 PM		2372				2372			2372	
5:00 PM		2168				2168			2168	
6:00 PM		2508				2508			2508	
7:00 PM		2468				2468			2468	
8:00 PM		1726				1726			1726	
9:00 PM		1418				1418			1418	
10:00 PM		989				989			989	
11:00 PM		535				535			535	
Day Total		41188				41188			41188	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2924				8:00 AM 2924			8:00 AM 2924	
PM Peak Volume		2:00 PM 2760				2:00 PM 2760			2:00 PM 2760	

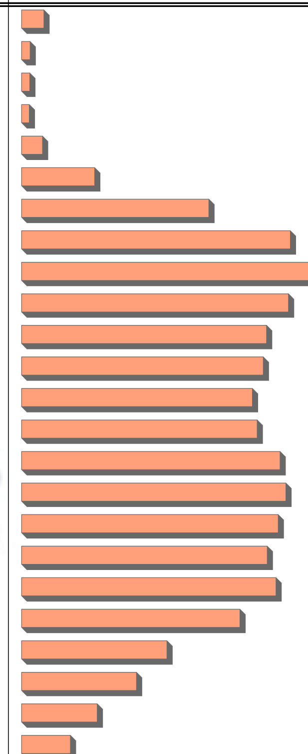


Comments: none

LOCATION: 122. Willow Rd
SPECIFIC LOCATION: 100 ft from Durham St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899489
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		191				191			191	
1:00 AM		73				73			73	
2:00 AM		70				70			70	
3:00 AM		66				66			66	
4:00 AM		179				179			179	
5:00 AM		626				626			626	
6:00 AM		1604				1604			1604	
7:00 AM		2302				2302			2302	
8:00 AM		**2463**				**2463**			**2463**	
9:00 AM		2286				2286			2286	
10:00 AM		2098				2098			2098	
11:00 AM		2070				2070			2070	
12:00 PM		1977				1977			1977	
1:00 PM		2018				2018			2018	
2:00 PM		2214				2214			2214	
3:00 PM		**2264**				**2264**			**2264**	
4:00 PM		2198				2198			2198	
5:00 PM		2104				2104			2104	
6:00 PM		2179				2179			2179	
7:00 PM		1870				1870			1870	
8:00 PM		1245				1245			1245	
9:00 PM		984				984			984	
10:00 PM		648				648			648	
11:00 PM		418				418			418	
Day Total		34147				34147			34147	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2463				8:00 AM 2463			8:00 AM 2463	
PM Peak Volume		3:00 PM 2264				3:00 PM 2264			3:00 PM 2264	



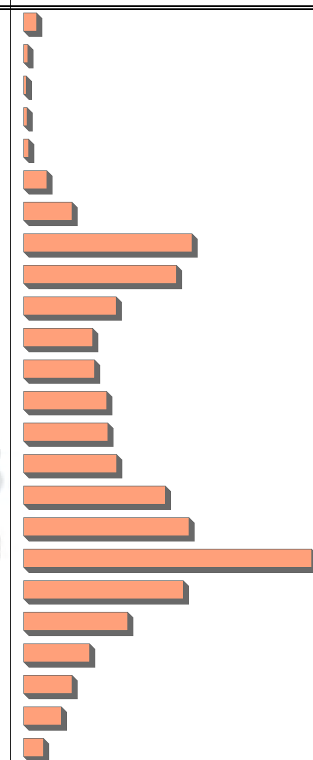
Comments: none

LOCATION: 123. Chilco St
SPECIFIC LOCATION: 100 ft from Terminal Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899490
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		34				34			34
1:00 AM		11				11			11
2:00 AM		7				7			7
3:00 AM		9				9			9
4:00 AM		13				13			13
5:00 AM		61				61			61
6:00 AM		127				127			127
7:00 AM		**442**				**442**			**442**
8:00 AM		401				401			401
9:00 AM		243				243			243
10:00 AM		181				181			181
11:00 AM		186				186			186
12:00 PM		218				218			218
1:00 PM		221				221			221
2:00 PM		244				244			244
3:00 PM		372				372			372
4:00 PM		434				434			434
5:00 PM		**756**				**756**			**756**
6:00 PM		419				419			419
7:00 PM		273				273			273
8:00 PM		173				173			173
9:00 PM		127				127			127
10:00 PM		99				99			99
11:00 PM		52				52			52
Day Total		5103				5103			5103
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		7:00 AM 442				7:00 AM 442			7:00 AM 442
PM Peak Volume		5:00 PM 756				5:00 PM 756			5:00 PM 756

Average Week Profile



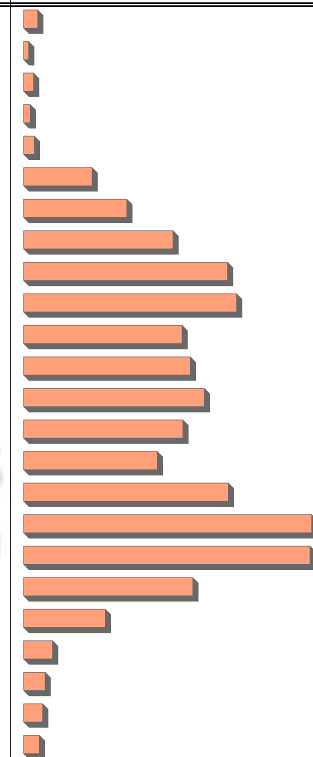
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 124. Chrysler Dr
SPECIFIC LOCATION: 100 ft from Constitution Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899491
DIRECTION: EB/WB
DATE: Oct 15 2014 - Oct 15 2014

Start Time	Mon	Tue	Wed 15-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			17			17			17	
1:00 AM			6			6			6	
2:00 AM			12			12			12	
3:00 AM			8			8			8	
4:00 AM			13			13			13	
5:00 AM			83			83			83	
6:00 AM			125			125			125	
7:00 AM			181			181			181	
8:00 AM			247			247			247	
9:00 AM			**258**			**258**			**258**	
10:00 AM			192			192			192	
11:00 AM			202			202			202	
12:00 PM			219			219			219	
1:00 PM			193			193			193	
2:00 PM			162			162			162	
3:00 PM			248			248			248	
4:00 PM			**349**			**349**			**349**	
5:00 PM			347			347			347	
6:00 PM			205			205			205	
7:00 PM			99			99			99	
8:00 PM			35			35			35	
9:00 PM			26			26			26	
10:00 PM			23			23			23	
11:00 PM			19			19			19	
Day Total			3269			3269			3269	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			9:00 AM 258			9:00 AM 258			9:00 AM 258	
PM Peak Volume			4:00 PM 349			4:00 PM 349			4:00 PM 349	



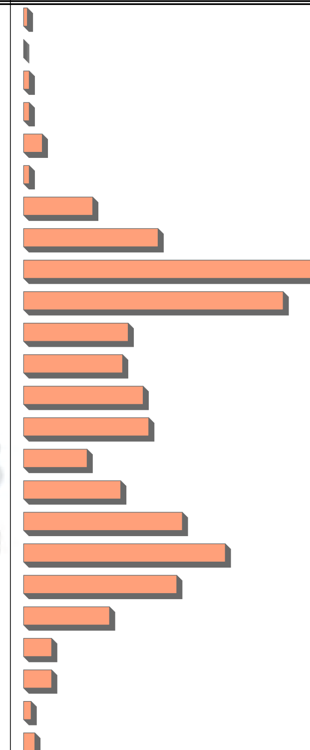
Comments: none

Report generated on 10/24/2014 2:47 PM

LOCATION: 125. Chrysler Dr
SPECIFIC LOCATION: 100 ft from Independence Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899492
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2				2			2	
1:00 AM		0				0			0	
2:00 AM		3				3			3	
3:00 AM		3				3			3	
4:00 AM		10				10			10	
5:00 AM		3				3			3	
6:00 AM		37				37			37	
7:00 AM		72				72			72	
8:00 AM		**154**				**154**			**154**	
9:00 AM		139				139			139	
10:00 AM		56				56			56	
11:00 AM		53				53			53	
12:00 PM		64				64			64	
1:00 PM		67				67			67	
2:00 PM		34				34			34	
3:00 PM		52				52			52	
4:00 PM		85				85			85	
5:00 PM		**108**				**108**			**108**	
6:00 PM		82				82			82	
7:00 PM		46				46			46	
8:00 PM		15				15			15	
9:00 PM		15				15			15	
10:00 PM		4				4			4	
11:00 PM		6				6			6	
Day Total		1110				1110			1110	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 154				8:00 AM 154			8:00 AM 154	
PM Peak Volume		5:00 PM 108				5:00 PM 108			5:00 PM 108	

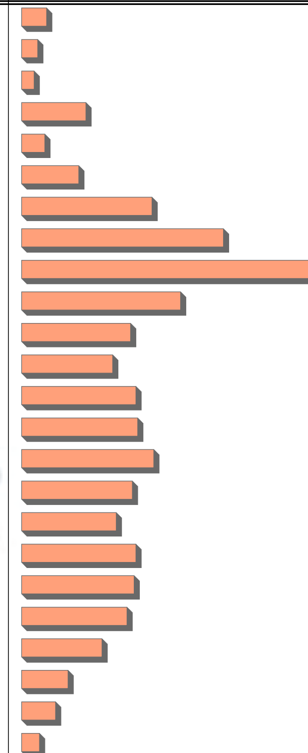


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 126. Adams Dr **QC JOB #:** 12899493
SPECIFIC LOCATION: 100 ft from University Dr **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			14			14			14	
1:00 AM			9			9			9	
2:00 AM			7			7			7	
3:00 AM			36			36			36	
4:00 AM			13			13			13	
5:00 AM			32			32			32	
6:00 AM			73			73			73	
7:00 AM			113			113			113	
8:00 AM			**161**			**161**			**161**	
9:00 AM			89			89			89	
10:00 AM			61			61			61	
11:00 AM			51			51			51	
12:00 PM			64			64			64	
1:00 PM			65			65			65	
2:00 PM			**74**			**74**			**74**	
3:00 PM			62			62			62	
4:00 PM			53			53			53	
5:00 PM			64			64			64	
6:00 PM			63			63			63	
7:00 PM			59			59			59	
8:00 PM			45			45			45	
9:00 PM			26			26			26	
10:00 PM			19			19			19	
11:00 PM			10			10			10	
Day Total			1263			1263			1263	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 161			8:00 AM 161			8:00 AM 161	
PM Peak Volume			2:00 PM 74			2:00 PM 74			2:00 PM 74	



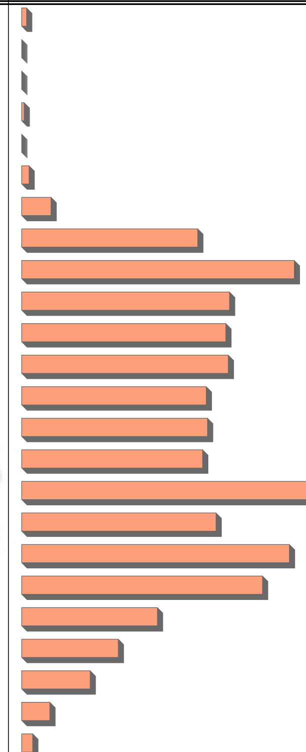
Comments: none

Report generated on 10/24/2014 2:47 PM

LOCATION: 133. Olive St
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899494
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		4				4			4	
1:00 AM		0				0			0	
2:00 AM		0				0			0	
3:00 AM		2				2			2	
4:00 AM		0				0			0	
5:00 AM		6				6			6	
6:00 AM		24				24			24	
7:00 AM		144				144			144	
8:00 AM		**223**				**223**			**223**	
9:00 AM		170				170			170	
10:00 AM		167				167			167	
11:00 AM		169				169			169	
12:00 PM		151				151			151	
1:00 PM		152				152			152	
2:00 PM		148				148			148	
3:00 PM		**236**				**236**			**236**	
4:00 PM		159				159			159	
5:00 PM		219				219			219	
6:00 PM		197				197			197	
7:00 PM		111				111			111	
8:00 PM		79				79			79	
9:00 PM		56				56			56	
10:00 PM		23				23			23	
11:00 PM		9				9			9	
Day Total		2449				2449			2449	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 223				8:00 AM 223			8:00 AM 223	
PM Peak Volume		3:00 PM 236				3:00 PM 236			3:00 PM 236	

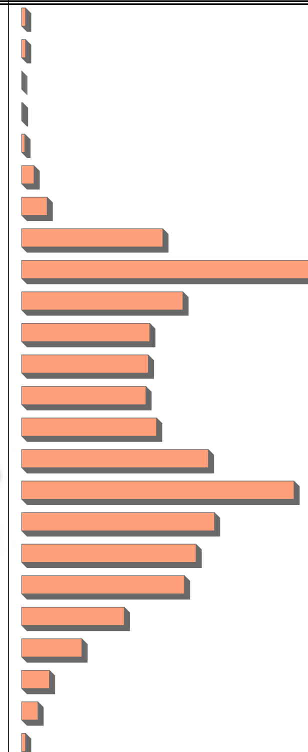


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 134. Olive St **QC JOB #:** 12899495
SPECIFIC LOCATION: 100 ft from Middle Ave **DIRECTION:** NB/SB
CITY/STATE: Menlo Park, CA **DATE:** Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		5				5			5	
1:00 AM		5				5			5	
2:00 AM		0				0			0	
3:00 AM		1				1			1	
4:00 AM		4				4			4	
5:00 AM		16				16			16	
6:00 AM		33				33			33	
7:00 AM		183				183			183	
8:00 AM		**374**				**374**			**374**	
9:00 AM		209				209			209	
10:00 AM		166				166			166	
11:00 AM		164				164			164	
12:00 PM		161				161			161	
1:00 PM		175				175			175	
2:00 PM		242				242			242	
3:00 PM		**353**				**353**			**353**	
4:00 PM		250				250			250	
5:00 PM		226				226			226	
6:00 PM		211				211			211	
7:00 PM		133				133			133	
8:00 PM		78				78			78	
9:00 PM		36				36			36	
10:00 PM		21				21			21	
11:00 PM		5				5			5	
Day Total		3051				3051			3051	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 374				8:00 AM 374			8:00 AM 374	
PM Peak Volume		3:00 PM 353				3:00 PM 353			3:00 PM 353	

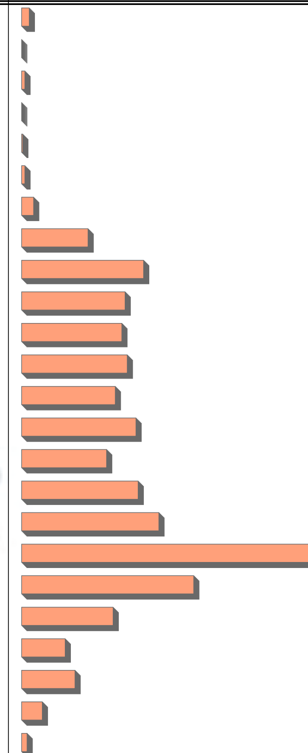


Comments: none

LOCATION: 135. Cambridge Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899496
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		7				7			7	
1:00 AM		0				0			0	
2:00 AM		3				3			3	
3:00 AM		0				0			0	
4:00 AM		1				1			1	
5:00 AM		3				3			3	
6:00 AM		11				11			11	
7:00 AM		61				61			61	
8:00 AM		**112**				**112**			**112**	
9:00 AM		95				95			95	
10:00 AM		92				92			92	
11:00 AM		97				97			97	
12:00 PM		86				86			86	
1:00 PM		105				105			105	
2:00 PM		78				78			78	
3:00 PM		107				107			107	
4:00 PM		126				126			126	
5:00 PM		**264**				**264**			**264**	
6:00 PM		158				158			158	
7:00 PM		84				84			84	
8:00 PM		40				40			40	
9:00 PM		49				49			49	
10:00 PM		19				19			19	
11:00 PM		5				5			5	
Day Total		1603				1603			1603	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 112				8:00 AM 112			8:00 AM 112	
PM Peak Volume		5:00 PM 264				5:00 PM 264			5:00 PM 264	

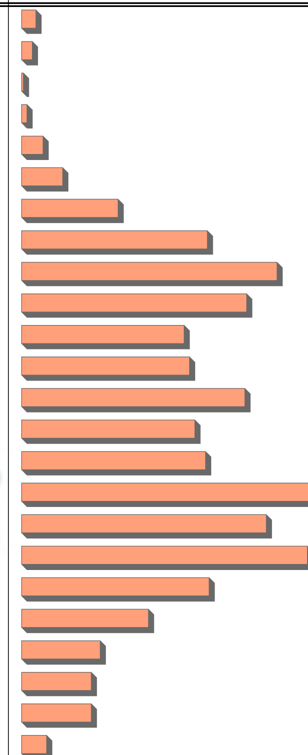


Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 136. Linfield Dr **QC JOB #:** 12899497
SPECIFIC LOCATION: 100 ft from Middlefield Rd **DIRECTION:** EB/WB
CITY/STATE: Menlo Park, CA **DATE:** Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				8		8			8	
1:00 AM				6		6			6	
2:00 AM				1		1			1	
3:00 AM				3		3			3	
4:00 AM				12		12			12	
5:00 AM				23		23			23	
6:00 AM				54		54			54	
7:00 AM				104		104			104	
8:00 AM				**143**		**143**			**143**	
9:00 AM				126		126			126	
10:00 AM				91		91			91	
11:00 AM				94		94			94	
12:00 PM				125		125			125	
1:00 PM				97		97			97	
2:00 PM				103		103			103	
3:00 PM				**161**		**161**			**161**	
4:00 PM				137		137			137	
5:00 PM				160		160			160	
6:00 PM				105		105			105	
7:00 PM				71		71			71	
8:00 PM				44		44			44	
9:00 PM				39		39			39	
10:00 PM				39		39			39	
11:00 PM				14		14			14	
Day Total				1760		1760			1760	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 143		8:00 AM 143			8:00 AM 143	
PM Peak Volume				3:00 PM 161		3:00 PM 161			3:00 PM 161	

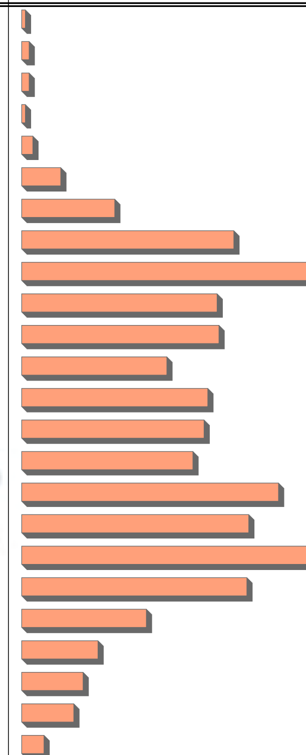


Comments: none

LOCATION: 137. Waverly St
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899498
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				2		2			2	
1:00 AM				4		4			4	
2:00 AM				4		4			4	
3:00 AM				2		2			2	
4:00 AM				6		6			6	
5:00 AM				21		21			21	
6:00 AM				50		50			50	
7:00 AM				114		114			114	
8:00 AM				**155**		**155**			**155**	
9:00 AM				105		105			105	
10:00 AM				106		106			106	
11:00 AM				78		78			78	
12:00 PM				100		100			100	
1:00 PM				98		98			98	
2:00 PM				92		92			92	
3:00 PM				138		138			138	
4:00 PM				122		122			122	
5:00 PM				**153**		**153**			**153**	
6:00 PM				121		121			121	
7:00 PM				67		67			67	
8:00 PM				41		41			41	
9:00 PM				33		33			33	
10:00 PM				28		28			28	
11:00 PM				12		12			12	
Day Total				1652		1652			1652	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 155		8:00 AM 155			8:00 AM 155	
PM Peak Volume				5:00 PM 153		5:00 PM 153			5:00 PM 153	



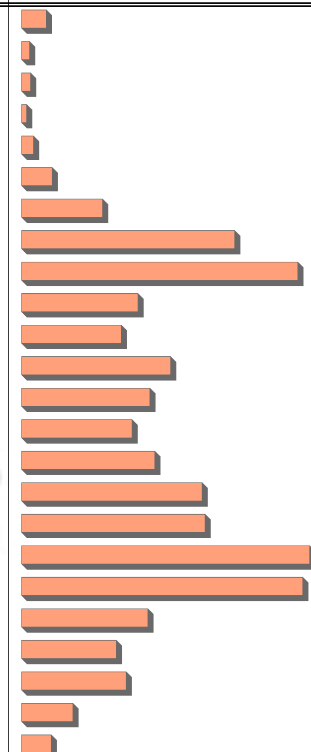
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 30. Hamilton Ave
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899421
DIRECTION: NB/SB
DATE: Dec 09 2014 - Dec 09 2014

Start Time	Mon	Tue 09-Dec-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		25				25			25	
1:00 AM		8				8			8	
2:00 AM		9				9			9	
3:00 AM		5				5			5	
4:00 AM		12				12			12	
5:00 AM		31				31			31	
6:00 AM		82				82			82	
7:00 AM		216				216			216	
8:00 AM		**280**				**280**			**280**	
9:00 AM		118				118			118	
10:00 AM		101				101			101	
11:00 AM		151				151			151	
12:00 PM		130				130			130	
1:00 PM		112				112			112	
2:00 PM		135				135			135	
3:00 PM		183				183			183	
4:00 PM		186				186			186	
5:00 PM		**292**				**292**			**292**	
6:00 PM		285				285			285	
7:00 PM		128				128			128	
8:00 PM		96				96			96	
9:00 PM		106				106			106	
10:00 PM		52				52			52	
11:00 PM		30				30			30	
Day Total		2773				2773			2773	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 280				8:00 AM 280			8:00 AM 280	
PM Peak Volume		5:00 PM 292				5:00 PM 292			5:00 PM 292	



Comments: none

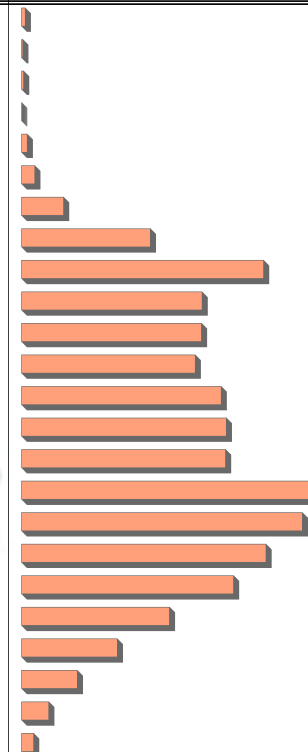
Report generated on 12/11/2014 9:23 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 43. Menlo Ave
SPECIFIC LOCATION: 100 ft from University Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899430
DIRECTION: EB/WB
DATE: Dec 09 2014 - Dec 09 2014

Start Time	Mon	Tue 09-Dec-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		9				9			9	
1:00 AM		3				3			3	
2:00 AM		5				5			5	
3:00 AM		0				0			0	
4:00 AM		14				14			14	
5:00 AM		33				33			33	
6:00 AM		105				105			105	
7:00 AM		322				322			322	
8:00 AM		**605**				**605**			**605**	
9:00 AM		451				451			451	
10:00 AM		450				450			450	
11:00 AM		434				434			434	
12:00 PM		499				499			499	
1:00 PM		512				512			512	
2:00 PM		510				510			510	
3:00 PM		**719**				**719**			**719**	
4:00 PM		702				702			702	
5:00 PM		611				611			611	
6:00 PM		530				530			530	
7:00 PM		370				370			370	
8:00 PM		239				239			239	
9:00 PM		139				139			139	
10:00 PM		68				68			68	
11:00 PM		30				30			30	
Day Total		7360				7360			7360	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 605				8:00 AM 605			8:00 AM 605	
PM Peak Volume		3:00 PM 719				3:00 PM 719			3:00 PM 719	



Comments: none

Appendix D

Bridge Counts

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES
7409 SW Tech Center Dr, Ste B150
Tigard, OR 97223
971-223-0003
www.qualitycounts.net

Site Code: 13113009
Location: Pierce Rd & Ringwood Overcrossing
Date: 10/14/2014

	Pedestrians		Bikes			
	WB	EB	WB	EB	Interval Total	Hour Total
0:00	0	0	0	0	0	
0:15	0	0	0	0	0	
0:30	0	0	0	0	0	
0:45	0	0	0	0	0	0
1:00	0	0	0	0	0	0
1:15	0	0	0	0	0	0
1:30	0	0	0	0	0	0
1:45	0	0	0	0	0	0
2:00	0	0	0	0	0	0
2:15	0	0	0	0	0	0
2:30	0	0	0	0	0	0
2:45	0	0	0	0	0	0
3:00	0	0	0	0	0	0
3:15	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:45	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:30	0	0	0	0	0	0
4:45	0	0	0	0	0	0
5:00	0	0	0	0	0	0
5:15	0	0	0	0	0	0
5:30	0	0	0	0	0	0
5:45	0	0	0	0	0	0
6:00	0	0	0	0	0	0
6:15	0	0	0	0	0	0
6:30	0	2	1	0	3	3
6:45	0	1	3	3	7	10
7:00	0	1	2	0	3	13
7:15	1	3	3	7	14	27
7:30	0	2	3	7	12	36
7:45	1	4	5	3	13	42
8:00	3	11	6	5	25	64
8:15	2	2	9	2	15	65
8:30	2	17	10	16	45	98
8:45	1	10	10	8	29	114
9:00	3	17	6	13	39	128
9:15	0	2	4	5	11	124
9:30	1	0	5	1	7	86
9:45	1	1	5	5	12	69
10:00	1	1	2	1	5	35
10:15	0	1	1	0	2	26
10:30	0	0	4	3	7	26
10:45	3	0	1	1	5	19
11:00	1	0	0	2	3	17
11:15	0	0	1	1	2	17
11:30	0	0	0	0	0	10
11:45	2	0	0	0	2	7

	Pedestrians		Bikes			
	WB	EB	WB	EB	Interval Total	Hour Total
12:00	0	0	2	0	2	6
12:15	0	0	1	1	2	6
12:30	0	0	0	0	0	6
12:45	0	1	0	0	1	5
13:00	0	2	0	1	3	6
13:15	0	0	0	2	2	6
13:30	0	0	1	1	2	8
13:45	0	1	1	1	3	10
14:00	1	3	1	0	5	12
14:15	0	0	0	0	0	10
14:30	0	1	2	3	6	14
14:45	0	2	0	3	5	16
15:00	2	1	1	0	4	15
15:15	0	2	1	9	12	27
15:30	2	51	1	8	62	83
15:45	1	31	3	5	40	118
16:00	2	7	0	0	9	123
16:15	4	5	2	2	13	124
16:30	0	0	2	1	3	65
16:45	0	3	1	3	7	32
17:00	0	3	7	9	19	42
17:15	0	5	9	5	19	48
17:30	0	1	2	6	9	54
17:45	0	4	6	1	11	58
18:00	2	2	3	2	9	48
18:15	0	2	6	3	11	40
18:30	1	2	3	2	8	39
18:45	0	1	7	3	11	39
19:00	0	5	6	2	13	43
19:15	1	1	4	0	6	38
19:30	0	1	4	0	5	35
19:45	2	0	3	0	5	29
20:00	0	0	3	0	3	19
20:15	2	2	1	0	5	18
20:30	0	0	0	0	0	13
20:45	0	0	0	0	0	8
21:00	0	0	0	0	0	5
21:15	0	0	1	0	1	1
21:30	0	0	1	0	1	2
21:45	0	0	2	2	4	6
22:00	0	0	1	1	2	8
22:15	0	0	2	1	3	10
22:30	0	0	0	2	2	11
22:45	0	0	0	2	2	9
23:00	0	0	0	0	0	7
23:15	0	0	0	0	0	4
23:30	0	0	0	0	0	2
23:45	0	1	0	0	1	1
Total	42	215	171	164		

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

7409 SW Tech Center Dr, Ste B150
Tigard, OR 97223
971-223-0003
www.qualitycounts.net

Site Code: 13113010
Location: Willow Pl Bike Bridge
Date: 10/14/2014

	Pedestrians		Bikes			
	SB	NB	SB	NB	Interval Total	Hour Total
0:00	0	0	0	2	2	
0:15	0	0	0	0	0	
0:30	0	0	0	0	0	
0:45	0	0	0	1	1	3
1:00	0	0	0	0	0	1
1:15	0	0	0	0	0	1
1:30	0	0	0	1	1	2
1:45	0	1	0	0	1	2
2:00	0	0	0	0	0	2
2:15	0	0	0	0	0	2
2:30	0	0	0	0	0	1
2:45	0	0	0	0	0	0
3:00	0	0	0	0	0	0
3:15	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:45	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:30	0	0	1	0	1	1
4:45	0	0	0	0	0	1
5:00	0	1	0	0	1	2
5:15	0	0	0	0	0	2
5:30	0	0	1	0	1	2
5:45	2	0	2	0	4	6
6:00	1	0	5	0	6	11
6:15	3	3	4	1	11	22
6:30	1	0	2	3	6	27
6:45	1	1	4	2	8	31
7:00	1	1	3	3	8	33
7:15	4	5	7	9	25	47
7:30	2	8	15	5	30	71
7:45	2	3	14	7	26	89
8:00	5	3	18	10	36	117
8:15	0	6	9	10	25	117
8:30	4	2	18	11	35	122
8:45	8	6	22	4	40	136
9:00	10	15	45	16	86	186
9:15	6	3	12	10	31	192
9:30	1	6	23	3	33	190
9:45	5	4	7	5	21	171
10:00	3	1	6	6	16	101
10:15	2	2	11	2	17	87
10:30	5	1	6	0	12	66
10:45	1	5	3	4	13	58
11:00	2	2	5	3	12	54
11:15	5	2	3	1	11	48
11:30	3	4	2	4	13	49
11:45	6	0	1	0	7	43

	Pedestrians		Bikes			
	SB	NB	SB	NB	Interval Total	Hour Total
12:00	5	5	2	5	17	48
12:15	4	2	5	4	15	52
12:30	2	4	4	4	14	53
12:45	1	8	1	4	14	60
13:00	3	4	2	1	10	53
13:15	1	6	3	2	12	50
13:30	2	4	1	1	8	44
13:45	3	5	3	4	15	45
14:00	1	5	2	2	10	45
14:15	3	0	1	4	8	41
14:30	6	1	1	2	10	43
14:45	1	5	1	3	10	38
15:00	3	1	4	3	11	39
15:15	4	2	4	5	15	46
15:30	4	3	3	8	18	54
15:45	1	4	4	4	13	57
16:00	5	2	8	7	22	68
16:15	2	1	8	5	16	69
16:30	6	7	6	6	25	76
16:45	8	4	3	7	22	85
17:00	3	2	6	9	20	83
17:15	3	1	5	9	18	85
17:30	3	1	8	14	26	86
17:45	4	2	10	16	32	96
18:00	0	2	11	13	26	102
18:15	4	2	6	16	28	112
18:30	4	4	6	16	30	116
18:45	1	5	9	16	31	115
19:00	2	5	3	12	22	111
19:15	1	1	4	9	15	98
19:30	5	1	2	10	18	86
19:45	2	1	3	4	10	65
20:00	1	2	0	2	5	48
20:15	0	1	4	5	10	43
20:30	0	2	3	3	8	33
20:45	0	0	1	3	4	27
21:00	0	3	2	3	8	30
21:15	0	3	0	2	5	25
21:30	0	0	2	2	4	21
21:45	0	1	1	2	4	21
22:00	0	2	0	3	5	18
22:15	0	5	0	2	7	20
22:30	0	0	0	1	1	17
22:45	0	1	2	2	5	18
23:00	0	0	0	1	1	14
23:15	0	0	0	1	1	8
23:30	1	1	0	0	2	9
23:45	0	1	0	1	2	6
Total	182	207	403	381		

Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

7409 SW Tech Center Dr, Ste B150
Tigard, OR 97223
971-223-0003
www.qualitycounts.net

Site Code: 13113011
Location: San Mateo Bike Bridge
Date: 10/21/2014

	Pedestrians		Bikes			
	NB	SB	NB	SB	Interval Total	Hour Total
0:00	0	0	0	0	0	
0:15	0	0	0	0	0	
0:30	0	0	0	0	0	
0:45	0	0	0	0	0	0
1:00	0	0	0	0	0	0
1:15	0	0	0	0	0	0
1:30	0	0	0	0	0	0
1:45	0	0	0	0	0	0
2:00	0	0	0	0	0	0
2:15	0	0	0	0	0	0
2:30	0	0	0	0	0	0
2:45	0	0	0	0	0	0
3:00	0	0	0	0	0	0
3:15	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:45	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:30	0	0	0	0	0	0
4:45	0	0	0	0	0	0
5:00	0	0	1	1	2	2
5:15	0	0	0	0	0	2
5:30	0	0	3	1	4	6
5:45	0	0	0	0	0	6
6:00	0	0	1	0	1	5
6:15	0	0	1	2	3	8
6:30	1	1	0	0	2	6
6:45	0	0	2	3	5	11
7:00	0	0	1	1	2	12
7:15	0	1	2	1	4	13
7:30	0	0	1	0	1	12
7:45	0	1	6	1	8	15
8:00	0	0	8	0	8	21
8:15	0	0	3	3	6	23
8:30	0	0	5	1	6	28
8:45	0	1	5	1	7	27
9:00	0	0	2	0	2	21
9:15	1	2	5	2	10	25
9:30	0	0	7	0	7	26
9:45	2	0	3	1	6	25
10:00	0	0	2	0	2	25
10:15	0	2	1	1	4	19
10:30	0	0	0	0	0	12
10:45	0	0	2	0	2	8
11:00	0	0	0	0	0	6
11:15	0	0	2	0	2	4
11:30	0	0	1	0	1	5
11:45	0	0	0	0	0	3

	Pedestrians		Bikes			
	NB	SB	NB	SB	Interval Total	Hour Total
12:00	1	0	0	0	1	4
12:15	0	0	0	0	0	2
12:30	0	0	0	1	1	2
12:45	1	0	0	2	3	5
13:00	0	0	0	0	0	4
13:15	2	0	2	0	4	8
13:30	0	0	0	0	0	7
13:45	0	2	0	0	2	6
14:00	0	0	0	0	0	6
14:15	0	0	0	0	0	2
14:30	0	0	0	0	0	2
14:45	0	1	0	1	2	2
15:00	0	0	1	2	3	5
15:15	0	0	0	0	0	5
15:30	0	0	0	1	1	6
15:45	0	0	0	1	1	5
16:00	0	2	0	0	2	4
16:15	2	0	0	2	4	8
16:30	0	0	2	1	3	10
16:45	0	0	0	0	0	9
17:00	0	0	1	1	2	9
17:15	0	0	3	5	8	13
17:30	0	0	0	9	9	19
17:45	0	0	3	10	13	32
18:00	0	1	0	3	4	34
18:15	0	0	4	5	9	35
18:30	0	1	0	4	5	31
18:45	2	0	0	2	4	22
19:00	0	0	1	3	4	22
19:15	0	0	0	2	2	15
19:30	0	0	0	0	0	10
19:45	0	0	0	0	0	6
20:00	0	0	0	1	1	3
20:15	1	0	0	1	2	3
20:30	0	0	1	0	1	4
20:45	0	0	0	0	0	4
21:00	0	0	0	0	0	3
21:15	0	0	0	0	0	1
21:30	0	1	0	0	1	1
21:45	0	0	0	1	1	2
22:00	0	0	0	0	0	2
22:15	0	0	0	0	0	2
22:30	0	0	0	0	0	1
22:45	0	0	0	0	0	0
23:00	0	0	0	0	0	0
23:15	0	0	0	0	0	0
23:30	0	0	0	0	0	0
23:45	0	0	0	0	0	0
Total	13	16	82	77		

7409 SW Tech Center Dr, Ste B150
Tigard, OR 97223
971-223-0003
www.qualitycounts.net

Site Code: 13113012
Location: Alma St Bike Bridge
Date: 10/14/2014

	Pedestrians		Bikes			
	SB	NB	SB	NB	Interval Total	Hour Total
0:00	0	0	0	2	2	
0:15	0	0	0	1	1	
0:30	0	1	0	1	2	
0:45	1	1	0	0	2	7
1:00	0	0	0	1	1	6
1:15	0	0	0	0	0	5
1:30	0	0	0	0	0	3
1:45	0	0	0	0	0	1
2:00	0	0	0	0	0	0
2:15	0	0	0	0	0	0
2:30	0	0	0	0	0	0
2:45	0	0	0	0	0	0
3:00	0	0	0	0	0	0
3:15	0	0	0	0	0	0
3:30	0	0	0	0	0	0
3:45	0	0	0	0	0	0
4:00	0	0	0	0	0	0
4:15	0	0	0	0	0	0
4:30	0	0	0	0	0	0
4:45	0	0	0	0	0	0
5:00	0	0	0	0	0	0
5:15	0	0	2	0	2	2
5:30	1	2	0	1	4	6
5:45	1	0	2	0	3	9
6:00	2	3	2	0	7	16
6:15	14	3	4	1	22	36
6:30	1	0	0	0	1	33
6:45	5	4	5	2	16	46
7:00	3	2	2	2	9	48
7:15	7	0	2	7	16	42
7:30	4	4	7	7	22	63
7:45	9	2	7	5	23	70
8:00	3	7	10	0	20	81
8:15	7	3	9	3	22	87
8:30	6	6	14	6	32	97
8:45	1	1	14	7	23	97
9:00	9	2	16	3	30	107
9:15	1	4	6	5	16	101
9:30	10	1	10	5	26	95
9:45	2	1	10	9	22	94
10:00	6	0	11	1	18	82
10:15	6	0	4	3	13	79
10:30	2	1	5	4	12	65
10:45	4	1	4	0	9	52
11:00	1	4	2	1	8	42
11:15	4	1	1	2	8	37
11:30	8	6	3	2	19	44
11:45	4	1	3	2	10	45

	Pedestrians		Bikes			
	SB	NB	SB	NB	Interval Total	Hour Total
12:00	3	3	1	5	12	49
12:15	3	0	2	3	8	49
12:30	2	7	2	4	15	45
12:45	4	4	4	1	13	48
13:00	1	1	1	0	3	39
13:15	4	3	5	2	14	45
13:30	2	4	6	3	15	45
13:45	1	2	4	2	9	41
14:00	2	3	1	4	10	48
14:15	2	1	1	2	6	40
14:30	1	1	2	7	11	36
14:45	4	0	3	5	12	39
15:00	0	0	3	4	7	36
15:15	0	0	6	2	8	38
15:30	3	1	4	4	12	39
15:45	1	1	0	6	8	35
16:00	4	1	2	6	13	41
16:15	1	4	5	4	14	47
16:30	1	1	6	11	19	54
16:45	1	1	5	13	20	66
17:00	3	3	4	14	24	77
17:15	4	2	3	10	19	82
17:30	4	11	10	10	35	98
17:45	1	7	4	12	24	102
18:00	4	7	7	8	26	104
18:15	4	6	3	19	32	117
18:30	5	7	3	9	24	106
18:45	7	8	3	16	34	116
19:00	5	2	4	5	16	106
19:15	2	3	3	8	16	90
19:30	1	6	2	12	21	87
19:45	0	5	2	1	8	61
20:00	1	3	1	6	11	56
20:15	0	1	0	3	4	44
20:30	2	5	1	3	11	34
20:45	1	2	3	4	10	36
21:00	3	3	4	4	14	39
21:15	3	0	0	1	4	39
21:30	2	1	1	1	5	33
21:45	0	1	1	2	4	27
22:00	1	2	1	0	4	17
22:15	3	0	1	2	6	19
22:30	1	0	0	3	4	18
22:45	0	3	1	1	5	19
23:00	0	0	0	2	2	17
23:15	1	0	1	0	2	13
23:30	0	0	0	1	1	10
23:45	0	1	0	1	2	7
Total	220	188	281	329		

APPENDIX E:
AIR QUALITY AND GREENHOUSE GAS DATA

CONNECTMENLO - GHG EMISSIONS INVENTORY & FORECAST

Notes: Based on emissions generated by land uses in the City and SOI. Excludes lifecycle emissions, municipal emissions that are not associated with land uses (e.g., utility operations), and stationary sources that are regulated by BAAQMD.

	MTCO$_2$e/Year					
SECTORS	**Existing**	**Percent of Total**	**AB 32 Year 2020**	**Percent of Total**	**2040 Maximum Citywide Buildout**	**Percent of Total**
Transportation	98,429	36%	97,661	36%	87,933	26%
Residential (Natural Gas and Electricity)	55,354	20%	58,735	22%	75,776	22%
Nonresidential (Natural Gas and Electricity)	100,846	37%	96,820	36%	151,059	45%
City (Natural Gas and Electricity)	1,581	1%	1,455	1%	2,070	1%
Waste (fugitive)	3,546	1%	4,047	1%	5,758	2%
Water/Wastewater	1,291	0%	1,083	0%	1,541	0%
Other - Offroad Equipment	12,696	5%	11,768	4%	13,389	4%
Total Community Emissions	273,743	100%	271,570	100%	337,526	100%
Service Population	63,800		72,830		103,600	
MTCO$_2$e/SP	4.29		3.73		3.26	
BAAQMD GHG GP Threshold (PLAN LEVEL)	NA		6.6		3.2	
BAAQMD Permitted Sources (not included in Total)	49,401					

		Change from Existing MTCO$_2$e			
SECTORS		**AB 32 Year 2020**	**Percent Change**	**2040 Maximum Citywide Buildout**	**Percent Change**
Transportation		-768	-1%	-10,496	-11%
Residential (Natural Gas and Electricity)		3,381	6%	20,421	37%
Nonresidential* (Natural Gas and Electricity)		-4,026	-4%	50,213	50%
City (Natural Gas and Electricity)		-126	-8%	488	31%
Waste		502	14%	2,212	62%
Water/Wastewater		-207	-16%	250	19%
Other - Offroad Equipment		-928	-7%	693	5%
Total Community Emissions		-2,173	-1%	63,783	23%

Notes:

Emissions forecasts for the non-transportation sectors are based on changes in housing units (residential energy), population (area sources,) employment (nonresidential energy, area sources), or service population (waste, water/wastewater).

Transportation. EMFAC2014 (exhaust) and TJKM using the regional model.

Energy. Energy use based on a three year (2011-2013) average provided by PG&E.

Water/Wastewater. Includes fugitive emissions from wastewater processing associated with water/wastewater treatment and conveyance. Water use and wastewater demand is estimated based on rates from the WSA.

Waste. CARB Landfill Emissions Tool Version 1_2013 and CalRecycle. Forecast waste generation based on three year average (2012-2014) waste commitment for the City of Menlo Park obtained from CalRecycle. Assumes 75 percent of fugitive GHG emissions are captured within the landfill's Landfill Gas Capture System with a landfill gas capture efficiency of 75%. The Landfill gas capture efficiency is based on the California Air Resources Board's (CARB) Local Government Operations Protocol (LGOP), Version 1.1.

Other Sources. OFFROAD2007. Estimated based on population (Landscaping), employment (Light Commercial Equipment), and construction building permits (Construction) for Menlo Park as a percentage of San Mateo County. Excludes BAAQMD permitted sources. Daily construction emissions multiplied by 347 days/year to account for reduced/limited construction activity on weekends and holidays.

Lifecycle: The GHG emissions inventory for CEQA is a combination of a geographic and consumption-based emissions inventory. While the BAAQMD is updating the regional emissions inventory for the Bay Area utilizing a consumption-based emissions methodology, life cycle emissions are not included in the GHG emissions analysis for CEQA purposes in accordance with the Governor's Office of Planning and Research (SB 97 Final Statement of Reasons) and the California Air Pollution Control Officer's Association (GHG Thresholds Whitepaper).

GHG emissions are based on the global warming potentials (GWPs) contained within the Intergovernmental Panel on Climate Change's (IPCC) Second Assessment Report. The IPCC has since come out with updated GWPs in their Fourth (2007) and Fifth (2013) Assessment Reports. However, BAAQMD's per capita significance criteria is based on the older GWPs in the SAR. Consequently, to maintain consistency with the modeling and thresholds currently used for CEQA assessments, this inventory utilizes the GWPs in IPCC's Second Assessment Report.

Permitted sources are based on data from BAAQMD for year 2011 emissions. This includes the Bayfront Park Landfill Emissions.

CONNECTMENLO - CRITERIA AIR POLLUTANT INVENTORY

	Existing - lbs/day			
SECTORS	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	87	302	99	42
Energy - Residential (Natural Gas)	22	188	15	15
Energy - Nonresidential (Natural Gas)	35	317	24	24
Energy - City (Natural Gas)	0	4	0	0
Area Sources (Consumer Products)	470	-	-	-
Area Sources (Landscaping, Light Commercial Equipment)	136	130	15	15
Other (Construction Equipment)	69	443	27	27
Total	819	1,383	180	123
	2014 - tons/year			
SECTORS	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	15	52	17	7
Energy - Residential (Natural Gas)	4	34	3	3
Energy - Nonresidential (Natural Gas)	6	58	4	4
Energy - City (Natural Gas)	0	1	0	0
Area Sources (Consumer Products)	86	-	-	-
Area Sources (Landscaping, Light Commercial Equipment)	25	24	3	3
Other (Construction Equipment)	12	77	5	5
Total	148	246	32	22

	Existing in 2040 Land Uses - lbs/day			
SECTORS	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	39	62	95	38
Energy - Residential (Natural Gas)	22	188	15	15
Energy - Nonresidential (Natural Gas)	35	317	24	24
Energy - City (Natural Gas)	0	4	0	0
Area Sources (Consumer Products)	470	-	-	-
Area Sources (Landscaping, Light Commercial Equipment)	136	130	15	15
Other (Construction Equipment)	69	443	27	27
Total	771	1,143	177	120
	Existing in 2040 - tons/year			
SECTORS	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	7	11	16	7
Energy - Residential (Natural Gas)	4	34	3	3
Energy - Nonresidential (Natural Gas)	6	58	4	4
Energy - City (Natural Gas)	0	1	0	0
Area Sources (Consumer Products)	86	-	-	-
Area Sources (Landscaping, Light Commercial Equipment)	25	24	3	3
Other (Construction Equipment)	12	77	5	5
Total	140	204	31	21

CONNECTMENLO - CRITERIA AIR POLLUTANT INVENTORY

	2040 Maximum Citywide Buildout			
SECTORS	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	61	97	148	60
Energy - Residential (Natural Gas)	33	286	23	23
Energy - Nonresidential (Natural Gas)	60	546	41	41
Energy - City (Natural Gas)	1	6	0	0
Area Sources (Consumer Products)	830	-	-	-
Area Sources (Landscaping, Light Commercial Equipment)	219	220	25	25
Other (Construction Equipment)	69	443	27	27
Total	1,273	1,597	265	176
Change from 2014 Land Uses	501	454	88	57

	2040 Maximum Citywide Buildout			
SECTORS	**ROG**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**
Transportation	11	17	26	10
Energy - Residential (Natural Gas)	6	52	4	4
Energy - Nonresidential (Natural Gas)	11	100	8	8
Energy - City (Natural Gas)	0	1	0	0
Area Sources (Consumer Products)	151	-	-	-
Area Sources (Landscaping, Light Commercial Equipment)	40	40	5	5
Other (Construction Equipment)	12	77	5	5
Total	231	287	47	31
Change from 2015 Land Uses	91	83	16	10

Notes:

Transportation. EMFAC2014 (exhaust+ tire and break wear) and TJKM using the regional model.

Energy. Energy use based on a three year (2011-2013) average provided by PG&E.

Area Sources. OFFROAD2007. Estimated based on population (Landscaping) and employment (Light Commercial Equipment) for Menlo Park as a percentage of San Mateo County. Excludes BAAQMD permitted sources. Does not include emissions from wood-burning fireplaces.

Other Sources. OFFROAD2007. Estimated based on construction building permits (Construction) for Menlo Park as a percentage of San Mateo County. Daily construction emissions multiplied by 347 days/year to account for reduced/limited construction activity on weekends and holidays.

Comparison of the Change in Service Population and VMT in the Plan Area

Category	Existing	2040 Maximum Citywide Buildout	Existing General Plan
Population	32,900	50,350	38,780
Percent Change in Population	NA	53.0%	17.9%
Employment	30,900	53,250	41,200
Total Service Population (SP)	63,800	103,600	79,980
Percent Change in SP	NA	62.4%	25.4%
VMT/Day (with RTAC)	934,722	1,449,338	1,359,431
Percent Change in VMT per day	NA	55.1%	45.4%
VMT/Person/Day	28.41	28.79	35.05
Percent Change in VMT/SP/Day	NA	1.3%	23.4%
VMT per SP per Day	14.65	13.99	17.00
Percent Change in VMT/SP/Day	NA	-4.5%	16.0%

STATEWIDE TRAJECTORY FOR INTERIM GHG TARGET

	CARB 2008 Scoping Plan (MMTCO$_2$e)		CARB 2014 Inventory Update (MMTCO$_2$e)	
	Second Assessment Report GWP	Reduction to 1990	Fourth Assessment Report GWP	Reduction to 1990
1990	433.29	Not Applicable	431	Not Applicable
2000	457.29	5%	466.32	8%
2001	473.49	8%	481.23	10%
2002	468.54	8%	480.32	10%
2003	467.42	7%	483.05	11%
2004	484.40	11%	492.86	13%
2005	491.40	12%	485.13	11%
2006	498.40	13%	482.52	11%
2007	505.40	14%	489.16	12%
2008	512.40	15%	487.1	12%
2009	Not Available		458.44	6%
2010	Not Available		453.06	5%
2011	Not Available		450.94	4%
2012	Not Available		458.68	6%
2013	Not Available		459.28	6%
Source:	CARB 2008		Source:	CARB 2015

Note: the 1990 emissions limit was set at 427 MMTCO^{2}e (426.60) based on the 2007 Inventory. The target includes the net reductions from sinks and rangelands of 6.69 MMTCO2e for a total of 433.29 MMTCO^{2}e in 1990. The Fourth Assessment Report GWPs were applied to the sinks and rangelands category is not available in the First Update to the Scoping Plan. Therefore, the percent reduction from 1990 for the 2014 Inventory Update is conservative.

FORECASTING THE POST-2020 GHG REDUCTION TARGETS - EFFICIENCY METRIC

	TARGET SAR		TARGET AR4	
2030	259.97	40%	258.60	40%
2050	86.66	80%	86.20	80%
2035	216.64	50%	215.50	50%
2040	173.32	60%	172.40	60%

Source: Based on CARB's Scoping Plan and Updated GHG Emissions Inventories

2035 CALIFORNIA SERVICE POPULATION (ESTIMATE)

Employment		
	All Occupations Estimated Employment	
2012	16,281,000	
2022	18,708,600	
2020	18,223,080	Forecast
2030	20,650,680	Forecast
2035	21,864,480	Forecast
2040	23,078,280	Forecast
2050	25,505,880	Forecast

California Employment Development Department, Labor Market Information Division. 2014, September 19. California Occupational Employment Projections 2012-2022.
http://www.labormarketinfo.edd.ca.gov/data/employment-projections.html

Population	
2020	40,619,346
2030	44,085,600
2035	45,747,645
2040	47,233,240
2050	49,779,362

California Department of Finance. 2014, December. Report P-1 (County): State and County Total Population Projections, 2010-2060 (5 -year increments).
http://www.dof.ca.gov/research/demographic/reports/projections/P-1/

Service Population (SP)		Plan Level Efficiency Target SAR	Plan Level Efficiency Target AR4
2020 SP	58,842,426	7.4	7.3
2030 SP	64,736,280	4.0	4.0
2035 SP	67,612,125	3.2	3.2
2040 SP	70,311,520	2.5	2.5
2050 SP	75,285,242	1.2	1.1

	PLAN LEVEL 2020 MTCO2e	PLAN LEVEL 2030 MTCO2e/SP	PLAN LEVEL 2035 MTCO2e/SP	PLAN LEVEL 2050 MTCO2e/SP
SAR	7.4	4.0	3.2	1.2
AR4	7.3	4.0	3.2	1.1

Non-Transportation Model Inputs for the ConnectMenlo (General Plan Update)

Based on the Maximum Citywide 2040 Buildout

	City + SOI		Estimate
	CEQA Baseline	**Maximum Citywide 2040 Buildout**	**AB 32 Target Year**
	2015	2040	2020 (ABAG)
Housing Units	13,100	19,880	15,409
Population	32,900	50,350	38,700
Hotel Rooms	570	1,490	
Non-Residential SQFT	14,600,000	20,200,000	16,126,149
Employment	30,900	53,250	34,130
Service Population	**63,800**	**103,600**	**72,830**
		2.533	
Jobs-Housing	2.4	2.7	

Growth Rates from Baseline	2040	2020 (ABAG)
Housing Growth Rate	1.52	1.18
Population Growth Rate	1.53	1.18
Employment Growth Rate	1.72	1.10
Service Population Growth Rate	1.62	1.14

BAU Forecasts

Electricity Use	2015	2040	2020 (ABAG)
Residential Electricity (Kwh)[1]	76,947,221	116,771,813	90,512,384
Nonresidential Electricity (Kwh)[2]	187,193,847	322,591,338	206,761,359
City (Kwh)[3]	4,352,648	7,067,936	4,968,704
Total Electricity (Kwh)	268,493,715	446,431,087	302,242,448

Source

1 Provided by PG&E. Projected based on increase in housing units. Based on a three-year average of 2011 to 2013 data.

2 Provided by PG&E. Projected based on increase in employment. Based on a three-year average of 2011 to 2013 data.

3 Provided by PG&E. Projected based on increase in Service Population. Based on a three-year average of 2011 to 2013 data.

BAU Forecasts

Natural Gas Use	2015	2040	2020 (ABAG)
Residential Natural Gas (Therms)[1]	7,463,042	11,325,593	8,778,715
Nonresidential Natural Gas (Therms)[2]	11,793,941	20,324,510	13,026,770
City Natural Gas (Therms)[3]	130,575	212,031	149,056
Total Natural Gas (Therms)	19,387,558	31,862,134	21,954,541

Source

1 Provided by PG&E. Projected based on increase in housing units. Based on a three-year average of 2011 to 2013 data.

2 Provided by PG&E. Projected based on increase in employment. Based on a three-year average of 2011 to 2013 data.

3 Provided by PG&E. Projected based on increase in Service Population. Based on a three-year average of 2011 to 2013 data.

Non-Transportation Model Inputs for the ConnectMenlo (General Plan Update)

Based on the Maximum Citywide 2040 Buildout

	City + SOI		Estimate
	CEQA Baseline	Maximum Citywide 2040 Buildout	AB 32 Target Year
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		2.533	
Jobs-Housing	2.4	2.7	

Growth Rates from Baseline	2040	2020 (ABAG)
Housing Growth Rate	1.52	1.18
Population Growth Rate	1.53	1.18
Employment Growth Rate	1.72	1.10
Service Population Growth Rate	1.62	1.14

	BAU Forecasts		
Water Conveyance	2015	2040	2020 (ABAG)
Water (AF/year)	3,879	6,299	
Water (gallons/year)	1,263,914,632	2,052,375,485	

Source

1 Based on the residential and non-residential water demand rates in the Water Supply Evaluation

	BAU Forecasts		
Wastewater Treatment	2015	2040	2020 (ABAG)
Wastewater (gallons/year)	1,138,454,829	1,848,650,788	
Wastewater (gallons/day)	3,119,054	5,064,797	0

Source

1 Indoor water use is 100 percent wastewater.

	BAU Forecasts		
Solid Waste Generation	2015	2040	2020 (ABAG)
Waste Generation (tons/year)	23,652	38,407	27,000
Waste Generation ADC (tons/year)	3,805	6,178	4,343
Total Waste Disposal (tons/year)	27,457	44,586	31,343

Source

1 CalRecycle. Disposal Reporting System (DRS): Jurisdiction Disposal and Alternative Daily Cover (ADC) Tons by Facility. Accessed January 2016. http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx. 2015 is based on an average 2012-2014 disposal rates. Projected based on Service Population.

BAAQMD 2011 INVENTORY, MENLO PARK STATIONARY SOURCES

Source: BAAQMD, Accessed January 2016, Reports, Data, and Documents, http://www.baaqmd.gov/research-and-data/emission-inventory/maps-data-and-documents

Plant #	Plant Name	Plant Address	City	County	Zipcode	Biogenic	Non-Biogenic	Total
19890	CALTRANS	Route 101	Menlo Park	San Mateo	94025	0	1	1
3499	City of Menlo Park	Marsh Road	Menlo Park	San Mateo	94025	3,216	146	3,361
18148	Conor Medsystems, c/o Cordis West Coast	1003 Hamilton Court	Menlo Park	San Mateo	94025	0	4	4
9573	Diageo North America, Inc	151 Commonwealth Drive	Menlo Park	San Mateo	94025	0	556	556
561	ECI Painting, Inc	165 Constitution Drive	Menlo Park	San Mateo	94025	0	16	16
20668	Facebook, Inc	1601 Willow Road	Menlo Park	San Mateo	94025	0	7	7
11668	Gas Recovery Systems, Inc	Marsh Road	Menlo Park	San Mateo	94025	11,022	11,771	22,793
19243	General Service Admin.	345 Middlefield Road	Menlo Park	San Mateo	94025	0	4,399	4,399
16110	Geron Corp.	230 Constitution Drive	Menlo Park	San Mateo	94025	0	9	9
17428	Henry J Kaiser Family Foundation (Quadrus Bldg 8)	2498 Sand Hill Road	Menlo Park	San Mateo	94025	0	1	1
18216	Infolmage	141 Jefferson Drive	Menlo Park	San Mateo	94025	0	0	0
3011	IPT SRI Cogeneration Inc	333 Ravenswood Drive	Menlo Park	San Mateo	94025	0	26,022	26,022
2877	L-3 Comms. Randtron Antenna Systems	130 Constitution Drive	Menlo Park	San Mateo	94025	0	1	1
9032	Landec Corp.	3603 Haven Avenue, Suite E	Menlo Park	San Mateo	94025	0	0	0
17258	Latham & Watkins LLP	140 Scott Drive	Menlo Park	San Mateo	94025	0	1	1
20224	Membrane Tech. & Research Inc	1235 Hamilton Court	Menlo Park	San Mateo	94025	0	588	588
11092	Membrane Tech. & Research Inc	1360 Willow Rd, Suite 103	Menlo Park	San Mateo	94025	0	76	76
11104	Memry Corp.	4065 Campbell Avenue	Menlo Park	San Mateo	94025	0	50	50
18066	Menlo Business Park, LLC	1455 Adams Drive	Menlo Park	San Mateo	94025	0	4	4
19690	Menlo Park Surgical Hosp./PA/Medi. Foundation	570 Willow Road	Menlo Park	San Mateo	94025	0	3	3
7258	Merchandising Systems, Inc	1140 O'Brien Drive	Menlo Park	San Mateo	94025	0	18	18
19245	New Enterprises Assoc., Inc	2855 Sand Hill Road	Menlo Park	San Mateo	94025	0	0	0
13488	Pacific Bell	2950 Sand Hill Road	Menlo Park	San Mateo	94025	0	2	2
20079	Pacific Biosciences	1380 Willow Road	Menlo Park	San Mateo	94025	0	12	12
18855	Pentair Thermal Management, LLC	307 Constitution Ave	Menlo Park	San Mateo	94025	0	1	1
18792	Rosewood Hotel c/o Stanford University	2825 Sand Hill Road	Menlo Park	San Mateo	94025	0	2	2
18716	Sand Hill Oak Partners	2800 Sand Hill Road	Menlo Park	San Mateo	94025	0	4	4
20076	SilverLake	2775 Sand Hill Road	Menlo Park	San Mateo	94025	0	0	0
556	SLAC National Accelerator Lab.	2575 Sand Hill Road	Menlo Park	San Mateo	94025	0	1,325	1,325
14789	South Bayside System Authority	1401 Marsh Road	Menlo Park	San Mateo	94025	0	0	0
598	SRI International	333 Ravenswood Ave, Mail Stop AE128	Menlo Park	San Mateo	94025	0	44	44
19374	St Anthony's Dining Room	3500 Middlefield Road	Menlo Park	San Mateo	94025	0	0	0
14188	State of California Department of Transportation	Highway 84	Menlo Park	San Mateo	94025	0	16	16
13212	Tyco Electronics Corp.	304 Constitution Drive	Menlo Park	San Mateo	94025	0	1,859	1,859
1462	Veterans Administration Medical Center	795 Willow Road	Menlo Park	San Mateo	94025	0	2,464	2,464
							49,401	

Water Use & Wastewater Generation

Water and Wastewater

Water Demand Calculations Based on the ConnectMenlo Water Supply Evaluation Study

	units	population/ employees	Outdoor Acres			
Bayfront Units	4,500	11,570	15.3			
Non-Residential		5,720	46.2			
	Unit	g/day/unit **Indoor**	g/yr/unit **Indoor**	g/unit/year **Outdoor**		
Water Demand Rates - Residential Units	Units	127	46,355	2,222		
Water Demand Rates - Non-Residential (avg with conservation factor)	Employees	47.9	17,470	4,196		
	Indoor (g/day)	**Indoor (g/yr)**	**Outdoor (g/yr)**	**TOTAL (g/yr)**	GPCD	GPSPD
Water Demand Residential Units	571,500	208,597,500	10,000,000	218,597,500	52	52
Water Demand Employees	273,774	99,927,328	24,000,000	123,927,328		59
		308,524,828	34,000,000	342,524,828	81	54
PERCENT OF TOTAL WATER		**90%**	**10%**			

CONNECTMENLO WATER SUPPLY ESTIMATE			
	Existing	2040 Maximum	2020
Population	32,900	50,350	38,700
Employment	30,900	53,250	34,130
Service Population (SP)	63,800	103,600	72,830
	g/yr	g/yr	
Indoor Water	1,138,454,829	1,848,650,788	1,299,587,229
Outdoor Water	125,459,803	203,724,696	143,216,888
Total	1,263,914,632	2,052,375,485	1,442,804,117
AFY	3,879	6,299	4,428

Water and Wastewater

Fugitive Emissions - Process Emissions from WWTP with Nitrification/Denitrification

CH_4 - Microorganisms can biodegrade soluble organic material in wastewater under aerobic (presence of oxygen) or anaerobic (absence of oxygen) conditions. Anaerobic conditions result in the production of CH_4.

N_2O - Treatment of domestic wastewater during both nitrification and denitrification of the nitrogen present leads to the formation of N_2O, usually in the form of urea, ammonia, and proteins. These compounds are converted to nitrate through the aerobic process of nitrification. Denitrification occurs under anoxic conditions (without free oxygen), and involves the biological conversion of nitrate into dinitrogen. N_2O can be an intermediate product of both processes, but more often is associated with denitrification.

Fugitive Emissions - Process Emissions from WWTP with Nitrification/Denitrification for combustion of biogas.

Anaerobic digesters produce methane-rich biogas which is typically combusted on-site. In some cases the biogas is combusted simply for the purpose of converting methane to CO_2, which has a lower global warming potential than methane. In many cases, a cogeneration system is used to harvest the heat from combustion and use it to generate electricity for on-site energy needs. In both cases, inherent inefficiencies in the system result in incomplete combustion of the biogas, which results in remaining methane emissions. Excludes biogenic emissions from combustion of biogas.

LGOP Version 1.1. Equation 10.1.

CH_4 = Wastewater x Digester Gas x FCH_4 x $Þ_{CH4}$ x (1-DE) x 0.0283 x 10^-3 x 10^-3

	CEQA Baseline	2040	2020
wastewater (gallons)=	1,138,454,829	1,848,650,788	1,299,587,229

Digester gas	0.01	ft^3 biogas/gallon wastewater
FCH_4	0.65	fraction of CH4 in biogas
$Þ_{CH4}$	662.00	g/m^3; density of CH_4 at standard conditions
DE	0.99	CH4 destruction efficiency
0.0283 =	0.0283	m^3/ft^3; conversion factor
10^-3 =	1.00E-03	MT/kg conversion factor
10^-3 =	1.00E-03	kg/g conversion factor

	CEQA Baseline	2040	2020
	MTons		
CH_4 =	1.39	2.25	1.58
CO_2e =	29	47	33

Source: California Air Resources Board (CARB). 2010, May. Local Government Operations Protocol (LGOP), Version 1.1. The LGOP protocol provides default values for all the terms except the digester gas, which is assumed to be 0.1 cubic feet of biogas per gallon of wastewater effluent based on USEPA methodology outlined in the CalEEMod program manual. South Coast Air Quality Management District (SCAQMD). 2013. California Emissions Estimator Model (CalEEMod), Version 2013.2.2. User's Manual. USEPA. 2008. Page 8-12. USEPA cites Metcalf & Eddy, Inc., 1991, "Wastewater Engineering: Treatment Disposal, and Reuse," 3rd Ed. McGraw Hill Publishing.

Fugitive Emissions - Process Emissions from WWTP with Nitrification/Denitrification from discharge into aquatic environments

Nitrous oxide is produced when treated wastewater is discharged to aquatic environments such as rivers or estuaries. The nitrogen which remains in treated wastewater effluent is converted to nitrous oxide in a multi-step process accomplished by bacteria which is present in soil and aquatic environments.

LGOP Version 1.1. Equation 10.9.

N_2O = Wastewater x 10^-6 x Nload x 44/28 x EF effluent x 10^3

	CEQA Baseline	2040	2020
wastewater (Liters)=	4,309,051,528	6,997,143,234	4,918,937,661

10^-6 =	1.00E-06	conversion factor; kg/mg	
N Load	26.00	mg/L of wastewater	USEPA 2013
48/28	1.57	Ratio of molecular weights for N_2O and N_2	
EF effluent	0.01	kg/N_2O/kg N	
10^-3 =	1.00E-03	conversion factor: MTons/kg	

	CEQA Baseline	2040	2020
	MTons		
N_2O	0.88	1.43	1.00
CO_2e =	273	443	312

Source: California Air Resources Board (CARB). 2010, May. Local Government Operations Protocol (LGOP), Version 1.1. The LGOP protocol provides default values for all the terms except the Nitrogen Load, which is assumed to be 26 mg of N per Liter of wastewater effluent based on USEPA methodology outlined in the CalEEMod program manual. South Coast Air Quality Management District (SCAQMD). 2013. California Emissions Estimator Model (CalEEMod), Version 2013.2.2. User's Manual. USEPA. 2008. Page 8-12. USEPA cites Metcalf & Eddy, Inc., 1991, "Wastewater Engineering: Treatment Disposal, and Reuse," 3rd Ed. McGraw Hill Publishing.

Water and Wastewater

Energy for Water Conveyance, Treatment, Distribution, and Wastewater Treatment (Northern California)

Water Supply and Conveyance (Northern California)	Water Treatment	Water Distribution	Total Water	Wastewater Treatment	
	kWhr/million gallons				
2,117	111	1,272	3,500	1,911	
2,117	0	0	2,117	1,911	Without double-counting

Source 1: California Energy Commission (CEC). 2006, December. Refining Estimates of Water-Related Energy Use in California. CEC-500-2006-118. Prepared by Navigant Consulting, Inc. Based on the electricity use for Northern California.

PG&E

	Intensity factor		21	310	CO_2e
	CO_2 MTons/MWH[1]	CO_2 lbs/KWH	CH_4 MTons/MWH[1]	N_2O MTons/MWH[1]	MTons/MWh
2005	0.222	0.489	0.000013	0.000005	0.224
2006	0.207	0.456	0.000013	0.000005	0.209
2007	0.288	0.636	0.000013	0.000005	0.290
2008	0.291	0.641	0.000013	0.000005	0.293
2009	0.261	0.575	0.000013	0.000005	0.263
2010	0.202	0.445	0.000013	0.000005	0.204
2011	0.178	0.393	0.000013	0.000005	0.180
2012	0.201	0.444	0.000013	0.000005	0.203
2013	0.226	0.499	0.000013	0.000005	0.228
3-Year Average (2011-2013) based on PG&E	0.202	0.445	0.000013	0.000005	0.204
2020 (CO_2)[3]	0.132	0.290	0.000013	0.000005	**0.133**

Source:

1 Pacific Gas & Electric (PG&E) 2014.

2 CH_4 and N_2O intensity based on California E-Grid data (CH_4 = 0.029 lbs/MWH; N_2O = 0.011 lbs/MWH) identified in the LGOP

3

The 2020 emissions rate is estimated by PG&E. It includes reductions from 33% Renewable Portfolio Standard (RPS), Cap-and-Trade, and other regulatory reductions for High Global Warming Potential (HGWP) gases such as reductions of SF_6. Pacific Gas & Electric (PG&E). 2015, November. Greenhouse Gas Emissions Factors Info Sheet. http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

GHG Emissions from Energy Associated with Water/Wastewater

Energy Associated with Water Use	**CEQA Baseline**	**2040**	**2020**
	MwH/Year		
Water	2,676	4,345	3,054
Wastewater	2,176	3,533	2,484
Total Water/Wastewater	4,851	7,878	5,538

GHG Emissions from Energy Associated with Water Use/Wastewater Generation	**CEQA Baseline**	**2040**	**2020**
	$MTCO_2e$/Year		
Water	545	886	623
Wastewater	443	720	506
Total Water/Wastewater	989	1,606	1,129

Water and Wastewater

Total GHGs (ELECTRICTY + FUGITIVE)

GHG Emissions from Water/Wastewater Use	CEQA Baseline	2040	2020
	$MTCO_2e$/Year		
Water	545	886	623
Wastewater	745	1,210	851
Total Water/Wastewater	1,291	2,096	1,473

GHG Emissions from Energy Use - Adjusted for Lower Carbon Intensity in 2020

GHG Emissions from Water/Wastewater Use	CEQA Baseline	2040	2020
	$MTCO_2e$/Year		
Water	357	579	407
Wastewater	290	471	331
Total Water/Wastewater	647	1,051	739

Total GHGs ABAU

GHG Emissions from Water/Wastewater Use	CEQA Baseline	2040	2020
	$MTCO_2e$/Year		
Water		579	407
Wastewater		962	676
Total Water/Wastewater		1,541	1,083

Water and Wastewater

General Conversion Factors

	Global Warming Potentials (GWP)
CO_2	1
CH_4	21
N_2O	310

Source: Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report: Climate Change 1995.

gallons to Liters	3.785	
kilowatt hrs to megawatt hrs	0.001	
gallons to AF	325851.4290	3.06888E-06
Centum Cubic Feet (CCF) to US Gallons	748.0519	
Tons to MTon	0.9071847	

Solid Waste Disposal

Solid Waste Disposal

Source: CalRecycle Disposal By Facility - City of Menlo Park (Disposal Reporting System)

Waste Generated Within City Limits

Waste in Place Method

Years	historic population estimates	Year	Interstate Tons + Transform Tons	ADC+AIC	
20	29,413	1995	48,046	392	historic rate
19	29,687	1996	52,820	538	
18	29,962	1997	51,372	1,817	
17	30,236	1998	58,927	2,022	
16	30,511	1999	51,138	5,471	
15	30,785	2000	50,508	9,446	
14	30,936	2001	45,452	8,611	
13	31,087	2002	43,900	3,408	
12	31,238	2003	41,321	1,264	
11	31,389	2004	40,001	525	
10	31,540	2005	38,656	763	
9	31,691	2006	39,597	1,388	
8	31,843	2007	35,637	1,356	
7	31,994	2008	32,653	1,667	
6	32,145	2009	29,199	1,890	
5	32,296	2010	27,602	3,400	
4	32,447	2011	32,259	2,125	Total
3	32,598	2012	15,373	2,152	17,525
2	32,749	2013	26,450	6,693	33,143
1	32,900	2014	29,134	2,570	31,703
		2015 (Average 2014-2012)	23,652	3,805	27,457
		Disposal Rate / SP			

Average 3-year disposal used to forecast waste disposal in 2040 and average disposal in 2015.

Source: CalRecycle, 2014, Disposal Reporting System, Jurisdiction Reporting by Facility, Menlo Park.
http://www.calrecycle.ca.gov/LGCentral/Reports/DRS/Destination/JurDspFa.aspx

Landfill Emission Tool (version 1.3) Model Results forecasted for ~30-50 years of decomposition

Year	MT CH_4 in CO_2e 2015 Disposal	$MTCO_2e$ w/ 75% LFG Capture 2015 Disposal		$MTCO_2e$ w/LFG Capture 2040	$MTCO_2e$ w/LFG Capture 2020
1	433	108		176	124
2	845	211		343	241
3	813	203		330	232
4	783	196		318	223
5	754	188		306	215
6	726	181		295	207
7	699	175		284	199
8	673	168		273	192
9	648	162		263	185
10	623	156		253	178
11	600	150		244	171
12	578	144		235	165
13	556	139		226	159
14	521	130		212	149
15	495	124		201	141
16	469	117		190	134
17	443	111		180	126
18	417	104		169	119
19	390	98		158	111
20	364	91		148	104
21	338	85		137	96
22	312	78		127	89
23	286	71		116	82
24	259	65		105	74
25	233	58		95	67
26	207	52		84	59
27	181	45		73	52
28	155	39		63	44
29	129	32		52	37
30	102	26		42	29
31	76	19		31	22
32	50	12		20	14
33	24	6		10	7
TOTAL	14,183	3,546	0	5,758	4,047

Waste. Landfill Emissions Tool Version 1.3 and CalRecycle. Biogenic CO_2 emissions are not included.
Notes
LFG capture

Efficiency	0.75

Waste generation based on three year average (2012-2014) waste commitment for the City of Menlo Park obtained from CalRecycle. This sector captures only the waste that is generated by the City of Menlo Park residents and businesses in the inventory year. This sector does not include historically generated waste disposal.

This method assumes that the degradable organic component (degradable organic carbon, DOC) in waste decays slowly throughout a few decades, during which CH_4 and biogenic CO_2 are formed. If conditions are constant, the rate of CH_4 production depends solely on the amount of carbon remaining in the waste. As a result emissions of CH_4 from waste deposited in a disposal site are highest in the first few years after deposition, then gradually decline as the degradable carbon in the waste is consumed by the bacteria responsible for the decay. Significant CH_4 production typically begins one or two years after waste disposal in a landfill and continues for 10 to 60 years or longer.

Decomposition based on an average annual rainfall of 26.17 inches per year average in Half Moon Bay near the Ox Mountain Landfill (anaerobic decomposition factor (k) of 0.038) (WRCC 2016).

The Landfill Gas Estimator only includes the landfill gas (LFG) capture in the landfill gas heat output and therefore the reduction and emissions from landfill gas capture are calculated separately. Assumes 75 percent of fugitive GHG emissions are captured within the landfill's Landfill Gas Capture System with a landfill gas capture efficiency of 75%. The Landfill gas capture efficiency is based on the California Air Resources Board's (CARB) Local Government Operations Protocol (LGOP), Version 1.1.

California Air Resources Board's Implementation of IPCC's Mathematically Exact First-Order Decay Model

Release date: November 14, 2011

This tool is designed to estimate greenhouse gas emissions from a landfill in support of the Local Government Operations Protocol.

Please follow these steps to estimate emissions:

1) Read the ***Methodology*** page to become familiar with the equations and the assumptions underlying the calculations.

2) Enter the landfill specific data on the ***Landfill Model Inputs*** page. **This is the only page where data needs to be added or modified.**

Data Type	Field or Column Name	Description
Landfill Specific Data	k Value	Decay factor (see ***Methodology*** page).
	State/Country	State or country where the landfill is located. Will determine the waste characterization data used.
Waste Deposit Data	Year	Year of the data entry values.
	Waste Deposited (Tons)	Amount of waste deposited in that year.
	Waste Deposited (% ANDOC)	Percent of the waste that is degradable, based on waste characterization data.
	Greenwaste & Compost - Daily Cover (Tons)	Amount of daily cover materials of the given type used in that year.
	Greenwaste & Compost - Daily Cover (% ANDOC)	Percent of the daily cover that is degradable, based on waste characterization data.
	Sludge - Daily Cover (Tons)	Amount of daily cover materials of the given type used in that year.
	Sludge - Daily Cover (% ANDOC)	Percent of the daily cover that is degradable, based on waste characterization data.
Note: Required data fields on the **Landfill Model Inputs** page are highlighted in rose		

The rose colored field names indicate which fields require data entry, all others have defaults that will be used in the calculations.

3) If you wish to overwrite the default % ANDOC value with your own value, you can use the calculator on the ***Landfill Specific ANDOC Values*** page (the last page in this tool) and then type your calculated landfill specific value over the default ANDOC% value.

4) Estimates of the emissions reflecting the current inputs are listed on the ***Landfill Emissions Output*** page and estimates of captured gas heat are available on the ***Landfill Gas Heat Output*** page.

Data Input: Lanfill Characteristics

Landfill Name:	Ox Mtn/Corinda (Va	**Year Opened:**		Click for lists of k values	
State/Country:	CA	**If Closed, Year:**		**k Value:**	0.038
City/County:	Half Moon Bay			**M Value:**	

Data Input: Waste Deposit History

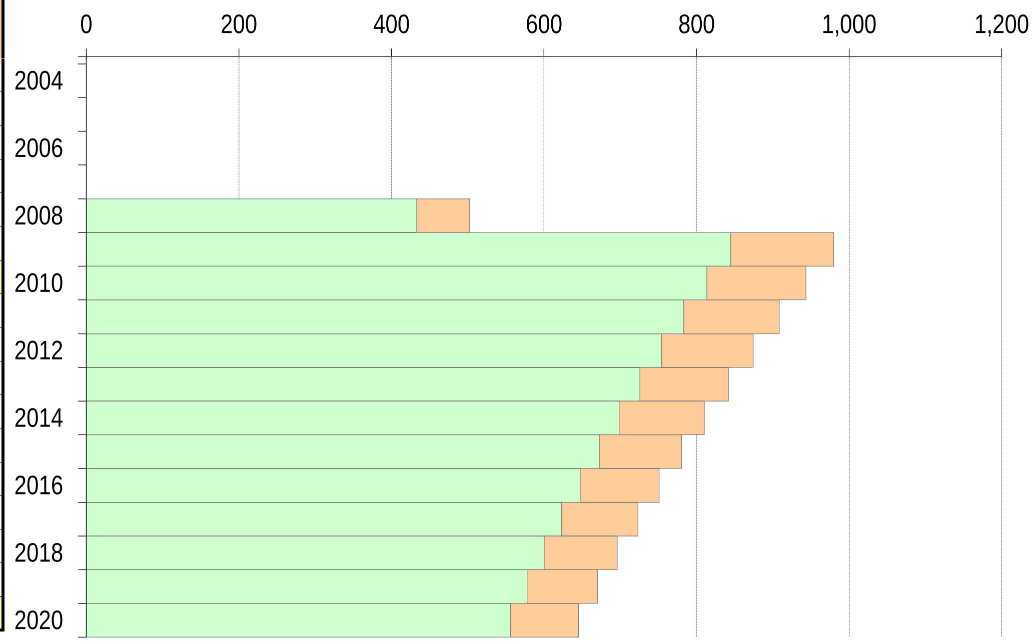
Year	Waste			Daily Cover			
	Waste Deposited			Greenwaste & Compost		Sludge	
	Tons	% ANDOC		Tons	% ANDOC	Tons	% ANDOC
2004							
2005							
2006							
2007							
2008	23,652	7.52%		3,805	6.24%		
2009							
2010							
2011							
2012							
2013							
2014							
2015							
2016							
2017							
2018							
2019							
2020							

Model Output: Lanfill Characteristics

Landfill Name: Ox Mtn/Corind
State: CA
City/County: Half Moon Bay
Year Opened:
If Closed, Year:
k Value: 0.038
M Value: 6

Model Output: Methane and Carbon Dioxide Emissions
(metric tonnes of CO_2 equivalent)

Year	CH_4	CO_2
2004		
2005		
2006		
2007		
2008	433	69
2009	845	135
2010	813	130
2011	783	125
2012	754	120
2013	726	116
2014	699	112
2015	673	107
2016	648	103
2017	623	100
2018	600	96
2019	578	92
2020	556	89



HALF MOON BAY, CALIFORNIA (043714)

Period of Record Monthly Climate Summary

Period of Record : 07/01/1939 to 01/20/2015

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	58.4	59.3	59.8	60.7	61.7	63.4	64.2	65.1	66.8	65.8	62.7	58.9	62.2
Average Min. Temperature (F)	42.9	43.5	43.8	44.6	47.4	49.8	51.9	52.7	51.2	48.3	45.4	43.3	47.1
Average Total Precipitation (in.)	5.15	4.49	3.83	1.88	0.76	0.30	0.12	0.19	0.35	1.59	2.99	4.52	26.17
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 97.5% Min. Temp.: 97.3% Precipitation: 98.5% Snowfall: 98.8% Snow Depth: 98.7%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, mailto:wrcc@dri.edu

Energy – Natural Gas & Electricity

Energy Use Report for Menlo Park- Purchased Electricity

Provided by PG&E

Excludes electricity from County facilities and special districts (e.g., school district) whose emissions are not under the jurisdictional control of the City. Does not include direct access electricity not provided by PG&E.

	2013 Annual KWH	2012 Annual KWH	2011 Annual KWH	Kwh 3-yr Avg
Residential	76,135,215	77,090,039	77,616,408	76,947,221
Non-Residential	191,299,065	188,425,840	181,856,636	187,193,847
City	4,370,663	4,368,224	4,319,056	4,352,648
Total	271,804,943	269,884,103	263,792,100	268,493,715

Energy Use Report for Menlo Park - Natural Gas

Provided by PG&E

Excludes electricity from County facilities and special districts (e.g., school district) whose emissions are not under the jurisdictional control of the City.

	2013 Annual Therms	2012 Annual Therms	2011 Annual Therms	Therms 3-yr Avg
Residential	7,413,274	7,323,469	7,652,382	7,463,042
Non-Residential	11,823,026	11,646,606	11,912,191	11,793,941
City	139,458	129,897	122,370	130,575
Total	19,375,758	19,099,972	19,686,943	19,387,558

Disclaimer. The 15/15 Rule is intended to protect customer confidentiality by reducing the possibility of identifying customers through the release of usage information. Menlo Parks applies the 15/15 Rule in releasing aggregated customer information. The rule was initially implemented by the California Public Utilities Commission during Direct Access proceedings in 1997 and was adopted through D. 97-10-031. The 15/15 rule requires that any aggregated information provided by the Utilities must be made up of at least 15 customers, and a customer's load must be less than 15% of an assigned category. If the number of customers in the compiled data is below 15, or if a single customer's load is more than 15% of the total data, categories (e.g., rate classes) must be combined before the information is released. The rule further requires that if the 15/15 rule is triggered for a second time after the data has been screened once already using the 15/15 rule, then the customer is dropped from the information provided.

FOR INFORMATIONAL PURPOSES ONLY

PG&E Emissions Factor Summary

Emission Type	Emission Factor			Source
	Year	*Lbs CO_2 /MWh*	*Metric tons CO_2/MWh*	
Historical Emissions	2003	620	0.281	PG&E's third-party-verified GHG inventory submitted to the California Climate Action Registry (CCAR)[2] (2003-2008) or The Climate Registry (TCR) (2009-2013)
	2004	566	0.257	
	2005	489	0.222	
	2006	456	0.207	
	2007	636	0.288	
	2008	641	0.291	
	2009	575	0.261	
	2010	445	0.202	
	2011	393	0.178	
	2012	445	0.202	
	2013	**427**	**0.194**	
2009-2013 Average	2009-2013	457	0.2074	Average of the last five years of historical emissions
CPUC Future Emissions (estimated in 2010 prior to the drought)	2014	412	0.187	CPUC GHG Calculator, which provides an independent forecast of PG&E's emission factors as part of a model on how the electricity sector would reduce emissions under AB 32[3]
	2015	391	0.177	
	2016	370	0.168	
	2017	349	0.158	
	2018	328	0.149	
	2019	307	0.139	
	2020	290	0.131	

Natural Gas Emission Factors

Historic, Current, and/or Future: The combustion of natural gas (in your stove, a furnace, or a natural gas power plant) releases CO_2. The emission factor for natural gas represents the amount of GHGs emitted per therm of natural gas combusted. Since the composition of PG&E natural gas does not change significantly over time, this factor does not change from year to year.

Emission Type		Emission Factor		Source
	Year	*Lbs CO_2/therm*	*Metric ton CO_2/therm*	
Historic, Current, or Future	All years	11.7	0.00531	U.S. Energy Information Administration[4]

[2] The 2003-2008 factors are in the Power/Utility Protocol (PUP) spreadsheet of PG&E's CCAR reports. The 2009-2013factors are in the Additional Optional Information tab of the Electric Power Sector (EPS) Report spreadsheet of PG&E's TCR reports.
[3] E3, GHG Calculator version 3c, worksheet tab "CO_2 Allocations," cells AH35 - AH44.
[4] U.S. Energy Information Administration, Voluntary Reporting of Greenhouse Gases Program.

Energy

Energy Emission Factors

Natural Gas	Intensity factor				CO_2e
	lbs CO_2/Therm	MTons CO_2/Therm	CH_4 MTons/Therm	N_2O MTons/Therm	MTons/Therm
All Years	11.7	0.0053	5.E-07	1.E-08	**0.00532**

Source: CO_2, CH_4 and N_2O intensity based on Table G.3 of the LGOP for residential and non-residential (CO_2, 53.02 kg/Mmbtu; CH_4: 0.005 kg/MMBtu; N_2O: 0.0001 kg/MMBtu)

PG&E

	Intensity factor		21	310	CO_2e
	CO_2 MTons/MWH[1]	CO_2 lbs/KWH	CH_4 MTons/MWH[1]	N_2O MTons/MWH[1]	MTons/MWh
2005	0.222	0.489	0.000013	0.000005	0.224
2006	0.207	0.456	0.000013	0.000005	0.209
2007	0.288	0.636	0.000013	0.000005	0.290
2008	0.291	0.641	0.000013	0.000005	0.293
2009	0.261	0.575	0.000013	0.000005	0.263
2010	0.202	0.445	0.000013	0.000005	0.204
2011	0.178	0.393	0.000013	0.000005	0.180
2012	0.201	0.444	0.000013	0.000005	0.203
2013	0.226	0.499	0.000013	0.000005	0.228
3-Year Average (2011-2013) based on PG&E	0.202	0.445	0.000013	0.000005	0.204
2020 (CO_2)[3]	0.132	0.290	0.000013	0.000005	**0.133**

Source:

1 Pacific Gas & Electric (PG&E) 2014.

2 CH_4 and N_2O intensity based on California E-Grid data (CH_4 = 0.029 lbs/MWH; N_2O = 0.011 lbs/MWH) identified in the LGOP

3

The 2020 emissions rate is estimated by PG&E. It includes reductions from 33% Renewable Portfolio Standard (RPS), Cap-and-Trade, and other regulatory reductions for High Global Warming Potential (HGWP) gases such as reductions of SF_6. Pacific Gas & Electric (PG&E). 2015, November. Greenhouse Gas Emissions Factors Info Sheet. http://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

GHG Emissions from Energy Use

Electricity	$MTCO_2e$/Year 2015	2040	2020 (ABAG)
Residential Electricity	15,684	23,801	18,448
Nonresidential Electricity	38,154	65,751	42,143
City Electricity	887	1,441	1,013
Total	54,725	90,993	61,604

Natural Gas	$MTCO_2e$/Year 2015	2040	2020 (ABAG)
Residential Natural Gas	39,671	60,202	46,664
Nonresidential Natural Gas	62,692	108,037	69,245
City Natural Gas	694	1,127	792
Total	103,057	169,366	116,702

Summary	$MTCO_2e$/Year 2015	2040	2020 (ABAG)
Residential Total	55,354	84,003	65,113
Nonresidential Total	100,846	173,788	111,388
City Total	1,581	2,568	1,805
Total	157,782	260,359	178,305

GHG Emissions from Energy Use - Adjusted for Lower Carbon Intensity in 2020

Electricity	$MTCO_2e$/Year 2015	2040	2020 (ABAG)
Residential Electricity	15,684	15,573	12,071
Nonresidential Electricity	38,154	43,022	27,575
City Electricity	887	943	663
Total	54,725	59,538	40,308

Summary	$MTCO_2e$/Year 2015	2040	2020 (ABAG)
Residential Total	55,354	75,776	58,735
Nonresidential Total	100,846	151,059	96,820
City Total	1,581	2,070	1,455
Total	157,782	228,905	157,010

General Conversion Factors

lbs to kg	0.4536
kg to MTons	0.001
Mmbtu to Therm	0.1
kilowatt hrs to megawatt hrs	0.001
lbs to Tons	2000
Tons to MTon	0.9071847

Source: California Air Resources Board (CARB). 2010. Local Government Operations Protocol. Version 1.1. Appendix F, Standard Conversion Factors

	Global Warming Potentials (GWP)
CO_2	1
CH_4	21
N_2O	310

Source: Intergovernmental Panel on Climate Change (IPCC). 1995. Second Assessment Report: Climate Change 1995.

Therms to kwh	29.30711111

Criteria Air Pollutants from Natural Gas

Rate	lbs/MBTU					
Natural Gas	**ROG**	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Residential	0.01078431	0.09215686	0.03921569	0.00058824	0.00745098	0.00745098
Non-Residential	0.01078431	0.09803922	0.08235294	0.00058824	0.00745098	0.00745098
Source: CalEEMod Version 2013.2.2.						

Natural Gas	**2015 lbs/day**					
	ROG	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Residential	22	188	80	1	15	15
Nonresidential	35	317	266	2	24	24
City	0	4	3	0	0	0
Total	57	509	349	3	40	40

Natural Gas	**2040 Project lbs/day**					
	ROG	**NO_x**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Residential	33	286	122	2	23	23
Nonresidential	60	546	459	3	41	41
City	1	6	5	0	0	0
Total	94	838	585	5	65	65
Increase from Baseline	37	329	236	2	25	25

General Conversion Factors	
Mmbtu to Therm	0.1
lbs to Tons	2000
Tons to MTon	0.9071847

Source: California Air Resources Board (CARB). 2010. Local Government Operations Protocol. Version 1.1. Appendix F, Standard Conversion Factors

On-Road Transportation

CONNECTMENLO — TRANSPORTATION SECTOR EMFAC2014 v1.0.7 Based on SAR GWPs

VMT		City of Menlo Park					
	RTAC	Daily VMT Passenger Vehicles[1]	Daily VMT Passenger Medium Trucks[1]	Daily VMT Passenger Heavy Trucks[1]	Total Daily VMT with RTAC [1]	Annual VMT[2]	Daily VMT/SP
EXISTING							
Internal VMT	100%	25,434	7	4	25,445	8,829,415	
Internal-External VMT	50%	898,819	1,838	8,872	454,765	157,803,282	
External-Internal VMT (passenger vehicles)	50%	896,470	2,021	10,534	454,513	157,715,838	
Total w/RTAC		923,079	1,937	9,707	934,722	324,348,534	14.65
Annual VMT with RTAC		320,308,240	671,966	3,368,329			
Percent of VMT with RTAC		98.8%	0.2%	1.0%	100%		
2040 Maximum Citywide Buildout							
Internal VMT	100%	37,017	21	12	37,050	12,856,350	
Internal-External VMT	50%	1,354,099	3,917	15,447	686,732	238,295,831	
External-Internal VMT (passenger vehicles)	50%	1,428,431	4,248	18,433	725,556	251,767,932	
Total w/RTAC		1,428,282	4,104	16,952	1,449,338	502,920,113	13.99
Annual VMT with RTAC		495,613,854	1,423,915	5,882,344			
Percent of VMT with RTAC		99%	0.3%	1.2%	100%		
Year 2020 Estimate							
Service Population		72,830			1,067,019	370,255,544	
Existing General Plan 2040A							
Internal VMT	100%	27,081	11	6	27,098	9,403,006	
Internal-External VMT	50%	1,312,127	2,910	12,476	663,757	230,323,506	
External-Internal VMT (passenger vehicles)	50%	1,319,204	3,201	14,748	668,577	231,996,046	
Total w/RTAC		1,342,747	3,067	13,618	1,359,431	471,722,557	17.00
Annual VMT with RTAC		465,933,036	1,064,076	4,725,446			
Percent of VMT with RTAC		93%	0.2%	0.9%	94%		

1. Passenger vehicle and truck VMT provided by TJKM is based on the Regional Transportation Demand Forecasting Model. For GHG emissions modeling, the transportation sector proportions 50 percent of the trip length for trips that occur outside of the City boundaries. Per the Regional Targets Advisory Committee (RTAC) under Senate Bill 375 (SB 375), 50 percent of the trip length for intrajurisdictional trips are the responsibility of the adjacent/corresponding jurisdiction while the other 50 percent are the responsibility of the City of Menlo Park. External-Internal and Internal-External trips include 50 percent of the trip length in accordance with these recommendations.

2. Daily VMT multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.

3. VMT estimated using ABAG forecasts the VMT/SP rate and VMT by classifications for 2015.

CRITERIA AIR POLLUTANTS

	lbs/day					
	ROG	NOx	CO	SOx	PM10	PM2.5
Existing	87	302	2,473	6	99	42
Existing in 2040	39	62	835	3	95	38
2040 Maximum Citywide Buildout	61	97	1,294	5	148	60
	Tons/year					
	ROG	NOx	CO	SOx	PM10	PM2.5
Existing	15	52	429	1	17	7
Existing in 2040	7	11	145	1	16	7
2040 Maximum Citywide Buildout	11	17	225	1	26	10

Daily emissions multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.

Source: EMFAC2014-PL. Based on running exhaust, breakwear, and tirewear emission rates.

GHG EMISSIONS

	MTons/year					
	CO_2	CH_4	N_2O	CO_2e	**CO_2e lbs/Mile**	**CO2e lbs/SP/day**
Existing	97,744	3	2	98,429	0.67	9.32
2040 Maximum Citywide Buildout	87,646	3	17	87,933	0.39	5.13
2020 Estimate	97,198	3	31	97,661	0.58	8.10

Source: EMFAC2014-PL. Based on the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report Global Warming Potentials (GWPs)

Note: MTons = metric tons; CO_2e = carbon dioxide-equivalent. Includes Pavley + California Advanced Clean Car Standards, the Low Carbon Fuel Standard (LCFS), on-road diesel fleet rules, and the Smartway/Phase I Heavy Duty Vehicle Greenhouse Gas Regulation.

Unlike EMFAC2011, EMFAC2014 does not identify GHG emissions rates with Pavley+LCFS and rates without these GHG emissions regulations. Therefore, only the "with reductions" rate is included.

Existing Criteria Air Pollutants

Based on EMFAC2014

2015	**934,722**								
Emission year	Daily								
				lbs/day					
	Percent of VMT	**Adjust % VMT**	**VMT by Fleet**	**ROG**	**NOx**	**CO**	**SOx**	**PM10**	**PM2.5**
All Other Buses	0.15%	0.03%	249	6.47E-02	2.51E+00	2.14E-01	6.13E-03	1.06E-01	5.86E-02
LDA	54.14%	65.43%	611,574	2.88E+01	1.18E+02	1.30E+03	3.63E+00	6.25E+01	2.59E+01
LDT1	4.87%	5.88%	54,977	5.98E+00	2.07E+01	2.21E+02	3.78E-01	5.71E+00	2.42E+00
LDT2	21.97%	26.55%	248,205	1.11E+01	6.45E+01	5.66E+02	1.96E+00	2.52E+01	1.03E+01
LHD1	2.00%	0.36%	3,371	5.51E-01	1.18E+01	8.77E+00	4.45E-02	7.10E-01	3.29E-01
LHD2	0.53%	0.10%	898	1.20E-01	3.05E+00	1.34E+00	1.21E-02	2.19E-01	1.01E-01
MCY	0.74%	0.89%	8,322	3.82E+01	1.94E+01	3.50E+02	3.38E-02	3.16E-01	1.36E-01
MDV	12.53%	0.21%	1,937	1.48E-01	8.06E-01	6.38E+00	1.98E-02	1.97E-01	8.12E-02
MH	0.06%	0.01%	109	5.37E-02	3.74E-01	1.50E+00	2.60E-03	3.99E-02	1.95E-02
Motor Coach	0.06%	0.01%	102	5.22E-02	1.74E+00	1.89E-01	3.76E-03	4.85E-02	2.89E-02
OBUS	0.13%	0.02%	215	2.79E-02	2.23E-01	8.98E-01	5.29E-03	6.78E-02	2.82E-02
SBUS	0.03%	0.01%	58	1.88E-02	5.67E-01	4.55E-01	1.02E-03	1.00E-01	4.50E-02
T6 Ag	0.01%	0.00%	14	2.59E-02	3.40E-01	8.55E-02	3.27E-04	2.11E-02	1.78E-02
T6 CAIRP Heavy	0.00%	0.00%	4	8.93E-04	2.73E-02	3.11E-03	1.01E-04	1.72E-03	9.39E-04
T6 CAIRP Small	0.01%	0.00%	13	5.37E-03	9.98E-02	1.81E-02	3.11E-04	7.59E-03	5.08E-03
T6 Instate Construction Heavy	0.01%	0.00%	13	6.65E-03	1.81E-01	2.35E-02	3.20E-04	7.95E-03	5.34E-03
T6 Instate Construction Small	0.13%	0.02%	223	1.11E-01	2.13E+00	3.80E-01	5.41E-03	1.40E-01	9.59E-02
T6 Instate Heavy	0.37%	0.07%	633	1.66E-01	5.01E+00	5.70E-01	1.52E-02	2.75E-01	1.55E-01
T6 Instate Small	0.99%	0.18%	1,664	8.82E-01	1.64E+01	3.01E+00	4.01E-02	1.10E+00	7.68E-01
T6 OOS Heavy	0.00%	0.00%	2	3.12E-04	1.39E-02	1.11E-03	5.79E-05	8.49E-04	4.04E-04
T6 OOS Small	0.00%	0.00%	7	3.08E-03	5.72E-02	1.04E-02	1.78E-04	4.35E-03	2.91E-03
T6 Public	0.03%	0.01%	50	5.30E-03	6.34E-01	1.77E-02	1.20E-03	1.86E-02	9.32E-03
T6 Utility	0.01%	0.00%	12	9.52E-04	5.50E-02	3.40E-03	3.00E-04	4.01E-03	1.79E-03
T6TS	0.23%	0.04%	396	1.64E-01	1.16E+00	5.33E+00	9.83E-03	1.26E-01	5.26E-02
T7 Ag	0.00%	0.00%	2	5.22E-03	6.40E-02	2.58E-02	6.02E-05	3.77E-03	3.40E-03
T7 CAIRP	0.06%	0.01%	102	4.85E-02	1.30E+00	1.85E-01	3.59E-03	3.66E-02	2.19E-02
T7 CAIRP Construction	0.01%	0.00%	9	6.18E-03	1.62E-01	2.19E-02	3.41E-04	4.36E-03	2.96E-03
T7 NNOOS	0.08%	0.01%	127	2.86E-02	9.08E-01	1.28E-01	4.28E-03	3.26E-02	1.50E-02
T7 NOOS	0.02%	0.00%	40	1.47E-02	4.80E-01	5.70E-02	1.42E-03	1.21E-02	6.42E-03
T7 Other Port	0.03%	0.01%	51	1.92E-02	6.35E-01	6.26E-02	1.86E-03	1.42E-02	7.08E-03
T7 POAK	0.02%	0.00%	40	1.60E-02	5.36E-01	5.11E-02	1.47E-03	1.14E-02	5.76E-03
T7 Public	0.03%	0.01%	57	1.19E-02	1.58E+00	5.47E-02	2.09E-03	2.03E-02	1.22E-02
T7 Single	0.12%	0.02%	203	1.58E-01	4.25E+00	6.90E-01	7.40E-03	1.27E-01	9.60E-02
T7 Single Construction	0.01%	0.00%	24	1.50E-02	4.52E-01	6.36E-02	8.70E-04	1.21E-02	8.45E-03
T7 SWCV	0.08%	0.01%	127	1.57E-02	2.52E+00	3.36E-01	7.69E-03	3.01E-02	1.25E-02
T7 Tractor	0.11%	0.02%	188	1.11E-01	2.99E+00	4.41E-01	6.62E-03	7.67E-02	4.94E-02
T7 Tractor Construction	0.01%	0.00%	18	1.66E-02	3.73E-01	6.55E-02	6.52E-04	1.12E-02	8.38E-03
T7 Utility	0.00%	0.00%	1	1.57E-04	9.23E-03	6.21E-04	3.57E-05	2.46E-04	1.09E-04
T7IS	0.02%	0.00%	38	6.19E-02	3.28E-01	2.91E+00	1.50E-03	6.93E-03	2.72E-03
UBUS	0.38%	0.07%	645	4.23E-01	1.55E+01	4.79E+00	2.19E-02	1.26E+00	6.37E-01
TOTAL	100%	100.00%	934,722	**87**	**302**	**2,473**	**6**	**99**	**42**

Based on the emission factors for San Mateo County - San Francisco Bay Area Air Basin. % VMT based on EMFAC2014-PL for San Mateo County.

Existing GHG Emissions

Based on EMFAC2014

	2015	324,348,534						
	Emission year	Annual VMT		SAR GWP	SAR GWP		SAR GWP	
				1	21		310	MTons
	Percent of VMT	Adjust % VMT	VMT by Fleet	MT CO2	MT CH4	MT NOx	MT N_2O	MT CO2e
All Other Buses	0.15%	0.03%	86,403	1.01E+02	4.73E-04	3.95E-01	0	106
LDA	54.14%	65.43%	212,216,055	5.69E+04	1.42E+00	1.85E+01	1	57,171
LDT1	4.87%	5.88%	19,077,041	5.90E+03	2.60E-01	3.26E+00	0	5,945
LDT2	21.97%	26.55%	86,127,267	3.07E+04	6.15E-01	1.02E+01	0	30,880
LHD1	2.00%	0.36%	1,169,786	7.10E+02	1.80E-02	1.85E+00	0	734
LHD2	0.53%	0.10%	311,538	1.95E+02	2.65E-03	4.80E-01	0	201
MCY	0.74%	0.89%	2,887,876	4.25E+02	1.04E+00	3.05E+00	0	486
MDV	12.53%	0.21%	671,966	3.11E+02	8.12E-03	1.27E-01	0	312
MH	0.06%	0.01%	37,676	4.10E+01	1.76E-03	5.89E-02	0	42
Motor Coach	0.06%	0.01%	35,494	6.21E+01	3.82E-04	2.74E-01	0	66
OBUS	0.13%	0.02%	74,657	8.33E+01	1.66E-03	3.51E-02	0	84
SBUS	0.03%	0.01%	20,064	1.65E+01	8.20E-04	8.92E-02	0	18
T6 Ag	0.01%	0.00%	4,803	5.40E+00	1.89E-04	5.35E-02	0	6
T6 CAIRP Heavy	0.00%	0.00%	1,447	1.66E+00	6.53E-06	4.29E-03	0	2
T6 CAIRP Small	0.01%	0.00%	4,443	5.13E+00	3.93E-05	1.57E-02	0	5
T6 Instate Construction Heavy	0.01%	0.00%	4,619	5.28E+00	4.86E-05	2.85E-02	0	6
T6 Instate Construction Small	0.13%	0.02%	77,385	8.92E+01	8.11E-04	3.36E-01	0	94
T6 Instate Heavy	0.37%	0.07%	219,575	2.51E+02	1.22E-03	7.88E-01	0	262
T6 Instate Small	0.99%	0.18%	577,415	6.62E+02	6.45E-03	2.59E+00	0	695
T6 OOS Heavy	0.00%	0.00%	829	9.55E-01	2.28E-06	2.19E-03	0	1
T6 OOS Small	0.00%	0.00%	2,546	2.94E+00	2.25E-05	9.00E-03	0	3
T6 Public	0.03%	0.01%	17,200	1.98E+01	3.87E-05	9.98E-02	0	21
T6 Utility	0.01%	0.00%	4,171	4.95E+00	6.96E-06	8.66E-03	0	5
T6TS	0.23%	0.04%	137,572	1.54E+02	9.57E-03	1.82E-01	0	156
T7 Ag	0.00%	0.00%	573	9.94E-01	3.82E-05	1.01E-02	0	1
T7 CAIRP	0.06%	0.01%	35,502	5.92E+01	3.54E-04	2.04E-01	0	62
T7 CAIRP Construction	0.01%	0.00%	3,277	5.63E+00	4.52E-05	2.55E-02	0	6
T7 NNOOS	0.08%	0.01%	44,022	7.07E+01	2.09E-04	1.43E-01	0	73
T7 NOOS	0.02%	0.00%	14,023	2.34E+01	1.07E-04	7.55E-02	0	24
T7 Other Port	0.03%	0.01%	17,761	3.07E+01	1.41E-04	1.00E-01	0	32
T7 POAK	0.02%	0.00%	13,933	2.42E+01	1.17E-04	8.44E-02	0	25
T7 Public	0.03%	0.01%	19,675	3.45E+01	8.68E-05	2.49E-01	0	38
T7 Single	0.12%	0.02%	70,409	1.22E+02	1.15E-03	6.69E-01	0	131
T7 Single Construction	0.01%	0.00%	8,476	1.44E+01	1.10E-04	7.12E-02	0	15
T7 SWCV	0.08%	0.01%	44,201	1.58E+02	2.38E-02	3.96E-01	0	164
T7 Tractor	0.11%	0.02%	65,183	1.09E+02	8.11E-04	4.70E-01	0	115
T7 Tractor Construction	0.01%	0.00%	6,319	1.08E+01	1.21E-04	5.87E-02	0	12
T7 Utility	0.00%	0.00%	344	5.88E-01	1.15E-06	1.45E-03	0	1
T7IS	0.02%	0.00%	13,169	2.30E+01	3.24E-03	5.17E-02	0	24
UBUS	0.38%	0.07%	223,841	3.74E+02	2.62E-02	2.44E+00	0	406
TOTAL	100%	100.00%	324,348,534	**97,744**	**3**	**47**	**2**	**98,429**

N_2O emissions were calculated using an off-model adjustment provided by CARB for gas emissions in the 2014 Technical Support Document for California's 2000-2012 GHG EMissions inventory. The off-model adjustment uses for every gram of NOx emitted from gasoline vehicles, an average of 0.0416 grams of N2O are emitted. ($N_2O = 0.0416 \times NO_x$)

Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.

Based on the emission factors for San Mateo County - San Francisco Bay Area Air Basin. % VMT based on EMFAC2014-PL for San Mateo County.

San Mateo County 2015 - all Model Years (40 MPH)	g/mile															
Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX	VMT from default EMFAC-SG	%VMT
All Other Buses	1.18E-01	4.57E+00	3.90E-01	1.12E-02	5.00E-02	1.20E-02	1.30E-01	1.92E-01	4.79E-02	3.00E-03	5.59E-02	1.07E-01	1.17E+03	5.48E-03	25,626	0.15%
LDA	2.14E-02	8.74E-02	9.62E-01	2.69E-03	1.60E-03	8.00E-03	3.67E-02	4.64E-02	1.48E-03	2.00E-03	1.57E-02	1.92E-02	2.68E+02	6.70E-03	9,403,626	54.14%
LDT1	4.93E-02	1.71E-01	1.82E+00	3.12E-03	2.38E-03	8.00E-03	3.68E-02	4.71E-02	2.20E-03	2.00E-03	1.58E-02	2.00E-02	3.09E+02	1.36E-02	845,334	4.87%
LDT2	2.02E-02	1.18E-01	1.03E+00	3.58E-03	1.22E-03	8.00E-03	3.67E-02	4.60E-02	1.12E-03	2.00E-03	1.57E-02	1.89E-02	3.57E+02	7.14E-03	3,816,434	21.97%
LHD1	7.42E-02	1.58E+00	1.18E+00	5.99E-03	9.49E-03	9.58E-03	7.64E-02	9.55E-02	9.05E-03	2.39E-03	3.28E-02	4.42E-02	6.07E+02	1.54E-02	346,940	2.00%
LHD2	6.07E-02	1.54E+00	6.79E-01	6.11E-03	1.09E-02	1.04E-02	8.92E-02	1.11E-01	1.04E-02	2.61E-03	3.82E-02	5.13E-02	6.25E+02	8.49E-03	92,397	0.53%
MCY	2.08E+00	1.05E+00	1.91E+01	1.84E-03	1.46E-03	4.00E-03	1.18E-02	1.72E-02	1.38E-03	1.00E-03	5.04E-03	7.42E-03	1.47E+02	3.59E-01	127,966	0.74%
MDV	3.47E-02	1.89E-01	1.49E+00	4.63E-03	1.38E-03	8.00E-03	3.67E-02	4.61E-02	1.28E-03	2.00E-03	1.57E-02	1.90E-02	4.62E+02	1.21E-02	2,176,730	12.53%
MH	2.24E-01	1.56E+00	6.25E+00	1.09E-02	2.36E-02	1.28E-02	1.30E-01	1.67E-01	2.25E-02	3.21E-03	5.59E-02	8.16E-02	1.09E+03	4.67E-02	11,174	0.06%
Motor Coach	2.31E-01	7.73E+00	8.39E-01	1.67E-02	7.25E-02	1.20E-02	1.30E-01	2.15E-01	6.94E-02	3.00E-03	5.59E-02	1.28E-01	1.75E+03	1.07E-02	10,527	0.06%
OBUS	5.88E-02	4.70E-01	1.89E+00	1.12E-02	5.54E-04	1.20E-02	1.30E-01	1.43E-01	5.11E-04	3.00E-03	5.59E-02	5.94E-02	1.12E+03	2.22E-02	22,142	0.13%
SBUS	1.48E-01	4.45E+00	3.57E+00	8.04E-03	3.26E-02	9.94E-03	7.45E-01	7.87E-01	3.11E-02	2.48E-03	3.19E-01	3.53E-01	8.24E+02	4.09E-02	5,951	0.03%
T6 Ag	8.48E-01	1.11E+01	2.80E+00	1.07E-02	5.49E-01	1.20E-02	1.30E-01	6.91E-01	5.25E-01	3.00E-03	5.59E-02	5.84E-01	1.12E+03	3.94E-02	1,424	0.01%
T6 CAIRP Heavy	9.72E-02	2.97E+00	3.38E-01	1.09E-02	4.52E-02	1.20E-02	1.30E-01	1.88E-01	4.33E-02	3.00E-03	5.59E-02	1.02E-01	1.15E+03	4.51E-03	429	0.00%
T6 CAIRP Small	1.90E-01	3.53E+00	6.41E-01	1.10E-02	1.27E-01	1.20E-02	1.30E-01	2.69E-01	1.21E-01	3.00E-03	5.59E-02	1.80E-01	1.15E+03	8.84E-03	1,318	0.01%
T6 Instate Construction Heavy	2.27E-01	6.18E+00	8.01E-01	1.09E-02	1.29E-01	1.20E-02	1.30E-01	2.71E-01	1.23E-01	3.00E-03	5.59E-02	1.82E-01	1.14E+03	1.05E-02	1,370	0.01%
T6 Instate Construction Small	2.26E-01	4.34E+00	7.74E-01	1.10E-02	1.42E-01	1.20E-02	1.30E-01	2.85E-01	1.36E-01	3.00E-03	5.59E-02	1.95E-01	1.15E+03	1.05E-02	22,951	0.13%
T6 Instate Heavy	1.19E-01	3.59E+00	4.08E-01	1.09E-02	5.47E-02	1.20E-02	1.30E-01	1.97E-01	5.23E-02	3.00E-03	5.59E-02	1.11E-01	1.14E+03	5.54E-03	65,122	0.37%
T6 Instate Small	2.41E-01	4.48E+00	8.20E-01	1.09E-02	1.57E-01	1.20E-02	1.30E-01	3.00E-01	1.50E-01	3.00E-03	5.59E-02	2.09E-01	1.15E+03	1.12E-02	171,252	0.99%
T6 OOS Heavy	5.93E-02	2.64E+00	2.11E-01	1.10E-02	1.87E-02	1.20E-02	1.30E-01	1.61E-01	1.79E-02	3.00E-03	5.59E-02	7.68E-02	1.15E+03	2.75E-03	246	0.00%
T6 OOS Small	1.90E-01	3.53E+00	6.41E-01	1.10E-02	1.27E-01	1.20E-02	1.30E-01	2.69E-01	1.21E-01	3.00E-03	5.59E-02	1.80E-01	1.15E+03	8.84E-03	755	0.00%
T6 Public	4.85E-02	5.80E+00	1.62E-01	1.10E-02	2.76E-02	1.20E-02	1.30E-01	1.70E-01	2.64E-02	3.00E-03	5.59E-02	8.53E-02	1.15E+03	2.25E-03	5,101	0.03%
T6 Utility	3.59E-02	2.08E+00	1.28E-01	1.13E-02	9.15E-03	1.20E-02	1.30E-01	1.51E-01	8.75E-03	3.00E-03	5.59E-02	6.76E-02	1.19E+03	1.67E-03	1,237	0.01%
T6TS	1.88E-01	1.32E+00	6.10E+00	1.12E-02	1.38E-03	1.20E-02	1.30E-01	1.44E-01	1.28E-03	3.00E-03	5.59E-02	6.01E-02	1.12E+03	6.96E-02	40,802	0.23%
T7 Ag	1.44E+00	1.76E+01	7.08E+00	1.65E-02	9.39E-01	3.60E-02	6.17E-02	1.04E+00	8.98E-01	9.00E-03	2.65E-02	9.34E-01	1.73E+03	6.67E-02	170	0.00%
T7 CAIRP	2.15E-01	5.75E+00	8.21E-01	1.59E-02	6.44E-02	3.60E-02	6.17E-02	1.62E-01	6.16E-02	9.00E-03	2.65E-02	9.71E-02	1.67E+03	9.98E-03	10,529	0.06%
T7 CAIRP Construction	2.97E-01	7.79E+00	1.05E+00	1.64E-02	1.12E-01	3.60E-02	6.17E-02	2.09E-01	1.07E-01	9.00E-03	2.65E-02	1.42E-01	1.72E+03	1.38E-02	972	0.01%
T7 NNOOS	1.02E-01	3.25E+00	4.58E-01	1.53E-02	1.88E-02	3.60E-02	6.17E-02	1.17E-01	1.80E-02	9.00E-03	2.65E-02	5.35E-02	1.61E+03	4.74E-03	13,056	0.08%
T7 NOOS	1.65E-01	5.39E+00	6.40E-01	1.59E-02	3.83E-02	3.60E-02	6.17E-02	1.36E-01	3.66E-02	9.00E-03	2.65E-02	7.21E-02	1.67E+03	7.66E-03	4,159	0.02%
T7 Other Port	1.70E-01	5.63E+00	5.55E-01	1.65E-02	2.85E-02	3.60E-02	6.17E-02	1.26E-01	2.73E-02	9.00E-03	2.65E-02	6.27E-02	1.73E+03	7.92E-03	5,268	0.03%
T7 POAK	1.81E-01	6.06E+00	5.77E-01	1.66E-02	3.10E-02	3.60E-02	6.17E-02	1.29E-01	2.96E-02	9.00E-03	2.65E-02	6.51E-02	1.74E+03	8.42E-03	4,132	0.02%
T7 Public	9.50E-02	1.27E+01	4.37E-01	1.67E-02	6.48E-02	3.60E-02	6.17E-02	1.63E-01	6.20E-02	9.00E-03	2.65E-02	9.75E-02	1.75E+03	4.41E-03	5,835	0.03%
T7 Single	3.53E-01	9.50E+00	1.54E+00	1.65E-02	1.87E-01	3.60E-02	6.17E-02	2.85E-01	1.79E-01	9.00E-03	2.65E-02	2.15E-01	1.73E+03	1.64E-02	20,882	0.12%
T7 Single Construction	2.78E-01	8.40E+00	1.18E+00	1.62E-02	1.27E-01	3.60E-02	6.17E-02	2.25E-01	1.22E-01	9.00E-03	2.65E-02	1.57E-01	1.69E+03	1.29E-02	2,514	0.01%
T7 SWCV	5.60E-02	8.97E+00	1.19E+00	2.74E-02	9.35E-03	3.60E-02	6.17E-02	1.07E-01	8.94E-03	9.00E-03	2.65E-02	4.44E-02	3.58E+03	5.39E-01	13,109	0.08%
T7 Tractor	2.68E-01	7.21E+00	1.06E+00	1.60E-02	8.75E-02	3.60E-02	6.17E-02	1.85E-01	8.38E-02	9.00E-03	2.65E-02	1.19E-01	1.68E+03	1.24E-02	19,332	0.11%
T7 Tractor Construction	4.13E-01	9.29E+00	1.63E+00	1.62E-02	1.81E-01	3.60E-02	6.17E-02	2.79E-01	1.73E-01	9.00E-03	2.65E-02	2.09E-01	1.70E+03	1.92E-02	1,874	0.01%
T7 Utility	7.20E-02	4.23E+00	2.84E-01	1.63E-02	1.50E-02	3.60E-02	6.17E-02	1.13E-01	1.44E-02	9.00E-03	2.65E-02	4.98E-02	1.71E+03	3.35E-03	102	0.00%
T7IS	7.40E-01	3.92E+00	3.48E+01	1.80E-02	1.11E-03	2.00E-02	6.17E-02	8.28E-02	1.03E-03	5.00E-03	2.65E-02	3.25E-02	1.74E+03	2.46E-01	3,906	0.02%
UBUS	2.98E-01	1.09E+01	3.37E+00	1.54E-02	1.34E-01	1.20E-02	7.37E-01	8.84E-01	1.29E-01	3.00E-03	3.16E-01	4.48E-01	1.67E+03	1.17E-01	66,388	0.38%
															17,369,083	100.00%

EMFAC2014v1.0.7 based on the average annual temperature (58.6) and humidity for Menlo Park (80.85) from USA.com (http://www.usa.com/menlo-park-ca-weather.htm) accessed January 12, 2016. Assumes an average 40 mph speed based on CalEEMod Users' Manual.

San Mateo County 2015 - all Model Years (40 MPH) ##

lbs/Mile

Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX
All Other Buses	2.60E-04	1.01E-02	8.59E-04	2.46E-05	1.10E-04	2.65E-05	2.87E-04	4.24E-04	1.06E-04	6.61E-06	1.23E-04	2.35E-04	2.58E+00	1.21E-05
LDA	4.72E-05	1.93E-04	2.12E-03	5.93E-06	3.53E-06	1.76E-05	8.10E-05	1.02E-04	3.26E-06	4.41E-06	3.47E-05	4.24E-05	5.91E-01	1.48E-05
LDT1	1.09E-04	3.76E-04	4.01E-03	6.87E-06	5.26E-06	1.76E-05	8.10E-05	1.04E-04	4.86E-06	4.41E-06	3.47E-05	4.40E-05	6.82E-01	3.01E-05
LDT2	4.46E-05	2.60E-04	2.28E-03	7.89E-06	2.68E-06	1.76E-05	8.10E-05	1.01E-04	2.47E-06	4.41E-06	3.47E-05	4.16E-05	7.87E-01	1.57E-05
LHD1	1.64E-04	3.49E-03	2.60E-03	1.32E-05	2.09E-05	2.11E-05	1.69E-04	2.11E-04	2.00E-05	5.28E-06	7.22E-05	9.75E-05	1.34E+00	3.40E-05
LHD2	1.34E-04	3.39E-03	1.50E-03	1.35E-05	2.41E-05	2.30E-05	1.97E-04	2.44E-04	2.30E-05	5.74E-06	8.43E-05	1.13E-04	1.38E+00	1.87E-05
MCY	4.59E-03	2.33E-03	4.21E-02	4.06E-06	3.23E-06	8.82E-06	2.59E-05	3.80E-05	3.04E-06	2.20E-06	1.11E-05	1.64E-05	3.24E-01	7.91E-04
MDV	7.65E-05	4.16E-04	3.29E-03	1.02E-05	3.05E-06	1.76E-05	8.10E-05	1.02E-04	2.81E-06	4.41E-06	3.47E-05	4.19E-05	1.02E+00	2.67E-05
MH	4.95E-04	3.45E-03	1.38E-02	2.40E-05	5.20E-05	2.83E-05	2.87E-04	3.68E-04	4.97E-05	7.08E-06	1.23E-04	1.80E-04	2.40E+00	1.03E-04
Motor Coach	5.10E-04	1.70E-02	1.85E-03	3.68E-05	1.60E-04	2.65E-05	2.87E-04	4.74E-04	1.53E-04	6.61E-06	1.23E-04	2.83E-04	3.86E+00	2.37E-05
OBUS	1.30E-04	1.04E-03	4.17E-03	2.46E-05	1.22E-06	2.65E-05	2.87E-04	3.15E-04	1.13E-06	6.61E-06	1.23E-04	1.31E-04	2.46E+00	4.90E-05
SBUS	3.26E-04	9.81E-03	7.86E-03	1.77E-05	7.18E-05	2.19E-05	1.64E-03	1.74E-03	6.86E-05	5.48E-06	7.04E-04	7.78E-04	1.82E+00	9.01E-05
T6 Ag	1.87E-03	2.46E-02	6.18E-03	2.36E-05	1.21E-03	2.65E-05	2.87E-04	1.52E-03	1.16E-03	6.61E-06	1.23E-04	1.29E-03	2.48E+00	8.68E-05
T6 CAIRP Heavy	2.14E-04	6.54E-03	7.45E-04	2.41E-05	9.97E-05	2.65E-05	2.87E-04	4.13E-04	9.54E-05	6.61E-06	1.23E-04	2.25E-04	2.53E+00	9.95E-06
T6 CAIRP Small	4.19E-04	7.79E-03	1.41E-03	2.43E-05	2.79E-04	2.65E-05	2.87E-04	5.93E-04	2.67E-04	6.61E-06	1.23E-04	3.97E-04	2.54E+00	1.95E-05
T6 Instate Construction Heavy	5.00E-04	1.36E-02	1.77E-03	2.40E-05	2.84E-04	2.65E-05	2.87E-04	5.97E-04	2.71E-04	6.61E-06	1.23E-04	4.01E-04	2.52E+00	2.32E-05
T6 Instate Construction Small	4.97E-04	9.56E-03	1.71E-03	2.42E-05	3.14E-04	2.65E-05	2.87E-04	6.27E-04	3.00E-04	6.61E-06	1.23E-04	4.30E-04	2.54E+00	2.31E-05
T6 Instate Heavy	2.63E-04	7.91E-03	9.00E-04	2.41E-05	1.21E-04	2.65E-05	2.87E-04	4.34E-04	1.15E-04	6.61E-06	1.23E-04	2.45E-04	2.52E+00	1.22E-05
T6 Instate Small	5.30E-04	9.88E-03	1.81E-03	2.41E-05	3.47E-04	2.65E-05	2.87E-04	6.60E-04	3.32E-04	6.61E-06	1.23E-04	4.61E-04	2.53E+00	2.46E-05
T6 OOS Heavy	1.31E-04	5.82E-03	4.65E-04	2.42E-05	4.12E-05	2.65E-05	2.87E-04	3.55E-04	3.95E-05	6.61E-06	1.23E-04	1.69E-04	2.54E+00	6.07E-06
T6 OOS Small	4.19E-04	7.79E-03	1.41E-03	2.43E-05	2.79E-04	2.65E-05	2.87E-04	5.93E-04	2.67E-04	6.61E-06	1.23E-04	3.97E-04	2.54E+00	1.95E-05
T6 Public	1.07E-04	1.28E-02	3.57E-04	2.43E-05	6.08E-05	2.65E-05	2.87E-04	3.75E-04	5.82E-05	6.61E-06	1.23E-04	1.88E-04	2.54E+00	4.96E-06
T6 Utility	7.92E-05	4.58E-03	2.83E-04	2.50E-05	2.02E-05	2.65E-05	2.87E-04	3.34E-04	1.93E-05	6.61E-06	1.23E-04	1.49E-04	2.62E+00	3.68E-06
T6TS	4.14E-04	2.91E-03	1.35E-02	2.48E-05	3.05E-06	2.65E-05	2.87E-04	3.17E-04	2.82E-06	6.61E-06	1.23E-04	1.33E-04	2.46E+00	1.53E-04
T7 Ag	3.16E-03	3.88E-02	1.56E-02	3.65E-05	2.07E-03	7.94E-05	1.36E-04	2.29E-03	1.98E-03	1.98E-05	5.83E-05	2.06E-03	3.82E+00	1.47E-04
T7 CAIRP	4.74E-04	1.27E-02	1.81E-03	3.51E-05	1.42E-04	7.94E-05	1.36E-04	3.57E-04	1.36E-04	1.98E-05	5.83E-05	2.14E-04	3.68E+00	2.20E-05
T7 CAIRP Construction	6.55E-04	1.72E-02	2.31E-03	3.61E-05	2.46E-04	7.94E-05	1.36E-04	4.62E-04	2.36E-04	1.98E-05	5.83E-05	3.14E-04	3.79E+00	3.04E-05
T7 NNOOS	2.25E-04	7.15E-03	1.01E-03	3.38E-05	4.15E-05	7.94E-05	1.36E-04	2.57E-04	3.97E-05	1.98E-05	5.83E-05	1.18E-04	3.54E+00	1.05E-05
T7 NOOS	3.63E-04	1.19E-02	1.41E-03	3.51E-05	8.44E-05	7.94E-05	1.36E-04	3.00E-04	8.07E-05	1.98E-05	5.83E-05	1.59E-04	3.68E+00	1.69E-05
T7 Other Port	3.76E-04	1.24E-02	1.22E-03	3.63E-05	6.28E-05	7.94E-05	1.36E-04	2.78E-04	6.01E-05	1.98E-05	5.83E-05	1.38E-04	3.81E+00	1.75E-05
T7 POAK	4.00E-04	1.33E-02	1.27E-03	3.66E-05	6.82E-05	7.94E-05	1.36E-04	2.84E-04	6.53E-05	1.98E-05	5.83E-05	1.43E-04	3.83E+00	1.86E-05
T7 Public	2.09E-04	2.79E-02	9.64E-04	3.69E-05	1.43E-04	7.94E-05	1.36E-04	3.58E-04	1.37E-04	1.98E-05	5.83E-05	2.15E-04	3.86E+00	9.73E-06
T7 Single	7.78E-04	2.09E-02	3.40E-03	3.65E-05	4.13E-04	7.94E-05	1.36E-04	6.28E-04	3.95E-04	1.98E-05	5.83E-05	4.73E-04	3.82E+00	3.61E-05
T7 Single Construction	6.13E-04	1.85E-02	2.60E-03	3.56E-05	2.80E-04	7.94E-05	1.36E-04	4.95E-04	2.68E-04	1.98E-05	5.83E-05	3.46E-04	3.73E+00	2.85E-05
T7 SWCV	1.23E-04	1.98E-02	2.63E-03	6.03E-05	2.06E-05	7.94E-05	1.36E-04	2.36E-04	1.97E-05	1.98E-05	5.83E-05	9.79E-05	7.88E+00	1.19E-03
T7 Tractor	5.90E-04	1.59E-02	2.35E-03	3.52E-05	1.93E-04	7.94E-05	1.36E-04	4.08E-04	1.85E-04	1.98E-05	5.83E-05	2.63E-04	3.69E+00	2.74E-05
T7 Tractor Construction	9.10E-04	2.05E-02	3.60E-03	3.58E-05	3.99E-04	7.94E-05	1.36E-04	6.15E-04	3.82E-04	1.98E-05	5.83E-05	4.60E-04	3.75E+00	4.23E-05
T7 Utility	1.59E-04	9.32E-03	6.27E-04	3.60E-05	3.31E-05	7.94E-05	1.36E-04	2.49E-04	3.17E-05	1.98E-05	5.83E-05	1.10E-04	3.78E+00	7.38E-06
T7IS	1.63E-03	8.65E-03	7.67E-02	3.96E-05	2.44E-06	4.41E-05	1.36E-04	1.83E-04	2.28E-06	1.10E-05	5.83E-05	7.16E-05	3.84E+00	5.43E-04
UBUS	6.56E-04	2.40E-02	7.43E-03	3.39E-05	2.96E-04	2.65E-05	1.63E-03	1.95E-03	2.84E-04	6.61E-06	6.97E-04	9.87E-04	3.69E+00	2.58E-04

San Mateo County 2015 - all Model Years (40 MPH) ###

MTons/Mile

Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX
All Other Buses	1.18E-07	4.57E-06	3.90E-07	1.12E-08	5.00E-08	1.20E-08	1.30E-07	1.92E-07	4.79E-08	3.00E-09	5.59E-08	1.07E-07	1.17E-03	5.48E-09
LDA	2.14E-08	8.74E-08	9.62E-07	2.69E-09	1.60E-09	8.00E-09	3.67E-08	4.64E-08	1.48E-09	2.00E-09	1.57E-08	1.92E-08	2.68E-04	6.70E-09
LDT1	4.93E-08	1.71E-07	1.82E-06	3.12E-09	2.38E-09	8.00E-09	3.68E-08	4.71E-08	2.20E-09	2.00E-09	1.58E-08	2.00E-08	3.09E-04	1.36E-08
LDT2	2.02E-08	1.18E-07	1.03E-06	3.58E-09	1.22E-09	8.00E-09	3.67E-08	4.60E-08	1.12E-09	2.00E-09	1.57E-08	1.89E-08	3.57E-04	7.14E-09
LHD1	7.42E-08	1.58E-06	1.18E-06	5.99E-09	9.49E-09	9.58E-09	7.64E-08	9.55E-08	9.05E-09	2.39E-09	3.28E-08	4.42E-08	6.07E-04	1.54E-08
LHD2	6.07E-08	1.54E-06	6.79E-07	6.11E-09	1.09E-08	1.04E-08	8.92E-08	1.11E-07	1.04E-08	2.61E-09	3.82E-08	5.13E-08	6.25E-04	8.49E-09
MCY	2.08E-06	1.05E-06	1.91E-05	1.84E-09	1.46E-09	4.00E-09	1.18E-08	1.72E-08	1.38E-09	1.00E-09	5.04E-09	7.42E-09	1.47E-04	3.59E-07
MDV	3.47E-08	1.89E-07	1.49E-06	4.63E-09	1.38E-09	8.00E-09	3.67E-08	4.61E-08	1.28E-09	2.00E-09	1.57E-08	1.90E-08	4.62E-04	1.21E-08
MH	2.24E-07	1.56E-06	6.25E-06	1.09E-08	2.36E-08	1.28E-08	1.30E-07	1.67E-07	2.25E-08	3.21E-09	5.59E-08	8.16E-08	1.09E-03	4.67E-08
Motor Coach	2.31E-07	7.73E-06	8.39E-07	1.67E-08	7.25E-08	1.20E-08	1.30E-07	2.15E-07	6.94E-08	3.00E-09	5.59E-08	1.28E-07	1.75E-03	1.07E-08
OBUS	5.88E-08	4.70E-07	1.89E-06	1.12E-08	5.54E-10	1.20E-08	1.30E-07	1.43E-07	5.11E-10	3.00E-09	5.59E-08	5.94E-08	1.12E-03	2.22E-08
SBUS	1.48E-07	4.45E-06	3.57E-06	8.04E-09	3.26E-08	9.94E-09	7.45E-07	7.87E-07	3.11E-08	2.48E-09	3.19E-07	3.53E-07	8.24E-04	4.09E-08
T6 Ag	8.48E-07	1.11E-05	2.80E-06	1.07E-08	5.49E-07	1.20E-08	1.30E-07	6.91E-07	5.25E-07	3.00E-09	5.59E-08	5.84E-07	1.12E-03	3.94E-08
T6 CAIRP Heavy	9.72E-08	2.97E-06	3.38E-07	1.09E-08	4.52E-08	1.20E-08	1.30E-07	1.88E-07	4.33E-08	3.00E-09	5.59E-08	1.02E-07	1.15E-03	4.51E-09
T6 CAIRP Small	1.90E-07	3.53E-06	6.41E-07	1.10E-08	1.27E-07	1.20E-08	1.30E-07	2.69E-07	1.21E-07	3.00E-09	5.59E-08	1.80E-07	1.15E-03	8.84E-09
T6 Instate Construction Heavy	2.27E-07	6.18E-06	8.01E-07	1.09E-08	1.29E-07	1.20E-08	1.30E-07	2.71E-07	1.23E-07	3.00E-09	5.59E-08	1.82E-07	1.14E-03	1.05E-08
T6 Instate Construction Small	2.26E-07	4.34E-06	7.74E-07	1.10E-08	1.42E-07	1.20E-08	1.30E-07	2.85E-07	1.36E-07	3.00E-09	5.59E-08	1.95E-07	1.15E-03	1.05E-08
T6 Instate Heavy	1.19E-07	3.59E-06	4.08E-07	1.09E-08	5.47E-08	1.20E-08	1.30E-07	1.97E-07	5.23E-08	3.00E-09	5.59E-08	1.11E-07	1.14E-03	5.54E-09
T6 Instate Small	2.41E-07	4.48E-06	8.20E-07	1.09E-08	1.57E-07	1.20E-08	1.30E-07	3.00E-07	1.50E-07	3.00E-09	5.59E-08	2.09E-07	1.15E-03	1.12E-08
T6 OOS Heavy	5.93E-08	2.64E-06	2.11E-07	1.10E-08	1.87E-08	1.20E-08	1.30E-07	1.61E-07	1.79E-08	3.00E-09	5.59E-08	7.68E-08	1.15E-03	2.75E-09
T6 OOS Small	1.90E-07	3.53E-06	6.41E-07	1.10E-08	1.27E-07	1.20E-08	1.30E-07	2.69E-07	1.21E-07	3.00E-09	5.59E-08	1.80E-07	1.15E-03	8.84E-09
T6 Public	4.85E-08	5.80E-06	1.62E-07	1.10E-08	2.76E-08	1.20E-08	1.30E-07	1.70E-07	2.64E-08	3.00E-09	5.59E-08	8.53E-08	1.15E-03	2.25E-09
T6 Utility	3.59E-08	2.08E-06	1.28E-07	1.13E-08	9.15E-09	1.20E-08	1.30E-07	1.51E-07	8.75E-09	3.00E-09	5.59E-08	6.76E-08	1.19E-03	1.67E-09
T6TS	1.88E-07	1.32E-06	6.10E-06	1.12E-08	1.38E-09	1.20E-08	1.30E-07	1.44E-07	1.28E-09	3.00E-09	5.59E-08	6.01E-08	1.12E-03	6.96E-08
T7 Ag	1.44E-06	1.76E-05	7.08E-06	1.65E-08	9.39E-07	3.60E-08	6.17E-08	1.04E-06	8.98E-07	9.00E-09	2.65E-08	9.34E-07	1.73E-03	6.67E-08
T7 CAIRP	2.15E-07	5.75E-06	8.21E-07	1.59E-08	6.44E-08	3.60E-08	6.17E-08	1.62E-07	6.16E-08	9.00E-09	2.65E-08	9.71E-08	1.67E-03	9.98E-09
T7 CAIRP Construction	2.97E-07	7.79E-06	1.05E-06	1.64E-08	1.12E-07	3.60E-08	6.17E-08	2.09E-07	1.07E-07	9.00E-09	2.65E-08	1.42E-07	1.72E-03	1.38E-08
T7 NNOOS	1.02E-07	3.25E-06	4.58E-07	1.53E-08	1.88E-08	3.60E-08	6.17E-08	1.17E-07	1.80E-08	9.00E-09	2.65E-08	5.35E-08	1.61E-03	4.74E-09
T7 NOOS	1.65E-07	5.39E-06	6.40E-07	1.59E-08	3.83E-08	3.60E-08	6.17E-08	1.36E-07	3.66E-08	9.00E-09	2.65E-08	7.21E-08	1.67E-03	7.66E-09
T7 Other Port	1.70E-07	5.63E-06	5.55E-07	1.65E-08	2.85E-08	3.60E-08	6.17E-08	1.26E-07	2.73E-08	9.00E-09	2.65E-08	6.27E-08	1.73E-03	7.92E-09
T7 POAK	1.81E-07	6.06E-06	5.77E-07	1.66E-08	3.10E-08	3.60E-08	6.17E-08	1.29E-07	2.96E-08	9.00E-09	2.65E-08	6.51E-08	1.74E-03	8.42E-09
T7 Public	9.50E-08	1.27E-05	4.37E-07	1.67E-08	6.48E-08	3.60E-08	6.17E-08	1.63E-07	6.20E-08	9.00E-09	2.65E-08	9.75E-08	1.75E-03	4.41E-09
T7 Single	3.53E-07	9.50E-06	1.54E-06	1.65E-08	1.87E-07	3.60E-08	6.17E-08	2.85E-07	1.79E-07	9.00E-09	2.65E-08	2.15E-07	1.73E-03	1.64E-08
T7 Single Construction	2.78E-07	8.40E-06	1.18E-06	1.62E-08	1.27E-07	3.60E-08	6.17E-08	2.25E-07	1.22E-07	9.00E-09	2.65E-08	1.57E-07	1.69E-03	1.29E-08
T7 SWCV	5.60E-08	8.97E-06	1.19E-06	2.74E-08	9.35E-09	3.60E-08	6.17E-08	1.07E-07	8.94E-09	9.00E-09	2.65E-08	4.44E-08	3.58E-03	5.39E-07
T7 Tractor	2.68E-07	7.21E-06	1.06E-06	1.60E-08	8.75E-08	3.60E-08	6.17E-08	1.85E-07	8.38E-08	9.00E-09	2.65E-08	1.19E-07	1.68E-03	1.24E-08
T7 Tractor Construction	4.13E-07	9.29E-06	1.63E-06	1.62E-08	1.81E-07	3.60E-08	6.17E-08	2.79E-07	1.73E-07	9.00E-09	2.65E-08	2.09E-07	1.70E-03	1.92E-08
T7 Utility	7.20E-08	4.23E-06	2.84E-07	1.63E-08	1.50E-08	3.60E-08	6.17E-08	1.13E-07	1.44E-08	9.00E-09	2.65E-08	4.98E-08	1.71E-03	3.35E-09
T7IS	7.40E-07	3.92E-06	3.48E-05	1.80E-08	1.11E-09	2.00E-08	6.17E-08	8.28E-08	1.03E-09	5.00E-09	2.65E-08	3.25E-08	1.74E-03	2.46E-07
UBUS	2.98E-07	1.09E-05	3.37E-06	1.54E-08	1.34E-07	1.20E-08	7.37E-07	8.84E-07	1.29E-07	3.00E-09	3.16E-07	4.48E-07	1.67E-03	1.17E-07

2040 Maximum Citywide Buildout Criteria Air Pollutants

Based on EMFAC2014

Emission year: 2040	Daily: 1,449,338								
				lbs/day					
	Percent of VMT	Adjust % VMT	VMT by Fleet	ROG	NOx	CO	SOx	PM10	PM2.5
All Other Buses	0.20%	0.04%	577	3.82E-02	5.19E-01	2.01E-01	1.34E-02	1.85E-01	7.86E-02
LDA	54.14%	65.29%	946,290	4.94E+00	3.20E+01	4.74E+02	2.90E+00	9.44E+01	3.80E+01
LDT1	4.87%	5.87%	85,066	6.12E-01	3.91E+00	5.64E+01	3.31E-01	8.52E+00	3.44E+00
LDT2	21.97%	26.50%	384,049	3.15E+00	1.91E+01	3.09E+02	1.73E+00	3.84E+01	1.55E+01
LHD1	2.00%	0.40%	5,837	2.98E-01	1.24E+00	1.91E+00	6.15E-02	1.18E+00	5.10E-01
LHD2	0.53%	0.11%	1,554	7.98E-02	1.49E-01	4.63E-01	1.77E-02	3.61E-01	1.57E-01
MCY	0.74%	0.89%	12,877	5.12E+01	2.89E+01	4.37E+02	5.22E-02	5.02E-01	2.22E-01
MDV	12.53%	0.28%	4,104	4.32E-02	2.51E-01	3.80E+00	2.43E-02	4.11E-01	1.66E-01
MH	0.06%	0.01%	188	5.21E-03	1.93E-01	6.26E-02	4.18E-03	6.11E-02	2.61E-02
Motor Coach	0.06%	0.01%	177	2.45E-02	2.59E-01	1.45E-01	5.86E-03	5.75E-02	2.48E-02
OBUS	0.13%	0.03%	373	6.16E-03	6.69E-02	1.56E-01	8.55E-03	1.18E-01	4.90E-02
SBUS	0.03%	0.01%	100	2.54E-03	3.17E-02	3.71E-02	1.37E-03	1.67E-01	7.12E-02
T6 Ag	0.01%	0.00%	24	1.82E-03	3.30E-02	9.60E-03	5.65E-04	7.71E-03	3.29E-03
T6 CAIRP Heavy	0.00%	0.00%	7	4.38E-04	5.56E-03	2.31E-03	1.64E-04	2.31E-03	9.79E-04
T6 CAIRP Small	0.01%	0.00%	22	1.28E-03	1.56E-02	6.72E-03	5.13E-04	7.08E-03	3.00E-03
T6 Instate Construction Heavy	0.01%	0.00%	23	1.57E-03	2.17E-02	8.26E-03	5.35E-04	7.39E-03	3.15E-03
T6 Instate Construction Small	0.13%	0.03%	386	2.43E-02	3.18E-01	1.28E-01	8.96E-03	1.24E-01	5.24E-02
T6 Instate Heavy	0.37%	0.08%	1,096	7.13E-02	9.59E-01	3.75E-01	2.49E-02	3.51E-01	1.49E-01
T6 Instate Small	0.99%	0.20%	2,881	1.80E-01	2.34E+00	9.48E-01	6.68E-02	9.22E-01	3.91E-01
T6 OOS Heavy	0.00%	0.00%	4	2.51E-04	3.19E-03	1.32E-03	9.40E-05	1.32E-03	5.61E-04
T6 OOS Small	0.00%	0.00%	13	7.31E-04	8.94E-03	3.85E-03	2.94E-04	4.06E-03	1.72E-03
T6 Public	0.03%	0.01%	86	4.55E-03	7.79E-02	2.32E-02	1.99E-03	2.75E-02	1.16E-02
T6 Utility	0.01%	0.00%	21	9.87E-04	1.07E-02	5.19E-03	4.82E-04	6.62E-03	2.78E-03
T6TS	0.23%	0.05%	686	1.12E-02	1.23E-01	2.88E-01	1.57E-02	2.17E-01	9.04E-02
T7 Ag	0.00%	0.00%	3	4.98E-04	8.58E-03	2.94E-03	9.16E-05	6.57E-04	2.63E-04
T7 CAIRP	0.06%	0.01%	177	2.68E-02	2.97E-01	1.58E-01	5.32E-03	4.03E-02	1.59E-02
T7 CAIRP Construction	0.01%	0.00%	16	2.54E-03	2.82E-02	1.50E-02	5.00E-04	3.73E-03	1.48E-03
T7 NNOOS	0.08%	0.02%	220	2.93E-02	3.02E-01	1.73E-01	6.58E-03	4.96E-02	1.93E-02
T7 NOOS	0.02%	0.00%	70	1.06E-02	1.18E-01	6.26E-02	2.10E-03	1.59E-02	6.29E-03
T7 Other Port	0.03%	0.01%	89	1.46E-02	1.64E-01	8.62E-02	2.71E-03	2.03E-02	8.08E-03
T7 POAK	0.02%	0.00%	70	1.16E-02	1.30E-01	6.83E-02	2.13E-03	1.59E-02	6.35E-03
T7 Public	0.03%	0.01%	98	1.21E-02	4.83E-01	6.37E-02	3.11E-03	2.31E-02	9.52E-03
T7 Single	0.12%	0.02%	351	4.69E-02	5.93E-01	2.77E-01	1.10E-02	7.93E-02	3.09E-02
T7 Single Construction	0.01%	0.00%	42	5.42E-03	6.07E-02	3.20E-02	1.30E-03	9.53E-03	3.70E-03
T7 SWCV	0.08%	0.02%	221	1.29E-02	5.57E-01	2.40E+00	1.70E-03	4.91E-02	1.88E-02
T7 Tractor	0.11%	0.02%	325	5.01E-02	5.68E-01	2.96E-01	9.78E-03	7.41E-02	2.93E-02
T7 Tractor Construction	0.01%	0.00%	32	5.05E-03	5.79E-02	2.98E-02	9.67E-04	7.21E-03	2.86E-03
T7 Utility	0.00%	0.00%	2	1.67E-04	1.44E-03	9.87E-04	5.24E-05	3.81E-04	1.45E-04
T7IS	0.02%	0.00%	66	3.64E-02	4.02E-01	4.31E+00	2.31E-03	1.20E-02	4.68E-03
UBUS	0.38%	0.08%	1,117	4.26E-02	2.45E+00	1.53E+00	2.69E-02	1.28E+00	5.56E-01
TOTAL	100%	100.00%	1,449,338	**61**	**97**	**1,294**	**5**	**148**	**60**

Based on the emission factors for San Mateo County - San Francisco Bay Area Air Basin. % VMT based on EMFAC2014-PL for San Mateo County.

Existing with 2040 Emission Rates

Based on EMFAC2014

	Percent of VMT	Adjust % VMT	VMT by Fleet	ROG	NOx	CO	SOx	PM10	PM2.5
2040 Emission year	934,722 Daily								
				lbs/day					
All Other Buses	0.20%	0.04%	330	2.19E-02	2.97E-01	1.15E-01	7.68E-03	1.06E-01	4.50E-02
LDA	54.14%	65.43%	611,574	3.19E+00	2.07E+01	3.06E+02	1.88E+00	6.10E+01	2.46E+01
LDT1	4.87%	5.88%	54,977	3.96E-01	2.53E+00	3.65E+01	2.14E-01	5.50E+00	2.22E+00
LDT2	21.97%	26.55%	248,205	2.04E+00	1.23E+01	1.99E+02	1.12E+00	2.48E+01	1.00E+01
LHD1	2.00%	0.36%	3,342	1.71E-01	7.11E-01	1.09E+00	3.52E-02	6.74E-01	2.92E-01
LHD2	0.53%	0.10%	890	4.57E-02	8.51E-02	2.65E-01	1.01E-02	2.07E-01	9.01E-02
MCY	0.74%	0.89%	8,322	3.31E+01	1.87E+01	2.82E+02	3.37E-02	3.24E-01	1.44E-01
MDV	12.53%	0.21%	1,937	2.04E-02	1.18E-01	1.79E+00	1.15E-02	1.94E-01	7.85E-02
MH	0.06%	0.01%	108	2.98E-03	1.11E-01	3.59E-02	2.39E-03	3.50E-02	1.50E-02
Motor Coach	0.06%	0.01%	101	1.40E-02	1.48E-01	8.29E-02	3.36E-03	3.29E-02	1.42E-02
OBUS	0.13%	0.02%	213	3.53E-03	3.83E-02	8.91E-02	4.90E-03	6.74E-02	2.81E-02
SBUS	0.03%	0.01%	57	1.46E-03	1.82E-02	2.12E-02	7.84E-04	9.54E-02	4.08E-02
T6 Ag	0.01%	0.00%	14	1.04E-03	1.89E-02	5.50E-03	3.24E-04	4.42E-03	1.89E-03
T6 CAIRP Heavy	0.00%	0.00%	4	2.51E-04	3.18E-03	1.32E-03	9.39E-05	1.32E-03	5.60E-04
T6 CAIRP Small	0.01%	0.00%	13	7.31E-04	8.93E-03	3.85E-03	2.94E-04	4.05E-03	1.72E-03
T6 Instate Construction Heavy	0.01%	0.00%	13	8.98E-04	1.24E-02	4.73E-03	3.06E-04	4.23E-03	1.80E-03
T6 Instate Construction Small	0.13%	0.02%	221	1.39E-02	1.82E-01	7.33E-02	5.13E-03	7.08E-02	3.00E-02
T6 Instate Heavy	0.37%	0.07%	627	4.08E-02	5.49E-01	2.15E-01	1.43E-02	2.01E-01	8.54E-02
T6 Instate Small	0.99%	0.18%	1,650	1.03E-01	1.34E+00	5.43E-01	3.83E-02	5.28E-01	2.24E-01
T6 OOS Heavy	0.00%	0.00%	2	1.44E-04	1.83E-03	7.57E-04	5.38E-05	7.58E-04	3.21E-04
T6 OOS Small	0.00%	0.00%	7	4.19E-04	5.12E-03	2.20E-03	1.68E-04	2.32E-03	9.83E-04
T6 Public	0.03%	0.01%	49	2.61E-03	4.46E-02	1.33E-02	1.14E-03	1.57E-02	6.67E-03
T6 Utility	0.01%	0.00%	12	5.65E-04	6.13E-03	2.97E-03	2.76E-04	3.79E-03	1.59E-03
T6TS	0.23%	0.04%	393	6.40E-03	7.06E-02	1.65E-01	9.01E-03	1.24E-01	5.17E-02
T7 Ag	0.00%	0.00%	2	2.85E-04	4.91E-03	1.69E-03	5.24E-05	3.76E-04	1.50E-04
T7 CAIRP	0.06%	0.01%	101	1.54E-02	1.70E-01	9.07E-02	3.04E-03	2.31E-02	9.11E-03
T7 CAIRP Construction	0.01%	0.00%	9	1.46E-03	1.62E-02	8.60E-03	2.86E-04	2.14E-03	8.45E-04
T7 NNOOS	0.08%	0.01%	126	1.68E-02	1.73E-01	9.90E-02	3.77E-03	2.84E-02	1.11E-02
T7 NOOS	0.02%	0.00%	40	6.07E-03	6.74E-02	3.58E-02	1.20E-03	9.12E-03	3.60E-03
T7 Other Port	0.03%	0.01%	51	8.36E-03	9.38E-02	4.94E-02	1.55E-03	1.16E-02	4.63E-03
T7 POAK	0.02%	0.00%	40	6.62E-03	7.45E-02	3.91E-02	1.22E-03	9.13E-03	3.64E-03
T7 Public	0.03%	0.01%	56	6.95E-03	2.77E-01	3.65E-02	1.78E-03	1.32E-02	5.45E-03
T7 Single	0.12%	0.02%	201	2.69E-02	3.40E-01	1.59E-01	6.27E-03	4.54E-02	1.77E-02
T7 Single Construction	0.01%	0.00%	24	3.10E-03	3.47E-02	1.83E-02	7.47E-04	5.46E-03	2.12E-03
T7 SWCV	0.08%	0.01%	126	7.39E-03	3.19E-01	1.37E+00	9.72E-04	2.81E-02	1.07E-02
T7 Tractor	0.11%	0.02%	186	2.87E-02	3.25E-01	1.69E-01	5.60E-03	4.24E-02	1.68E-02
T7 Tractor Construction	0.01%	0.00%	18	2.89E-03	3.32E-02	1.71E-02	5.54E-04	4.13E-03	1.64E-03
T7 Utility	0.00%	0.00%	1	9.57E-05	8.24E-04	5.65E-04	3.00E-05	2.18E-04	8.29E-05
T7IS	0.02%	0.00%	38	2.08E-02	2.30E-01	2.47E+00	1.32E-03	6.86E-03	2.68E-03
UBUS	0.38%	0.07%	640	2.44E-02	1.41E+00	8.76E-01	1.54E-02	7.35E-01	3.18E-01
TOTAL	100%	100.00%	934,722	**39**	**62**	**835**	**3**	**95**	**38**

Based on the emission factors for San Mateo County - San Francisco Bay Area Air Basin. % VMT based on EMFAC2014-PL for San Mateo County.

2040 Maximum Citywide Buildout GHGs
Based on EMFAC2014

	Emission year: 2040	Annual VMT: 502,920,113		SAR GWP 1	SAR GWP 21		SAR GWP 310	MTons
	Percent of VMT	**Adjust % VMT**	**VMT by Fleet**	**MT CO2**	**MT CH4**	**MT NOx**	**MT N_2O**	**MT CO2e**
All Other Buses	0.20%	0.03%	161,873	1.79E+02	2.26E-04	6.61E-02	0	180
LDA	43.98%	55.64%	279,815,281	3.90E+04	2.64E-01	4.29E+00	0	39,020
LDT1	5.15%	6.52%	32,792,885	5.78E+03	4.32E-02	6.83E-01	0	5,786
LDT2	27.79%	35.16%	176,846,149	3.60E+04	2.64E-01	3.99E+00	0	36,100
LHD1	1.69%	0.27%	1,382,789	6.78E+02	1.98E-03	1.33E-01	0	680
LHD2	0.79%	0.13%	650,905	3.46E+02	8.72E-04	2.82E-02	0	346
MCY	0.97%	1.22%	6,159,539	9.44E+02	2.42E+00	6.26E+00	0	1,076
MDV	14.93%	0.28%	1,423,915	3.82E+02	2.69E-03	3.95E-02	0	383
MH	0.10%	0.02%	80,329	8.18E+01	2.08E-04	3.75E-02	0	82
Motor Coach	0.09%	0.01%	71,766	1.13E+02	2.09E-04	4.75E-02	0	114
OBUS	0.19%	0.03%	156,913	1.64E+02	4.76E-04	1.28E-02	0	164
SBUS	0.07%	0.01%	59,763	3.78E+01	1.45E-04	8.59E-03	0	38
T6 Ag	0.01%	0.00%	5,951	6.67E+00	9.54E-06	3.71E-03	0	7
T6 CAIRP Heavy	0.00%	0.00%	2,927	3.16E+00	3.74E-06	1.02E-03	0	3
T6 CAIRP Small	0.01%	0.00%	8,984	9.89E+00	1.09E-05	2.87E-03	0	10
T6 Instate Construction Heavy	0.01%	0.00%	7,463	8.24E+00	1.07E-05	3.19E-03	0	8
T6 Instate Construction Small	0.15%	0.02%	125,045	1.38E+02	1.66E-04	4.67E-02	0	139
T6 Instate Heavy	0.70%	0.11%	571,322	6.18E+02	7.83E-04	2.27E-01	0	621
T6 Instate Small	1.75%	0.29%	1,438,834	1.59E+03	1.90E-03	5.29E-01	0	1,594
T6 OOS Heavy	0.00%	0.00%	1,677	1.81E+00	2.15E-06	5.86E-04	0	2
T6 OOS Small	0.01%	0.00%	5,147	5.67E+00	6.24E-06	1.64E-03	0	6
T6 Public	0.03%	0.01%	26,656	2.94E+01	2.98E-05	1.10E-02	0	30
T6 Utility	0.01%	0.00%	6,527	7.18E+00	6.52E-06	1.52E-03	0	7
T6TS	0.35%	0.06%	287,857	3.00E+02	8.59E-04	2.35E-02	0	300
T7 Ag	0.00%	0.00%	710	1.08E+00	2.61E-06	9.67E-04	0	1
T7 CAIRP	0.09%	0.01%	71,783	1.02E+02	2.29E-04	5.47E-02	0	103
T7 CAIRP Construction	0.01%	0.00%	5,295	7.70E+00	1.74E-05	4.14E-03	0	8
T7 NNOOS	0.11%	0.02%	89,011	1.27E+02	2.50E-04	5.56E-02	0	128
T7 NOOS	0.03%	0.01%	28,354	4.05E+01	9.05E-05	2.16E-02	0	41
T7 Other Port	0.03%	0.00%	21,631	3.14E+01	7.51E-05	1.81E-02	0	32
T7 POAK	0.06%	0.01%	52,676	7.66E+01	1.85E-04	4.47E-02	0	77
T7 Public	0.02%	0.00%	19,286	2.91E+01	5.02E-05	4.31E-02	0	30
T7 Single	0.08%	0.01%	65,275	9.68E+01	1.84E-04	5.00E-02	0	97
T7 Single Construction	0.02%	0.00%	13,696	2.01E+01	3.70E-05	8.91E-03	0	20
T7 SWCV	0.06%	0.01%	46,745	1.26E+02	6.39E-02	5.35E-02	0	128
T7 Tractor	0.16%	0.03%	134,821	1.93E+02	4.38E-04	1.07E-01	0	194
T7 Tractor Construction	0.01%	0.00%	10,212	1.49E+01	3.45E-05	8.51E-03	0	15
T7 Utility	0.00%	0.00%	538	7.82E-01	1.10E-06	2.05E-04	0	1
T7IS	0.05%	0.01%	38,734	6.01E+01	3.93E-03	1.08E-01	0	62
UBUS	0.28%	0.05%	230,850	3.01E+02	1.30E-02	2.30E-01	0	304
TOTAL	100%	100.00%	502,920,113	**87,646**	**3**	**17**	**1**	**87,933**

N_2O emissions were calculated using an off-model adjustment provided by CARB for gas emissions in the 2014 Technical Support Document for California's 2000-2012 GHG EMissions inventory. The off-model adjustment uses for every gram of NOx emitted from gasoline vehicles, an average of 0.0416 grams of N2O are emitted. ($N_2O = 0.0416 \times NO_x$)

Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.

Based on the emission factors for San Mateo County - San Francisco Bay Area Air Basin. % VMT based on EMFAC2014-PL for San Mateo County.

San Mateo County 2040 - all Model Years (40 MPH)	g/mile														VMT from default EMFAC-SG	%VMT
Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX		
All Other Buses	3.00E-02	4.08E-01	1.58E-01	1.06E-02	3.07E-03	1.20E-02	1.30E-01	1.45E-01	2.94E-03	3.00E-03	5.59E-02	6.18E-02	1.11E+03	1.39E-03	38,748	0.20%
LDA	2.37E-03	1.53E-02	2.27E-01	1.39E-03	5.20E-04	8.00E-03	3.67E-02	4.53E-02	4.79E-04	2.00E-03	1.58E-02	1.82E-02	1.39E+02	9.44E-04	8,633,444	43.98%
LDT1	3.26E-03	2.08E-02	3.01E-01	1.76E-03	6.59E-04	8.00E-03	3.67E-02	4.54E-02	6.06E-04	2.00E-03	1.58E-02	1.84E-02	1.76E+02	1.32E-03	1,011,794	5.15%
LDT2	3.72E-03	2.26E-02	3.64E-01	2.04E-03	6.36E-04	8.00E-03	3.68E-02	4.54E-02	5.85E-04	2.00E-03	1.58E-02	1.83E-02	2.04E+02	1.49E-03	5,456,426	27.79%
LHD1	2.32E-02	9.65E-02	1.48E-01	4.78E-03	4.46E-03	1.06E-02	7.64E-02	9.15E-02	4.25E-03	2.66E-03	3.28E-02	3.97E-02	4.91E+02	1.43E-03	330,998	1.69%
LHD2	2.33E-02	4.34E-02	1.35E-01	5.16E-03	5.22E-03	1.08E-02	8.92E-02	1.05E-01	4.99E-03	2.71E-03	3.82E-02	4.59E-02	5.31E+02	1.34E-03	155,807	0.79%
MCY	1.80E+00	1.02E+00	1.54E+01	1.84E-03	1.92E-03	4.00E-03	1.18E-02	1.77E-02	1.79E-03	1.00E-03	5.04E-03	7.83E-03	1.53E+02	3.93E-01	190,047	0.97%
MDV	4.78E-03	2.77E-02	4.20E-01	2.68E-03	6.96E-04	8.00E-03	3.67E-02	4.54E-02	6.41E-04	2.00E-03	1.57E-02	1.84E-02	2.69E+02	1.89E-03	2,931,916	14.93%
MH	1.26E-02	4.67E-01	1.51E-01	1.01E-02	4.18E-03	1.29E-02	1.30E-01	1.47E-01	3.97E-03	3.22E-03	5.59E-02	6.31E-02	1.02E+03	2.59E-03	19,228	0.10%
Motor Coach	6.28E-02	6.62E-01	3.71E-01	1.50E-02	4.92E-03	1.20E-02	1.30E-01	1.47E-01	4.71E-03	3.00E-03	5.59E-02	6.36E-02	1.57E+03	2.92E-03	17,179	0.09%
OBUS	7.51E-03	8.14E-02	1.89E-01	1.04E-02	9.32E-04	1.20E-02	1.30E-01	1.43E-01	8.57E-04	3.00E-03	5.59E-02	5.97E-02	1.04E+03	3.03E-03	37,560	0.19%
SBUS	1.15E-02	1.44E-01	1.68E-01	6.21E-03	1.35E-03	8.90E-03	7.45E-01	7.55E-01	1.26E-03	2.23E-03	3.19E-01	3.23E-01	6.33E+02	2.42E-03	14,305	0.07%
T6 Ag	3.45E-02	6.24E-01	1.82E-01	1.07E-02	3.65E-03	1.20E-02	1.30E-01	1.46E-01	3.49E-03	3.00E-03	5.59E-02	6.24E-02	1.12E+03	1.60E-03	1,424	0.01%
T6 CAIRP Heavy	2.75E-02	3.49E-01	1.45E-01	1.03E-02	2.74E-03	1.20E-02	1.30E-01	1.45E-01	2.62E-03	3.00E-03	5.59E-02	6.15E-02	1.08E+03	1.28E-03	701	0.00%
T6 CAIRP Small	2.61E-02	3.19E-01	1.37E-01	1.05E-02	2.54E-03	1.20E-02	1.30E-01	1.45E-01	2.43E-03	3.00E-03	5.59E-02	6.13E-02	1.10E+03	1.21E-03	2,150	0.01%
T6 Instate Construction Heavy	3.09E-02	4.27E-01	1.62E-01	1.05E-02	3.19E-03	1.20E-02	1.30E-01	1.46E-01	3.05E-03	3.00E-03	5.59E-02	6.19E-02	1.10E+03	1.43E-03	1,787	0.01%
T6 Instate Construction Small	2.86E-02	3.74E-01	1.50E-01	1.05E-02	2.88E-03	1.20E-02	1.30E-01	1.45E-01	2.75E-03	3.00E-03	5.59E-02	6.16E-02	1.10E+03	1.33E-03	29,932	0.15%
T6 Instate Heavy	2.95E-02	3.97E-01	1.55E-01	1.03E-02	3.00E-03	1.20E-02	1.30E-01	1.45E-01	2.87E-03	3.00E-03	5.59E-02	6.17E-02	1.08E+03	1.37E-03	136,757	0.70%
T6 Instate Small	2.84E-02	3.68E-01	1.49E-01	1.05E-02	2.85E-03	1.20E-02	1.30E-01	1.45E-01	2.73E-03	3.00E-03	5.59E-02	6.16E-02	1.10E+03	1.32E-03	344,413	1.75%
T6 OOS Heavy	2.75E-02	3.50E-01	1.45E-01	1.03E-02	2.74E-03	1.20E-02	1.30E-01	1.45E-01	2.62E-03	3.00E-03	5.59E-02	6.15E-02	1.08E+03	1.28E-03	401	0.00%
T6 OOS Small	2.61E-02	3.19E-01	1.37E-01	1.05E-02	2.54E-03	1.20E-02	1.30E-01	1.45E-01	2.43E-03	3.00E-03	5.59E-02	6.13E-02	1.10E+03	1.21E-03	1,232	0.01%
T6 Public	2.41E-02	4.11E-01	1.22E-01	1.05E-02	2.84E-03	1.20E-02	1.30E-01	1.45E-01	2.72E-03	3.00E-03	5.59E-02	6.16E-02	1.10E+03	1.12E-03	6,381	0.03%
T6 Utility	2.15E-02	2.33E-01	1.13E-01	1.05E-02	1.92E-03	1.20E-02	1.30E-01	1.44E-01	1.83E-03	3.00E-03	5.59E-02	6.07E-02	1.10E+03	9.99E-04	1,562	0.01%
T6TS	7.38E-03	8.15E-02	1.91E-01	1.04E-02	9.32E-04	1.20E-02	1.30E-01	1.43E-01	8.57E-04	3.00E-03	5.59E-02	5.97E-02	1.04E+03	2.98E-03	68,904	0.35%
T7 Ag	7.91E-02	1.36E+00	4.67E-01	1.45E-02	6.50E-03	3.60E-02	6.17E-02	1.04E-01	6.22E-03	9.00E-03	2.65E-02	4.17E-02	1.52E+03	3.67E-03	170	0.00%
T7 CAIRP	6.87E-02	7.62E-01	4.06E-01	1.36E-02	5.53E-03	3.60E-02	6.17E-02	1.03E-01	5.29E-03	9.00E-03	2.65E-02	4.08E-02	1.43E+03	3.19E-03	17,183	0.09%
T7 CAIRP Construction	7.06E-02	7.83E-01	4.17E-01	1.39E-02	5.73E-03	3.60E-02	6.17E-02	1.03E-01	5.48E-03	9.00E-03	2.65E-02	4.09E-02	1.45E+03	3.28E-03	1,267	0.01%
T7 NNOOS	6.05E-02	6.24E-01	3.57E-01	1.36E-02	4.67E-03	3.60E-02	6.17E-02	1.02E-01	4.47E-03	9.00E-03	2.65E-02	3.99E-02	1.43E+03	2.81E-03	21,306	0.11%
T7 NOOS	6.87E-02	7.63E-01	4.06E-01	1.36E-02	5.53E-03	3.60E-02	6.17E-02	1.03E-01	5.30E-03	9.00E-03	2.65E-02	4.08E-02	1.43E+03	3.19E-03	6,787	0.03%
T7 Other Port	7.47E-02	8.39E-01	4.41E-01	1.39E-02	6.17E-03	3.60E-02	6.17E-02	1.04E-01	5.90E-03	9.00E-03	2.65E-02	4.14E-02	1.45E+03	3.47E-03	5,178	0.03%
T7 POAK	7.54E-02	8.49E-01	4.45E-01	1.39E-02	6.24E-03	3.60E-02	6.17E-02	1.04E-01	5.97E-03	9.00E-03	2.65E-02	4.14E-02	1.45E+03	3.50E-03	12,609	0.06%
T7 Public	5.60E-02	2.23E+00	2.95E-01	1.44E-02	8.93E-03	3.60E-02	6.17E-02	1.07E-01	8.54E-03	9.00E-03	2.65E-02	4.40E-02	1.51E+03	2.60E-03	4,617	0.02%
T7 Single	6.06E-02	7.66E-01	3.58E-01	1.41E-02	4.65E-03	3.60E-02	6.17E-02	1.02E-01	4.45E-03	9.00E-03	2.65E-02	3.99E-02	1.48E+03	2.81E-03	15,625	0.08%
T7 Single Construction	5.82E-02	6.51E-01	3.43E-01	1.40E-02	4.44E-03	3.60E-02	6.17E-02	1.02E-01	4.25E-03	9.00E-03	2.65E-02	3.97E-02	1.47E+03	2.70E-03	3,278	0.02%
T7 SWCV	2.65E-02	1.15E+00	4.93E+00	3.49E-03	3.25E-03	3.60E-02	6.17E-02	1.01E-01	3.11E-03	9.00E-03	2.65E-02	3.86E-02	2.69E+03	1.37E+00	11,189	0.06%
T7 Tractor	6.99E-02	7.92E-01	4.13E-01	1.36E-02	5.65E-03	3.60E-02	6.17E-02	1.03E-01	5.41E-03	9.00E-03	2.65E-02	4.09E-02	1.43E+03	3.25E-03	32,272	0.16%
T7 Tractor Construction	7.26E-02	8.33E-01	4.29E-01	1.39E-02	5.95E-03	3.60E-02	6.17E-02	1.04E-01	5.69E-03	9.00E-03	2.65E-02	4.12E-02	1.46E+03	3.37E-03	2,444	0.01%
T7 Utility	4.42E-02	3.81E-01	2.61E-01	1.39E-02	2.98E-03	3.60E-02	6.17E-02	1.01E-01	2.85E-03	9.00E-03	2.65E-02	3.83E-02	1.45E+03	2.05E-03	129	0.00%
T7IS	2.51E-01	2.78E+00	2.97E+01	1.60E-02	9.34E-04	2.00E-02	6.17E-02	8.27E-02	8.59E-04	5.00E-03	2.65E-02	3.23E-02	1.55E+03	1.02E-01	9,272	0.05%
UBUS	1.73E-02	9.97E-01	6.21E-01	1.09E-02	8.38E-03	1.20E-02	5.01E-01	5.22E-01	8.00E-03	3.00E-03	2.15E-01	2.26E-01	1.30E+03	5.63E-02	55,258	0.28%
															19,631,683	100.00%

EMFAC2014v1.0.7 based on the average annual temperature (58.6) and humidity for Menlo Park (80.85) from USA.com (http://www.usa.com/menlo-park-ca-weather.htm) accessed January 12, 2016. Assumes an average 40 mph speed based on CalEEMod Users' Manual.

San Mateo County 2040 - all Model Years (40 MPH)	##	lbs/Mile												
Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX
All Other Buses	6.62E-05	9.00E-04	3.48E-04	2.33E-05	6.78E-06	2.65E-05	2.87E-04	3.21E-04	6.48E-06	6.61E-06	1.23E-04	1.36E-04	2.44E+00	3.07E-06
LDA	5.22E-06	3.38E-05	5.01E-04	3.07E-06	1.15E-06	1.76E-05	8.10E-05	9.98E-05	1.06E-06	4.41E-06	3.47E-05	4.02E-05	3.07E-01	2.08E-06
LDT1	7.20E-06	4.59E-05	6.63E-04	3.89E-06	1.45E-06	1.76E-05	8.10E-05	1.00E-04	1.34E-06	4.41E-06	3.47E-05	4.05E-05	3.88E-01	2.90E-06
LDT2	8.20E-06	4.98E-05	8.03E-04	4.50E-06	1.40E-06	1.76E-05	8.10E-05	1.00E-04	1.29E-06	4.41E-06	3.47E-05	4.04E-05	4.49E-01	3.29E-06
LHD1	5.11E-05	2.13E-04	3.27E-04	1.05E-05	9.83E-06	2.34E-05	1.69E-04	2.02E-04	9.38E-06	5.85E-06	7.22E-05	8.75E-05	1.08E+00	3.16E-06
LHD2	5.13E-05	9.56E-05	2.98E-04	1.14E-05	1.15E-05	2.39E-05	1.97E-04	2.32E-04	1.10E-05	5.98E-06	8.43E-05	1.01E-04	1.17E+00	2.95E-06
MCY	3.97E-03	2.24E-03	3.39E-02	4.05E-06	4.24E-06	8.82E-06	2.59E-05	3.90E-05	3.95E-06	2.20E-06	1.11E-05	1.73E-05	3.38E-01	8.65E-04
MDV	1.05E-05	6.11E-05	9.25E-04	5.92E-06	1.53E-06	1.76E-05	8.10E-05	1.00E-04	1.41E-06	4.41E-06	3.47E-05	4.05E-05	5.92E-01	4.17E-06
MH	2.77E-05	1.03E-03	3.33E-04	2.22E-05	9.22E-06	2.84E-05	2.87E-04	3.25E-04	8.76E-06	7.10E-06	1.23E-04	1.39E-04	2.25E+00	5.72E-06
Motor Coach	1.38E-04	1.46E-03	8.18E-04	3.31E-05	1.08E-05	2.65E-05	2.87E-04	3.25E-04	1.04E-05	6.61E-06	1.23E-04	1.40E-04	3.47E+00	6.43E-06
OBUS	1.65E-05	1.80E-04	4.18E-04	2.30E-05	2.05E-06	2.65E-05	2.87E-04	3.16E-04	1.89E-06	6.61E-06	1.23E-04	1.32E-04	2.30E+00	6.69E-06
SBUS	2.54E-05	3.17E-04	3.70E-04	1.37E-05	2.97E-06	1.96E-05	1.64E-03	1.66E-03	2.78E-06	4.91E-06	7.04E-04	7.11E-04	1.39E+00	5.33E-06
T6 Ag	7.61E-05	1.38E-03	4.01E-04	2.36E-05	8.05E-06	2.65E-05	2.87E-04	3.22E-04	7.70E-06	6.61E-06	1.23E-04	1.37E-04	2.47E+00	3.54E-06
T6 CAIRP Heavy	6.07E-05	7.70E-04	3.19E-04	2.27E-05	6.03E-06	2.65E-05	2.87E-04	3.20E-04	5.77E-06	6.61E-06	1.23E-04	1.36E-04	2.38E+00	2.82E-06
T6 CAIRP Small	5.75E-05	7.04E-04	3.03E-04	2.32E-05	5.61E-06	2.65E-05	2.87E-04	3.19E-04	5.36E-06	6.61E-06	1.23E-04	1.35E-04	2.43E+00	2.67E-06
T6 Instate Construction Heavy	6.81E-05	9.42E-04	3.58E-04	2.32E-05	7.04E-06	2.65E-05	2.87E-04	3.21E-04	6.73E-06	6.61E-06	1.23E-04	1.36E-04	2.43E+00	3.16E-06
T6 Instate Construction Small	6.30E-05	8.23E-04	3.31E-04	2.32E-05	6.35E-06	2.65E-05	2.87E-04	3.20E-04	6.07E-06	6.61E-06	1.23E-04	1.36E-04	2.43E+00	2.92E-06
T6 Instate Heavy	6.51E-05	8.75E-04	3.42E-04	2.27E-05	6.62E-06	2.65E-05	2.87E-04	3.20E-04	6.34E-06	6.61E-06	1.23E-04	1.36E-04	2.38E+00	3.02E-06
T6 Instate Small	6.25E-05	8.11E-04	3.29E-04	2.32E-05	6.28E-06	2.65E-05	2.87E-04	3.20E-04	6.01E-06	6.61E-06	1.23E-04	1.36E-04	2.43E+00	2.90E-06
T6 OOS Heavy	6.07E-05	7.71E-04	3.20E-04	2.27E-05	6.04E-06	2.65E-05	2.87E-04	3.20E-04	5.78E-06	6.61E-06	1.23E-04	1.36E-04	2.38E+00	2.82E-06
T6 OOS Small	5.75E-05	7.04E-04	3.03E-04	2.32E-05	5.61E-06	2.65E-05	2.87E-04	3.19E-04	5.36E-06	6.61E-06	1.23E-04	1.35E-04	2.43E+00	2.67E-06
T6 Public	5.30E-05	9.07E-04	2.70E-04	2.32E-05	6.26E-06	2.65E-05	2.87E-04	3.20E-04	5.99E-06	6.61E-06	1.23E-04	1.36E-04	2.44E+00	2.46E-06
T6 Utility	4.74E-05	5.14E-04	2.50E-04	2.31E-05	4.22E-06	2.65E-05	2.87E-04	3.18E-04	4.04E-06	6.61E-06	1.23E-04	1.34E-04	2.43E+00	2.20E-06
T6TS	1.63E-05	1.80E-04	4.20E-04	2.29E-05	2.05E-06	2.65E-05	2.87E-04	3.16E-04	1.89E-06	6.61E-06	1.23E-04	1.32E-04	2.30E+00	6.58E-06
T7 Ag	1.74E-04	3.00E-03	1.03E-03	3.20E-05	1.43E-05	7.94E-05	1.36E-04	2.30E-04	1.37E-05	1.98E-05	5.83E-05	9.19E-05	3.36E+00	8.10E-06
T7 CAIRP	1.51E-04	1.68E-03	8.94E-04	3.00E-05	1.22E-05	7.94E-05	1.36E-04	2.28E-04	1.17E-05	1.98E-05	5.83E-05	8.98E-05	3.15E+00	7.03E-06
T7 CAIRP Construction	1.56E-04	1.73E-03	9.18E-04	3.06E-05	1.26E-05	7.94E-05	1.36E-04	2.28E-04	1.21E-05	1.98E-05	5.83E-05	9.03E-05	3.21E+00	7.22E-06
T7 NNOOS	1.33E-04	1.38E-03	7.87E-04	3.00E-05	1.03E-05	7.94E-05	1.36E-04	2.26E-04	9.86E-06	1.98E-05	5.83E-05	8.80E-05	3.14E+00	6.19E-06
T7 NOOS	1.51E-04	1.68E-03	8.94E-04	3.00E-05	1.22E-05	7.94E-05	1.36E-04	2.28E-04	1.17E-05	1.98E-05	5.83E-05	8.98E-05	3.15E+00	7.04E-06
T7 Other Port	1.65E-04	1.85E-03	9.73E-04	3.06E-05	1.36E-05	7.94E-05	1.36E-04	2.29E-04	1.30E-05	1.98E-05	5.83E-05	9.12E-05	3.20E+00	7.65E-06
T7 POAK	1.66E-04	1.87E-03	9.82E-04	3.06E-05	1.38E-05	7.94E-05	1.36E-04	2.29E-04	1.32E-05	1.98E-05	5.83E-05	9.13E-05	3.20E+00	7.73E-06
T7 Public	1.24E-04	4.92E-03	6.49E-04	3.17E-05	1.97E-05	7.94E-05	1.36E-04	2.35E-04	1.88E-05	1.98E-05	5.83E-05	9.70E-05	3.32E+00	5.74E-06
T7 Single	1.34E-04	1.69E-03	7.89E-04	3.12E-05	1.03E-05	7.94E-05	1.36E-04	2.26E-04	9.81E-06	1.98E-05	5.83E-05	8.80E-05	3.27E+00	6.20E-06
T7 Single Construction	1.28E-04	1.43E-03	7.57E-04	3.08E-05	9.79E-06	7.94E-05	1.36E-04	2.25E-04	9.36E-06	1.98E-05	5.83E-05	8.75E-05	3.23E+00	5.95E-06
T7 SWCV	5.85E-05	2.53E-03	1.09E-02	7.69E-06	7.17E-06	7.94E-05	1.36E-04	2.23E-04	6.86E-06	1.98E-05	5.83E-05	8.50E-05	5.93E+00	3.01E-03
T7 Tractor	1.54E-04	1.75E-03	9.10E-04	3.01E-05	1.25E-05	7.94E-05	1.36E-04	2.28E-04	1.19E-05	1.98E-05	5.83E-05	9.01E-05	3.15E+00	7.15E-06
T7 Tractor Construction	1.60E-04	1.84E-03	9.45E-04	3.07E-05	1.31E-05	7.94E-05	1.36E-04	2.29E-04	1.25E-05	1.98E-05	5.83E-05	9.07E-05	3.22E+00	7.44E-06
T7 Utility	9.75E-05	8.39E-04	5.76E-04	3.06E-05	6.56E-06	7.94E-05	1.36E-04	2.22E-04	6.28E-06	1.98E-05	5.83E-05	8.45E-05	3.20E+00	4.53E-06
T7IS	5.54E-04	6.13E-03	6.55E-02	3.52E-05	2.06E-06	4.41E-05	1.36E-04	1.82E-04	1.89E-06	1.10E-05	5.83E-05	7.13E-05	3.42E+00	2.24E-04
UBUS	3.81E-05	2.20E-03	1.37E-03	2.40E-05	1.85E-05	2.65E-05	1.11E-03	1.15E-03	1.76E-05	6.61E-06	4.74E-04	4.98E-04	2.87E+00	1.24E-04

San Mateo County 2040 - all Model Years (40 MPH) ###

MTons/Mile

Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX
All Other Buses	3.00E-08	4.08E-07	1.58E-07	1.06E-08	3.07E-09	1.20E-08	1.30E-07	1.45E-07	2.94E-09	3.00E-09	5.59E-08	6.18E-08	1.11E-03	1.39E-09
LDA	2.37E-09	1.53E-08	2.27E-07	1.39E-09	5.20E-10	8.00E-09	3.67E-08	4.53E-08	4.79E-10	2.00E-09	1.58E-08	1.82E-08	1.39E-04	9.44E-10
LDT1	3.26E-09	2.08E-08	3.01E-07	1.76E-09	6.59E-10	8.00E-09	3.67E-08	4.54E-08	6.06E-10	2.00E-09	1.58E-08	1.84E-08	1.76E-04	1.32E-09
LDT2	3.72E-09	2.26E-08	3.64E-07	2.04E-09	6.36E-10	8.00E-09	3.68E-08	4.54E-08	5.85E-10	2.00E-09	1.58E-08	1.83E-08	2.04E-04	1.49E-09
LHD1	2.32E-08	9.65E-08	1.48E-07	4.78E-09	4.46E-09	1.06E-08	7.64E-08	9.15E-08	4.25E-09	2.66E-09	3.28E-08	3.97E-08	4.91E-04	1.43E-09
LHD2	2.33E-08	4.34E-08	1.35E-07	5.16E-09	5.22E-09	1.08E-08	8.92E-08	1.05E-07	4.99E-09	2.71E-09	3.82E-08	4.59E-08	5.31E-04	1.34E-09
MCY	1.80E-06	1.02E-06	1.54E-05	1.84E-09	1.92E-09	4.00E-09	1.18E-08	1.77E-08	1.79E-09	1.00E-09	5.04E-09	7.83E-09	1.53E-04	3.93E-07
MDV	4.78E-09	2.77E-08	4.20E-07	2.68E-09	6.96E-10	8.00E-09	3.67E-08	4.54E-08	6.41E-10	2.00E-09	1.57E-08	1.84E-08	2.69E-04	1.89E-09
MH	1.26E-08	4.67E-07	1.51E-07	1.01E-08	4.18E-09	1.29E-08	1.30E-07	1.47E-07	3.97E-09	3.22E-09	5.59E-08	6.31E-08	1.02E-03	2.59E-09
Motor Coach	6.28E-08	6.62E-07	3.71E-07	1.50E-08	4.92E-09	1.20E-08	1.30E-07	1.47E-07	4.71E-09	3.00E-09	5.59E-08	6.36E-08	1.57E-03	2.92E-09
OBUS	7.51E-09	8.14E-08	1.89E-07	1.04E-08	9.32E-10	1.20E-08	1.30E-07	1.43E-07	8.57E-10	3.00E-09	5.59E-08	5.97E-08	1.04E-03	3.03E-09
SBUS	1.15E-08	1.44E-07	1.68E-07	6.21E-09	1.35E-09	8.90E-09	7.45E-07	7.55E-07	1.26E-09	2.23E-09	3.19E-07	3.23E-07	6.33E-04	2.42E-09
T6 Ag	3.45E-08	6.24E-07	1.82E-07	1.07E-08	3.65E-09	1.20E-08	1.30E-07	1.46E-07	3.49E-09	3.00E-09	5.59E-08	6.24E-08	1.12E-03	1.60E-09
T6 CAIRP Heavy	2.75E-08	3.49E-07	1.45E-07	1.03E-08	2.74E-09	1.20E-08	1.30E-07	1.45E-07	2.62E-09	3.00E-09	5.59E-08	6.15E-08	1.08E-03	1.28E-09
T6 CAIRP Small	2.61E-08	3.19E-07	1.37E-07	1.05E-08	2.54E-09	1.20E-08	1.30E-07	1.45E-07	2.43E-09	3.00E-09	5.59E-08	6.13E-08	1.10E-03	1.21E-09
T6 Instate Construction Heavy	3.09E-08	4.27E-07	1.62E-07	1.05E-08	3.19E-09	1.20E-08	1.30E-07	1.46E-07	3.05E-09	3.00E-09	5.59E-08	6.19E-08	1.10E-03	1.43E-09
T6 Instate Construction Small	2.86E-08	3.74E-07	1.50E-07	1.05E-08	2.88E-09	1.20E-08	1.30E-07	1.45E-07	2.75E-09	3.00E-09	5.59E-08	6.16E-08	1.10E-03	1.33E-09
T6 Instate Heavy	2.95E-08	3.97E-07	1.55E-07	1.03E-08	3.00E-09	1.20E-08	1.30E-07	1.45E-07	2.87E-09	3.00E-09	5.59E-08	6.17E-08	1.08E-03	1.37E-09
T6 Instate Small	2.84E-08	3.68E-07	1.49E-07	1.05E-08	2.85E-09	1.20E-08	1.30E-07	1.45E-07	2.73E-09	3.00E-09	5.59E-08	6.16E-08	1.10E-03	1.32E-09
T6 OOS Heavy	2.75E-08	3.50E-07	1.45E-07	1.03E-08	2.74E-09	1.20E-08	1.30E-07	1.45E-07	2.62E-09	3.00E-09	5.59E-08	6.15E-08	1.08E-03	1.28E-09
T6 OOS Small	2.61E-08	3.19E-07	1.37E-07	1.05E-08	2.54E-09	1.20E-08	1.30E-07	1.45E-07	2.43E-09	3.00E-09	5.59E-08	6.13E-08	1.10E-03	1.21E-09
T6 Public	2.41E-08	4.11E-07	1.22E-07	1.05E-08	2.84E-09	1.20E-08	1.30E-07	1.45E-07	2.72E-09	3.00E-09	5.59E-08	6.16E-08	1.10E-03	1.12E-09
T6 Utility	2.15E-08	2.33E-07	1.13E-07	1.05E-08	1.92E-09	1.20E-08	1.30E-07	1.44E-07	1.83E-09	3.00E-09	5.59E-08	6.07E-08	1.10E-03	9.99E-10
T6TS	7.38E-09	8.15E-08	1.91E-07	1.04E-08	9.32E-10	1.20E-08	1.30E-07	1.43E-07	8.57E-10	3.00E-09	5.59E-08	5.97E-08	1.04E-03	2.98E-09
T7 Ag	7.91E-08	1.36E-06	4.67E-07	1.45E-08	6.50E-09	3.60E-08	6.17E-08	1.04E-07	6.22E-09	9.00E-09	2.65E-08	4.17E-08	1.52E-03	3.67E-09
T7 CAIRP	6.87E-08	7.62E-07	4.06E-07	1.36E-08	5.53E-09	3.60E-08	6.17E-08	1.03E-07	5.29E-09	9.00E-09	2.65E-08	4.08E-08	1.43E-03	3.19E-09
T7 CAIRP Construction	7.06E-08	7.83E-07	4.17E-07	1.39E-08	5.73E-09	3.60E-08	6.17E-08	1.03E-07	5.48E-09	9.00E-09	2.65E-08	4.09E-08	1.45E-03	3.28E-09
T7 NNOOS	6.05E-08	6.24E-07	3.57E-07	1.36E-08	4.67E-09	3.60E-08	6.17E-08	1.02E-07	4.47E-09	9.00E-09	2.65E-08	3.99E-08	1.43E-03	2.81E-09
T7 NOOS	6.87E-08	7.63E-07	4.06E-07	1.36E-08	5.53E-09	3.60E-08	6.17E-08	1.03E-07	5.30E-09	9.00E-09	2.65E-08	4.08E-08	1.43E-03	3.19E-09
T7 Other Port	7.47E-08	8.39E-07	4.41E-07	1.39E-08	6.17E-09	3.60E-08	6.17E-08	1.04E-07	5.90E-09	9.00E-09	2.65E-08	4.14E-08	1.45E-03	3.47E-09
T7 POAK	7.54E-08	8.49E-07	4.45E-07	1.39E-08	6.24E-09	3.60E-08	6.17E-08	1.04E-07	5.97E-09	9.00E-09	2.65E-08	4.14E-08	1.45E-03	3.50E-09
T7 Public	5.60E-08	2.23E-06	2.95E-07	1.44E-08	8.93E-09	3.60E-08	6.17E-08	1.07E-07	8.54E-09	9.00E-09	2.65E-08	4.40E-08	1.51E-03	2.60E-09
T7 Single	6.06E-08	7.66E-07	3.58E-07	1.41E-08	4.65E-09	3.60E-08	6.17E-08	1.02E-07	4.45E-09	9.00E-09	2.65E-08	3.99E-08	1.48E-03	2.81E-09
T7 Single Construction	5.82E-08	6.51E-07	3.43E-07	1.40E-08	4.44E-09	3.60E-08	6.17E-08	1.02E-07	4.25E-09	9.00E-09	2.65E-08	3.97E-08	1.47E-03	2.70E-09
T7 SWCV	2.65E-08	1.15E-06	4.93E-06	3.49E-09	3.25E-09	3.60E-08	6.17E-08	1.01E-07	3.11E-09	9.00E-09	2.65E-08	3.86E-08	2.69E-03	1.37E-06
T7 Tractor	6.99E-08	7.92E-07	4.13E-07	1.36E-08	5.65E-09	3.60E-08	6.17E-08	1.03E-07	5.41E-09	9.00E-09	2.65E-08	4.09E-08	1.43E-03	3.25E-09
T7 Tractor Construction	7.26E-08	8.33E-07	4.29E-07	1.39E-08	5.95E-09	3.60E-08	6.17E-08	1.04E-07	5.69E-09	9.00E-09	2.65E-08	4.12E-08	1.46E-03	3.37E-09
T7 Utility	4.42E-08	3.81E-07	2.61E-07	1.39E-08	2.98E-09	3.60E-08	6.17E-08	1.01E-07	2.85E-09	9.00E-09	2.65E-08	3.83E-08	1.45E-03	2.05E-09
T7IS	2.51E-07	2.78E-06	2.97E-05	1.60E-08	9.34E-10	2.00E-08	6.17E-08	8.27E-08	8.59E-10	5.00E-09	2.65E-08	3.23E-08	1.55E-03	1.02E-07
UBUS	1.73E-08	9.97E-07	6.21E-07	1.09E-08	8.38E-09	1.20E-08	5.01E-07	5.22E-07	8.00E-09	3.00E-09	2.15E-07	2.26E-07	1.30E-03	5.63E-08

2020 ABAG Forecast

Based on EMFAC2014

2020	370,255,544							
	Emission year	Annual VMT		SAR GWP	SAR GWP		SAR GWP	
				1	21		310	MTons
	Percent of VMT	**Adjust % VMT**	**VMT by Fleet**	**MT CO2**	**MT CH4**	**MT NOx**	**MT N_2O**	**MT CO2e**
All Other Buses	0.16%	0.03%	104,428	1.22E+02	3.16E-04	2.99E-01	0	126
LDA	49.05%	60.35%	223,436,372	5.06E+04	8.09E-01	1.07E+01	0	50,710
LDT1	4.97%	6.12%	22,660,876	6.12E+03	1.37E-01	1.76E+00	0	6,147
LDT2	25.36%	31.21%	115,550,186	3.58E+04	4.72E-01	7.03E+00	0	35,867
LHD1	1.79%	0.31%	1,137,228	6.39E+02	9.65E-03	1.09E+00	0	654
LHD2	0.65%	0.11%	413,994	2.39E+02	1.39E-03	2.56E-01	0	243
MCY	0.88%	1.08%	3,995,968	6.04E+02	1.55E+00	4.11E+00	0	689
MDV	13.68%	0.21%	767,073	3.12E+02	5.29E-03	7.79E-02	0	313
MH	0.07%	0.01%	47,033	4.96E+01	8.65E-04	4.27E-02	0	50
Motor Coach	0.07%	0.01%	43,840	7.41E+01	2.63E-04	1.80E-01	0	76
OBUS	0.16%	0.03%	101,894	1.10E+02	9.52E-04	2.03E-02	0	110
SBUS	0.04%	0.01%	27,591	2.08E+01	3.61E-04	6.76E-02	0	22
T6 Ag	0.01%	0.00%	4,915	5.79E+00	8.90E-05	2.52E-02	0	6
T6 CAIRP Heavy	0.00%	0.00%	1,788	2.02E+00	3.24E-06	2.21E-03	0	2
T6 CAIRP Small	0.01%	0.00%	5,488	6.22E+00	1.58E-05	5.58E-03	0	6
T6 Instate Construction Heavy	0.00%	0.00%	3,057	3.54E+00	8.11E-06	8.16E-03	0	4
T6 Instate Construction Small	0.08%	0.01%	51,223	5.86E+01	2.18E-04	8.29E-02	0	60
T6 Instate Heavy	0.48%	0.08%	301,432	3.44E+02	7.32E-04	6.03E-01	0	351
T6 Instate Small	1.24%	0.21%	788,284	8.98E+02	3.50E-03	1.23E+00	0	914
T6 OOS Heavy	0.00%	0.00%	1,024	1.16E+00	1.87E-06	1.33E-03	0	1
T6 OOS Small	0.00%	0.00%	3,144	3.56E+00	9.06E-06	3.20E-03	0	4
T6 Public	0.03%	0.01%	18,887	2.16E+01	3.52E-05	6.67E-02	0	22
T6 Utility	0.01%	0.00%	4,498	5.26E+00	4.61E-06	1.92E-03	0	5
T6TS	0.28%	0.05%	176,209	1.90E+02	4.05E-03	7.98E-02	0	191
T7 Ag	0.00%	0.00%	586	1.00E+00	2.17E-05	5.68E-03	0	1
T7 CAIRP	0.07%	0.01%	43,850	6.93E+01	2.42E-04	1.50E-01	0	71
T7 CAIRP Construction	0.00%	0.00%	2,169	3.46E+00	1.21E-05	7.58E-03	0	4
T7 NNOOS	0.09%	0.01%	54,374	8.02E+01	1.87E-04	7.60E-02	0	81
T7 NOOS	0.03%	0.00%	17,321	2.74E+01	9.54E-05	6.02E-02	0	28
T7 Other Port	0.03%	0.01%	19,157	3.19E+01	1.37E-04	8.77E-02	0	33
T7 POAK	0.03%	0.00%	18,483	3.13E+01	1.50E-04	9.92E-02	0	33
T7 Public	0.03%	0.01%	18,793	3.20E+01	7.59E-05	1.89E-01	0	34
T7 Single	0.11%	0.02%	72,078	1.22E+02	3.99E-04	3.71E-01	0	127
T7 Single Construction	0.01%	0.00%	5,610	9.10E+00	2.40E-05	2.04E-02	0	9
T7 SWCV	0.07%	0.01%	43,512	1.46E+02	3.30E-02	2.88E-01	0	150
T7 Tractor	0.13%	0.02%	80,821	1.30E+02	5.30E-04	3.64E-01	0	135
T7 Tractor Construction	0.01%	0.00%	4,183	6.83E+00	2.64E-05	1.98E-02	0	7
T7 Utility	0.00%	0.00%	370	6.00E-01	7.72E-07	2.82E-04	0	1
T7IS	0.03%	0.01%	19,826	3.23E+01	2.40E-03	5.20E-02	0	33
UBUS	0.33%	0.06%	207,977	3.22E+02	1.99E-02	1.41E+00	0	340
TOTAL	100%	100.00%	370,255,544	**97,198**	**3**	**31**	**1**	**97,661**

N_2O emissions were calculated using an off-model adjustment provided by CARB for gas emissions in the 2014 Technical Support Document for California's 2000-2012 GHG EMissions inventory. The off-model adjustment uses for every gram of NOx emitted from gasoline vehicles, an average of 0.0416 grams of N2O are emitted. ($N_2O = 0.0416 \times NO_x$)

Daily vehicles miles traveled (VMT) multiplied by 347 days/year to account for reduced traffic on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology within the Climate Change Scoping Plan Measure Documentation Supplement.

Based on the emission factors for San Mateo County - San Francisco Bay Area Air Basin. % VMT based on EMFAC2014-PL for San Mateo County.

San Mateo County 2020 - all Model Years (40 MPH)	g/mile															
Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX	VMT from default EMFAC-SG	%VMT
All Other Buses	6.51E-02	2.87E+00	2.23E-01	1.12E-02	1.62E-02	1.20E-02	1.30E-01	1.59E-01	1.55E-02	3.00E-03	5.59E-02	7.44E-02	1.17E+03	3.02E-03	30,265	0.16%
LDA	9.16E-03	4.80E-02	5.79E-01	2.27E-03	1.52E-03	8.00E-03	3.67E-02	4.63E-02	1.40E-03	2.00E-03	1.57E-02	1.92E-02	2.26E+02	3.62E-03	9,017,726	49.05%
LDT1	1.51E-02	7.79E-02	8.76E-01	2.71E-03	1.78E-03	8.00E-03	3.67E-02	4.65E-02	1.64E-03	2.00E-03	1.58E-02	1.94E-02	2.70E+02	6.04E-03	914,576	4.97%
LDT2	1.01E-02	6.09E-02	6.39E-01	3.10E-03	1.42E-03	8.00E-03	3.68E-02	4.62E-02	1.31E-03	2.00E-03	1.58E-02	1.91E-02	3.10E+02	4.08E-03	4,663,520	25.36%
LHD1	5.04E-02	9.61E-01	6.47E-01	5.52E-03	8.36E-03	1.00E-02	7.64E-02	9.48E-02	7.98E-03	2.51E-03	3.28E-02	4.33E-02	5.62E+02	8.49E-03	329,593	1.79%
LHD2	3.58E-02	6.18E-01	2.78E-01	5.63E-03	8.20E-03	1.07E-02	8.92E-02	1.08E-01	7.84E-03	2.67E-03	3.82E-02	4.87E-02	5.78E+02	3.36E-03	119,984	0.65%
MCY	1.89E+00	1.03E+00	1.67E+01	1.84E-03	1.69E-03	4.00E-03	1.18E-02	1.74E-02	1.58E-03	1.00E-03	5.04E-03	7.62E-03	1.51E+02	3.87E-01	161,274	0.88%
MDV	1.91E-02	1.02E-01	9.46E-01	4.07E-03	1.54E-03	8.00E-03	3.68E-02	4.63E-02	1.42E-03	2.00E-03	1.57E-02	1.92E-02	4.06E+02	6.90E-03	2,515,073	13.68%
MH	6.05E-02	9.07E-01	1.60E+00	1.05E-02	1.34E-02	1.29E-02	1.30E-01	1.57E-01	1.28E-02	3.22E-03	5.59E-02	7.19E-02	1.05E+03	1.84E-02	13,631	0.07%
Motor Coach	1.29E-01	4.10E+00	5.04E-01	1.61E-02	2.26E-02	1.20E-02	1.30E-01	1.65E-01	2.16E-02	3.00E-03	5.59E-02	8.05E-02	1.69E+03	6.00E-03	12,706	0.07%
OBUS	2.37E-02	1.99E-01	7.20E-01	1.08E-02	7.35E-04	1.20E-02	1.30E-01	1.43E-01	6.76E-04	3.00E-03	5.59E-02	5.95E-02	1.08E+03	9.35E-03	29,531	0.16%
SBUS	5.36E-02	2.45E+00	1.09E+00	7.36E-03	1.09E-02	9.58E-03	7.45E-01	7.65E-01	1.05E-02	2.39E-03	3.19E-01	3.32E-01	7.55E+02	1.31E-02	7,997	0.04%
T6 Ag	3.90E-01	5.12E+00	1.31E+00	1.12E-02	2.41E-01	1.20E-02	1.30E-01	3.83E-01	2.30E-01	3.00E-03	5.59E-02	2.89E-01	1.18E+03	1.81E-02	1,424	0.01%
T6 CAIRP Heavy	3.90E-02	1.24E+00	1.70E-01	1.08E-02	6.65E-03	1.20E-02	1.30E-01	1.49E-01	6.36E-03	3.00E-03	5.59E-02	6.52E-02	1.13E+03	1.81E-03	518	0.00%
T6 CAIRP Small	6.20E-02	1.02E+00	2.39E-01	1.08E-02	3.02E-02	1.20E-02	1.30E-01	1.73E-01	2.89E-02	3.00E-03	5.59E-02	8.78E-02	1.13E+03	2.88E-03	1,591	0.01%
T6 Instate Construction Heavy	5.71E-02	2.67E+00	2.03E-01	1.10E-02	1.56E-02	1.20E-02	1.30E-01	1.58E-01	1.50E-02	3.00E-03	5.59E-02	7.38E-02	1.16E+03	2.65E-03	886	0.00%
T6 Instate Construction Small	9.16E-02	1.62E+00	3.26E-01	1.09E-02	5.09E-02	1.20E-02	1.30E-01	1.93E-01	4.87E-02	3.00E-03	5.59E-02	1.08E-01	1.14E+03	4.25E-03	14,846	0.08%
T6 Instate Heavy	5.23E-02	2.00E+00	1.98E-01	1.09E-02	1.10E-02	1.20E-02	1.30E-01	1.53E-01	1.05E-02	3.00E-03	5.59E-02	6.93E-02	1.14E+03	2.43E-03	87,362	0.48%
T6 Instate Small	9.56E-02	1.56E+00	3.39E-01	1.09E-02	5.62E-02	1.20E-02	1.30E-01	1.99E-01	5.38E-02	3.00E-03	5.59E-02	1.13E-01	1.14E+03	4.44E-03	228,462	1.24%
T6 OOS Heavy	3.93E-02	1.30E+00	1.71E-01	1.08E-02	7.09E-03	1.20E-02	1.30E-01	1.49E-01	6.78E-03	3.00E-03	5.59E-02	6.56E-02	1.13E+03	1.82E-03	297	0.00%
T6 OOS Small	6.20E-02	1.02E+00	2.39E-01	1.08E-02	3.02E-02	1.20E-02	1.30E-01	1.73E-01	2.89E-02	3.00E-03	5.59E-02	8.78E-02	1.13E+03	2.88E-03	911	0.00%
T6 Public	4.02E-02	3.53E+00	1.48E-01	1.09E-02	1.74E-02	1.20E-02	1.30E-01	1.60E-01	1.67E-02	3.00E-03	5.59E-02	7.55E-02	1.14E+03	1.87E-03	5,474	0.03%
T6 Utility	2.21E-02	4.27E-01	1.16E-01	1.12E-02	1.97E-03	1.20E-02	1.30E-01	1.44E-01	1.89E-03	3.00E-03	5.59E-02	6.07E-02	1.17E+03	1.02E-03	1,304	0.01%
T6TS	5.69E-02	4.53E-01	1.87E+00	1.08E-02	9.19E-04	1.20E-02	1.30E-01	1.43E-01	8.45E-04	3.00E-03	5.59E-02	5.97E-02	1.08E+03	2.30E-02	51,069	0.28%
T7 Ag	7.97E-01	9.69E+00	3.94E+00	1.63E-02	5.07E-01	3.60E-02	6.17E-02	6.04E-01	4.85E-01	9.00E-03	2.65E-02	5.20E-01	1.71E+03	3.70E-02	170	0.00%
T7 CAIRP	1.19E-01	3.42E+00	5.59E-01	1.51E-02	1.62E-02	3.60E-02	6.17E-02	1.14E-01	1.55E-02	9.00E-03	2.65E-02	5.10E-02	1.58E+03	5.53E-03	12,709	0.07%
T7 CAIRP Construction	1.20E-01	3.50E+00	5.21E-01	1.52E-02	2.01E-02	3.60E-02	6.17E-02	1.18E-01	1.92E-02	9.00E-03	2.65E-02	5.47E-02	1.60E+03	5.56E-03	629	0.00%
T7 NNOOS	7.39E-02	1.40E+00	4.02E-01	1.41E-02	7.66E-03	3.60E-02	6.17E-02	1.05E-01	7.33E-03	9.00E-03	2.65E-02	4.28E-02	1.48E+03	3.43E-03	15,759	0.09%
T7 NOOS	1.19E-01	3.48E+00	5.60E-01	1.51E-02	1.65E-02	3.60E-02	6.17E-02	1.14E-01	1.58E-02	9.00E-03	2.65E-02	5.13E-02	1.58E+03	5.51E-03	5,020	0.03%
T7 Other Port	1.54E-01	4.58E+00	5.85E-01	1.59E-02	2.31E-02	3.60E-02	6.17E-02	1.21E-01	2.21E-02	9.00E-03	2.65E-02	5.75E-02	1.66E+03	7.17E-03	5,552	0.03%
T7 POAK	1.75E-01	5.37E+00	6.28E-01	1.61E-02	2.73E-02	3.60E-02	6.17E-02	1.25E-01	2.61E-02	9.00E-03	2.65E-02	6.16E-02	1.69E+03	8.11E-03	5,357	0.03%
T7 Public	8.69E-02	1.00E+01	3.95E-01	1.62E-02	4.87E-02	3.60E-02	6.17E-02	1.46E-01	4.66E-02	9.00E-03	2.65E-02	8.21E-02	1.70E+03	4.04E-03	5,447	0.03%
T7 Single	1.19E-01	5.15E+00	4.49E-01	1.62E-02	2.45E-02	3.60E-02	6.17E-02	1.22E-01	2.34E-02	9.00E-03	2.65E-02	5.89E-02	1.70E+03	5.54E-03	20,890	0.11%
T7 Single Construction	9.19E-02	3.64E+00	3.91E-01	1.55E-02	1.75E-02	3.60E-02	6.17E-02	1.15E-01	1.67E-02	9.00E-03	2.65E-02	5.22E-02	1.62E+03	4.27E-03	1,626	0.01%
T7 SWCV	4.85E-02	6.61E+00	2.20E+00	2.10E-02	7.65E-03	3.60E-02	6.17E-02	1.05E-01	7.32E-03	9.00E-03	2.65E-02	4.28E-02	3.35E+03	7.58E-01	12,611	0.07%
T7 Tractor	1.41E-01	4.50E+00	5.77E-01	1.53E-02	2.29E-02	3.60E-02	6.17E-02	1.21E-01	2.19E-02	9.00E-03	2.65E-02	5.74E-02	1.61E+03	6.55E-03	23,424	0.13%
T7 Tractor Construction	1.36E-01	4.73E+00	5.48E-01	1.56E-02	2.72E-02	3.60E-02	6.17E-02	1.25E-01	2.61E-02	9.00E-03	2.65E-02	6.15E-02	1.63E+03	6.32E-03	1,212	0.01%
T7 Utility	4.49E-02	7.62E-01	2.65E-01	1.55E-02	3.02E-03	3.60E-02	6.17E-02	1.01E-01	2.89E-03	9.00E-03	2.65E-02	3.84E-02	1.62E+03	2.08E-03	107	0.00%
T7IS	2.99E-01	2.62E+00	2.67E+01	1.67E-02	7.57E-04	2.00E-02	6.17E-02	8.25E-02	6.96E-04	5.00E-03	2.65E-02	3.22E-02	1.63E+03	1.21E-01	5,746	0.03%
UBUS	1.85E-01	6.78E+00	2.19E+00	1.38E-02	8.23E-02	1.20E-02	6.55E-01	7.50E-01	7.88E-02	3.00E-03	2.81E-01	3.63E-01	1.55E+03	9.56E-02	60,276	0.33%
															18,386,553	100.00%

EMFAC2014v1.0.7 based on the average annual temperature (58.6) and humidity for Menlo Park (80.85) from USA.com (http://www.usa.com/menlo-park-ca-weather.htm) accessed January 12, 2016. Assumes an average 40 mph speed based on CalEEMod Users' Manual.

San Mateo County 2020 - all Model Years (40 MPH) ##

lbs/Mile

Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX
All Other Buses	1.44E-04	6.32E-03	4.92E-04	2.46E-05	3.58E-05	2.65E-05	2.87E-04	3.50E-04	3.42E-05	6.61E-06	1.23E-04	1.64E-04	2.58E+00	6.67E-06
LDA	2.02E-05	1.06E-04	1.28E-03	5.00E-06	3.35E-06	1.76E-05	8.10E-05	1.02E-04	3.09E-06	4.41E-06	3.47E-05	4.22E-05	4.99E-01	7.98E-06
LDT1	3.33E-05	1.72E-04	1.93E-03	5.97E-06	3.92E-06	1.76E-05	8.10E-05	1.03E-04	3.61E-06	4.41E-06	3.47E-05	4.27E-05	5.96E-01	1.33E-05
LDT2	2.24E-05	1.34E-04	1.41E-03	6.83E-06	3.13E-06	1.76E-05	8.10E-05	1.02E-04	2.88E-06	4.41E-06	3.47E-05	4.20E-05	6.82E-01	9.00E-06
LHD1	1.11E-04	2.12E-03	1.43E-03	1.22E-05	1.84E-05	2.21E-05	1.69E-04	2.09E-04	1.76E-05	5.53E-06	7.22E-05	9.54E-05	1.24E+00	1.87E-05
LHD2	7.89E-05	1.36E-03	6.12E-04	1.24E-05	1.81E-05	2.36E-05	1.97E-04	2.38E-04	1.73E-05	5.89E-06	8.43E-05	1.07E-04	1.28E+00	7.41E-06
MCY	4.18E-03	2.27E-03	3.68E-02	4.05E-06	3.72E-06	8.82E-06	2.59E-05	3.85E-05	3.48E-06	2.20E-06	1.11E-05	1.68E-05	3.33E-01	8.53E-04
MDV	4.22E-05	2.24E-04	2.09E-03	8.96E-06	3.39E-06	1.76E-05	8.10E-05	1.02E-04	3.13E-06	4.41E-06	3.47E-05	4.23E-05	8.96E-01	1.52E-05
MH	1.33E-04	2.00E-03	3.53E-03	2.30E-05	2.96E-05	2.84E-05	2.87E-04	3.45E-04	2.83E-05	7.10E-06	1.23E-04	1.59E-04	2.32E+00	4.06E-05
Motor Coach	2.85E-04	9.04E-03	1.11E-03	3.55E-05	4.98E-05	2.65E-05	2.87E-04	3.64E-04	4.77E-05	6.61E-06	1.23E-04	1.77E-04	3.73E+00	1.32E-05
OBUS	5.23E-05	4.38E-04	1.59E-03	2.37E-05	1.62E-06	2.65E-05	2.87E-04	3.15E-04	1.49E-06	6.61E-06	1.23E-04	1.31E-04	2.37E+00	2.06E-05
SBUS	1.18E-04	5.40E-03	2.40E-03	1.62E-05	2.41E-05	2.11E-05	1.64E-03	1.69E-03	2.30E-05	5.28E-06	7.04E-04	7.32E-04	1.67E+00	2.89E-05
T6 Ag	8.59E-04	1.13E-02	2.90E-03	2.48E-05	5.31E-04	2.65E-05	2.87E-04	8.44E-04	5.08E-04	6.61E-06	1.23E-04	6.37E-04	2.60E+00	3.99E-05
T6 CAIRP Heavy	8.59E-05	2.72E-03	3.74E-04	2.37E-05	1.47E-05	2.65E-05	2.87E-04	3.28E-04	1.40E-05	6.61E-06	1.23E-04	1.44E-04	2.49E+00	3.99E-06
T6 CAIRP Small	1.37E-04	2.24E-03	5.27E-04	2.38E-05	6.66E-05	2.65E-05	2.87E-04	3.80E-04	6.37E-05	6.61E-06	1.23E-04	1.94E-04	2.50E+00	6.35E-06
T6 Instate Construction Heavy	1.26E-04	5.88E-03	4.48E-04	2.43E-05	3.45E-05	2.65E-05	2.87E-04	3.48E-04	3.30E-05	6.61E-06	1.23E-04	1.63E-04	2.55E+00	5.85E-06
T6 Instate Construction Small	2.02E-04	3.57E-03	7.19E-04	2.41E-05	1.12E-04	2.65E-05	2.87E-04	4.26E-04	1.07E-04	6.61E-06	1.23E-04	2.37E-04	2.52E+00	9.38E-06
T6 Instate Heavy	1.15E-04	4.41E-03	4.37E-04	2.40E-05	2.42E-05	2.65E-05	2.87E-04	3.38E-04	2.31E-05	6.61E-06	1.23E-04	1.53E-04	2.51E+00	5.35E-06
T6 Instate Small	2.11E-04	3.44E-03	7.46E-04	2.40E-05	1.24E-04	2.65E-05	2.87E-04	4.38E-04	1.19E-04	6.61E-06	1.23E-04	2.48E-04	2.51E+00	9.79E-06
T6 OOS Heavy	8.66E-05	2.87E-03	3.77E-04	2.37E-05	1.56E-05	2.65E-05	2.87E-04	3.29E-04	1.50E-05	6.61E-06	1.23E-04	1.45E-04	2.49E+00	4.02E-06
T6 OOS Small	1.37E-04	2.24E-03	5.27E-04	2.38E-05	6.66E-05	2.65E-05	2.87E-04	3.80E-04	6.37E-05	6.61E-06	1.23E-04	1.94E-04	2.50E+00	6.35E-06
T6 Public	8.85E-05	7.79E-03	3.25E-04	2.40E-05	3.84E-05	2.65E-05	2.87E-04	3.52E-04	3.67E-05	6.61E-06	1.23E-04	1.66E-04	2.52E+00	4.11E-06
T6 Utility	4.86E-05	9.40E-04	2.56E-04	2.46E-05	4.35E-06	2.65E-05	2.87E-04	3.18E-04	4.16E-06	6.61E-06	1.23E-04	1.34E-04	2.58E+00	2.26E-06
T6TS	1.25E-04	9.99E-04	4.12E-03	2.38E-05	2.03E-06	2.65E-05	2.87E-04	3.16E-04	1.86E-06	6.61E-06	1.23E-04	1.32E-04	2.38E+00	5.07E-05
T7 Ag	1.76E-03	2.14E-02	8.68E-03	3.60E-05	1.12E-03	7.94E-05	1.36E-04	1.33E-03	1.07E-03	1.98E-05	5.83E-05	1.15E-03	3.78E+00	8.17E-05
T7 CAIRP	2.62E-04	7.53E-03	1.23E-03	3.32E-05	3.57E-05	7.94E-05	1.36E-04	2.51E-04	3.42E-05	1.98E-05	5.83E-05	1.12E-04	3.48E+00	1.22E-05
T7 CAIRP Construction	2.64E-04	7.71E-03	1.15E-03	3.36E-05	4.43E-05	7.94E-05	1.36E-04	2.60E-04	4.24E-05	1.98E-05	5.83E-05	1.21E-04	3.52E+00	1.23E-05
T7 NNOOS	1.63E-04	3.08E-03	8.87E-04	3.10E-05	1.69E-05	7.94E-05	1.36E-04	2.32E-04	1.62E-05	1.98E-05	5.83E-05	9.43E-05	3.25E+00	7.56E-06
T7 NOOS	2.62E-04	7.66E-03	1.23E-03	3.33E-05	3.64E-05	7.94E-05	1.36E-04	2.52E-04	3.48E-05	1.98E-05	5.83E-05	1.13E-04	3.49E+00	1.21E-05
T7 Other Port	3.40E-04	1.01E-02	1.29E-03	3.50E-05	5.08E-05	7.94E-05	1.36E-04	2.66E-04	4.86E-05	1.98E-05	5.83E-05	1.27E-04	3.67E+00	1.58E-05
T7 POAK	3.85E-04	1.18E-02	1.39E-03	3.56E-05	6.02E-05	7.94E-05	1.36E-04	2.76E-04	5.76E-05	1.98E-05	5.83E-05	1.36E-04	3.73E+00	1.79E-05
T7 Public	1.92E-04	2.21E-02	8.70E-04	3.58E-05	1.07E-04	7.94E-05	1.36E-04	3.23E-04	1.03E-04	1.98E-05	5.83E-05	1.81E-04	3.75E+00	8.90E-06
T7 Single	2.63E-04	1.13E-02	9.91E-04	3.57E-05	5.40E-05	7.94E-05	1.36E-04	2.69E-04	5.16E-05	1.98E-05	5.83E-05	1.30E-04	3.74E+00	1.22E-05
T7 Single Construction	2.03E-04	8.03E-03	8.61E-04	3.41E-05	3.86E-05	7.94E-05	1.36E-04	2.54E-04	3.69E-05	1.98E-05	5.83E-05	1.15E-04	3.58E+00	9.41E-06
T7 SWCV	1.07E-04	1.46E-02	4.84E-03	4.62E-05	1.69E-05	7.94E-05	1.36E-04	2.32E-04	1.61E-05	1.98E-05	5.83E-05	9.43E-05	7.38E+00	1.67E-03
T7 Tractor	3.11E-04	9.92E-03	1.27E-03	3.38E-05	5.06E-05	7.94E-05	1.36E-04	2.66E-04	4.84E-05	1.98E-05	5.83E-05	1.27E-04	3.54E+00	1.45E-05
T7 Tractor Construction	3.00E-04	1.04E-02	1.21E-03	3.44E-05	6.00E-05	7.94E-05	1.36E-04	2.76E-04	5.74E-05	1.98E-05	5.83E-05	1.36E-04	3.60E+00	1.39E-05
T7 Utility	9.90E-05	1.68E-03	5.84E-04	3.41E-05	6.66E-06	7.94E-05	1.36E-04	2.22E-04	6.37E-06	1.98E-05	5.83E-05	8.45E-05	3.57E+00	4.60E-06
T7IS	6.60E-04	5.78E-03	5.88E-02	3.68E-05	1.67E-06	4.41E-05	1.36E-04	1.82E-04	1.53E-06	1.10E-05	5.83E-05	7.09E-05	3.59E+00	2.67E-04
UBUS	4.08E-04	1.49E-02	4.83E-03	3.05E-05	1.82E-04	2.65E-05	1.44E-03	1.65E-03	1.74E-04	6.61E-06	6.19E-04	7.99E-04	3.41E+00	2.11E-04

San Mateo County 2020 - all Model Years (40 MPH) ###

MTons/Mile

Veh	ROG_RUNEX	NOx_RUNEX	CO_RUNEX	SOx_RUNEX	PM10_RUN EX	PM10_PMTW	PM10_PMBW	PM10_Total	PM2.5_RUN EX	PM2.5_PMTW	PM2.5_PMBW	PM2_5_Total	CO2_RUNEX	CH4_RUNEX
All Other Buses	6.51E-08	2.87E-06	2.23E-07	1.12E-08	1.62E-08	1.20E-08	1.30E-07	1.59E-07	1.55E-08	3.00E-09	5.59E-08	7.44E-08	1.17E-03	3.02E-09
LDA	9.16E-09	4.80E-08	5.79E-07	2.27E-09	1.52E-09	8.00E-09	3.67E-08	4.63E-08	1.40E-09	2.00E-09	1.57E-08	1.92E-08	2.26E-04	3.62E-09
LDT1	1.51E-08	7.79E-08	8.76E-07	2.71E-09	1.78E-09	8.00E-09	3.67E-08	4.65E-08	1.64E-09	2.00E-09	1.58E-08	1.94E-08	2.70E-04	6.04E-09
LDT2	1.01E-08	6.09E-08	6.39E-07	3.10E-09	1.42E-09	8.00E-09	3.68E-08	4.62E-08	1.31E-09	2.00E-09	1.58E-08	1.91E-08	3.10E-04	4.08E-09
LHD1	5.04E-08	9.61E-07	6.47E-07	5.52E-09	8.36E-09	1.00E-08	7.64E-08	9.48E-08	7.98E-09	2.51E-09	3.28E-08	4.33E-08	5.62E-04	8.49E-09
LHD2	3.58E-08	6.18E-07	2.78E-07	5.63E-09	8.20E-09	1.07E-08	8.92E-08	1.08E-07	7.84E-09	2.67E-09	3.82E-08	4.87E-08	5.78E-04	3.36E-09
MCY	1.89E-06	1.03E-06	1.67E-05	1.84E-09	1.69E-09	4.00E-09	1.18E-08	1.74E-08	1.58E-09	1.00E-09	5.04E-09	7.62E-09	1.51E-04	3.87E-07
MDV	1.91E-08	1.02E-07	9.46E-07	4.07E-09	1.54E-09	8.00E-09	3.68E-08	4.63E-08	1.42E-09	2.00E-09	1.57E-08	1.92E-08	4.06E-04	6.90E-09
MH	6.05E-08	9.07E-07	1.60E-06	1.05E-08	1.34E-08	1.29E-08	1.30E-07	1.57E-07	1.28E-08	3.22E-09	5.59E-08	7.19E-08	1.05E-03	1.84E-08
Motor Coach	1.29E-07	4.10E-06	5.04E-07	1.61E-08	2.26E-08	1.20E-08	1.30E-07	1.65E-07	2.16E-08	3.00E-09	5.59E-08	8.05E-08	1.69E-03	6.00E-09
OBUS	2.37E-08	1.99E-07	7.20E-07	1.08E-08	7.35E-10	1.20E-08	1.30E-07	1.43E-07	6.76E-10	3.00E-09	5.59E-08	5.95E-08	1.08E-03	9.35E-09
SBUS	5.36E-08	2.45E-06	1.09E-06	7.36E-09	1.09E-08	9.58E-09	7.45E-07	7.65E-07	1.05E-08	2.39E-09	3.19E-07	3.32E-07	7.55E-04	1.31E-08
T6 Ag	3.90E-07	5.12E-06	1.31E-06	1.12E-08	2.41E-07	1.20E-08	1.30E-07	3.83E-07	2.30E-07	3.00E-09	5.59E-08	2.89E-07	1.18E-03	1.81E-08
T6 CAIRP Heavy	3.90E-08	1.24E-06	1.70E-07	1.08E-08	6.65E-09	1.20E-08	1.30E-07	1.49E-07	6.36E-09	3.00E-09	5.59E-08	6.52E-08	1.13E-03	1.81E-09
T6 CAIRP Small	6.20E-08	1.02E-06	2.39E-07	1.08E-08	3.02E-08	1.20E-08	1.30E-07	1.73E-07	2.89E-08	3.00E-09	5.59E-08	8.78E-08	1.13E-03	2.88E-09
T6 Instate Construction Heavy	5.71E-08	2.67E-06	2.03E-07	1.10E-08	1.56E-08	1.20E-08	1.30E-07	1.58E-07	1.50E-08	3.00E-09	5.59E-08	7.38E-08	1.16E-03	2.65E-09
T6 Instate Construction Small	9.16E-08	1.62E-06	3.26E-07	1.09E-08	5.09E-08	1.20E-08	1.30E-07	1.93E-07	4.87E-08	3.00E-09	5.59E-08	1.08E-07	1.14E-03	4.25E-09
T6 Instate Heavy	5.23E-08	2.00E-06	1.98E-07	1.09E-08	1.10E-08	1.20E-08	1.30E-07	1.53E-07	1.05E-08	3.00E-09	5.59E-08	6.93E-08	1.14E-03	2.43E-09
T6 Instate Small	9.56E-08	1.56E-06	3.39E-07	1.09E-08	5.62E-08	1.20E-08	1.30E-07	1.99E-07	5.38E-08	3.00E-09	5.59E-08	1.13E-07	1.14E-03	4.44E-09
T6 OOS Heavy	3.93E-08	1.30E-06	1.71E-07	1.08E-08	7.09E-09	1.20E-08	1.30E-07	1.49E-07	6.78E-09	3.00E-09	5.59E-08	6.56E-08	1.13E-03	1.82E-09
T6 OOS Small	6.20E-08	1.02E-06	2.39E-07	1.08E-08	3.02E-08	1.20E-08	1.30E-07	1.73E-07	2.89E-08	3.00E-09	5.59E-08	8.78E-08	1.13E-03	2.88E-09
T6 Public	4.02E-08	3.53E-06	1.48E-07	1.09E-08	1.74E-08	1.20E-08	1.30E-07	1.60E-07	1.67E-08	3.00E-09	5.59E-08	7.55E-08	1.14E-03	1.87E-09
T6 Utility	2.21E-08	4.27E-07	1.16E-07	1.12E-08	1.97E-09	1.20E-08	1.30E-07	1.44E-07	1.89E-09	3.00E-09	5.59E-08	6.07E-08	1.17E-03	1.02E-09
T6TS	5.69E-08	4.53E-07	1.87E-06	1.08E-08	9.19E-10	1.20E-08	1.30E-07	1.43E-07	8.45E-10	3.00E-09	5.59E-08	5.97E-08	1.08E-03	2.30E-08
T7 Ag	7.97E-07	9.69E-06	3.94E-06	1.63E-08	5.07E-07	3.60E-08	6.17E-08	6.04E-07	4.85E-07	9.00E-09	2.65E-08	5.20E-07	1.71E-03	3.70E-08
T7 CAIRP	1.19E-07	3.42E-06	5.59E-07	1.51E-08	1.62E-08	3.60E-08	6.17E-08	1.14E-07	1.55E-08	9.00E-09	2.65E-08	5.10E-08	1.58E-03	5.53E-09
T7 CAIRP Construction	1.20E-07	3.50E-06	5.21E-07	1.52E-08	2.01E-08	3.60E-08	6.17E-08	1.18E-07	1.92E-08	9.00E-09	2.65E-08	5.47E-08	1.60E-03	5.56E-09
T7 NNOOS	7.39E-08	1.40E-06	4.02E-07	1.41E-08	7.66E-09	3.60E-08	6.17E-08	1.05E-07	7.33E-09	9.00E-09	2.65E-08	4.28E-08	1.48E-03	3.43E-09
T7 NOOS	1.19E-07	3.48E-06	5.60E-07	1.51E-08	1.65E-08	3.60E-08	6.17E-08	1.14E-07	1.58E-08	9.00E-09	2.65E-08	5.13E-08	1.58E-03	5.51E-09
T7 Other Port	1.54E-07	4.58E-06	5.85E-07	1.59E-08	2.31E-08	3.60E-08	6.17E-08	1.21E-07	2.21E-08	9.00E-09	2.65E-08	5.75E-08	1.66E-03	7.17E-09
T7 POAK	1.75E-07	5.37E-06	6.28E-07	1.61E-08	2.73E-08	3.60E-08	6.17E-08	1.25E-07	2.61E-08	9.00E-09	2.65E-08	6.16E-08	1.69E-03	8.11E-09
T7 Public	8.69E-08	1.00E-05	3.95E-07	1.62E-08	4.87E-08	3.60E-08	6.17E-08	1.46E-07	4.66E-08	9.00E-09	2.65E-08	8.21E-08	1.70E-03	4.04E-09
T7 Single	1.19E-07	5.15E-06	4.49E-07	1.62E-08	2.45E-08	3.60E-08	6.17E-08	1.22E-07	2.34E-08	9.00E-09	2.65E-08	5.89E-08	1.70E-03	5.54E-09
T7 Single Construction	9.19E-08	3.64E-06	3.91E-07	1.55E-08	1.75E-08	3.60E-08	6.17E-08	1.15E-07	1.67E-08	9.00E-09	2.65E-08	5.22E-08	1.62E-03	4.27E-09
T7 SWCV	4.85E-08	6.61E-06	2.20E-06	2.10E-08	7.65E-09	3.60E-08	6.17E-08	1.05E-07	7.32E-09	9.00E-09	2.65E-08	4.28E-08	3.35E-03	7.58E-07
T7 Tractor	1.41E-07	4.50E-06	5.77E-07	1.53E-08	2.29E-08	3.60E-08	6.17E-08	1.21E-07	2.19E-08	9.00E-09	2.65E-08	5.74E-08	1.61E-03	6.55E-09
T7 Tractor Construction	1.36E-07	4.73E-06	5.48E-07	1.56E-08	2.72E-08	3.60E-08	6.17E-08	1.25E-07	2.61E-08	9.00E-09	2.65E-08	6.15E-08	1.63E-03	6.32E-09
T7 Utility	4.49E-08	7.62E-07	2.65E-07	1.55E-08	3.02E-09	3.60E-08	6.17E-08	1.01E-07	2.89E-09	9.00E-09	2.65E-08	3.84E-08	1.62E-03	2.08E-09
T7IS	2.99E-07	2.62E-06	2.67E-05	1.67E-08	7.57E-10	2.00E-08	6.17E-08	8.25E-08	6.96E-10	5.00E-09	2.65E-08	3.22E-08	1.63E-03	1.21E-07
UBUS	1.85E-07	6.78E-06	2.19E-06	1.38E-08	8.23E-08	1.20E-08	6.55E-07	7.50E-07	7.88E-08	3.00E-09	2.81E-07	3.63E-07	1.55E-03	9.56E-08

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- Public Library
- Crime and Crime Rate
- **Weather**
- Natural Disasters & Extremes
- Air Quality
- Environmental Watch
- Government

San Mateo County

California State

San Francisco, Oakland, Fremont Area

Menlo Park, CA Weather

Basic Info | Population/Races | Income/Careers | Housing | Education | Crime/Crime Rate | Others

Weather | Natural Extremes | Air Quality | Environmental Watch | Government

The average temperature of Menlo Park is 58.58°F, which is lower than the California average temperature of 61.17°F and is higher than the national average temperature of 54.45°F.

Topics:

Heating Cost Index
Historical Temperature
Historical Snow
Historical Wind Speed
Cooling Cost Index
Historical Precipitation
Historical Humidity

Hot Rankings

Fastest / Slowest Growing Cities Nearby
Best / Worst Cities by Crime Rate Nearby
Richest / Poorest Cities by Income Nearby
Expensive / Cheapest Homes Nearby
Most / Least Educated Cities Nearby
Fastest / Slowest Growing Cities in CA
High / Low CA Cities by Males Employed
High / Low CA Cities by Females Employed
Best / Worst Cities by Crime Rate in CA
Richest / Poorest Cities by Income in CA
Expensive / Cheapest Homes by City in CA
Most / Least Educated Cities in CA

Historical Weather

Heating Cost Index, #349

Menlo Park, CA	35.29
California	61.47
U.S.	212.91

Cooling Cost Index, #29

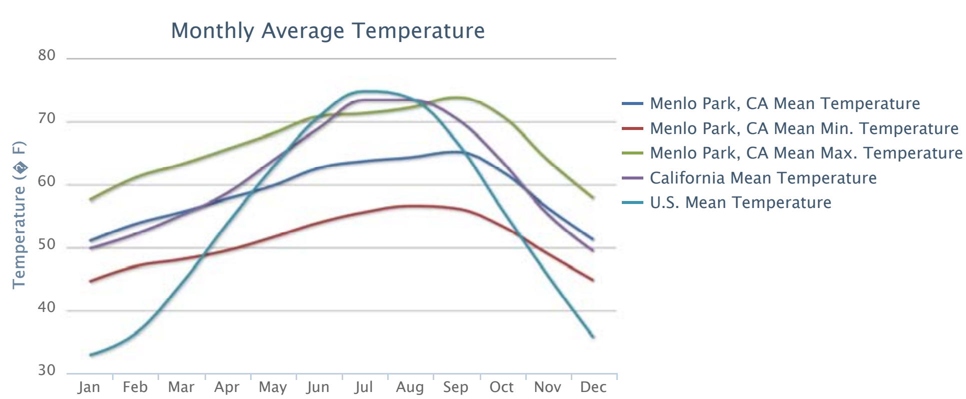
Menlo Park, CA	11.06
California	167.34
U.S.	139.42

The Heating Cost Index and the Cooling Cost Index are indicators of the relative heating and cooling cost of an area. They were calculated based on the average temperate and duration of the hot and cold days for the area. Please note, the actual heating cost and cooling cost are also dependent on other factors specific to individual residences such as the size of the house, the insulation condition, and the equipment efficiency, etc.

Average Temperature

Annual Average Temperature, #1274

Menlo Park, CA	58.6 °F
California	61.2 °F
U.S.	54.5 °F

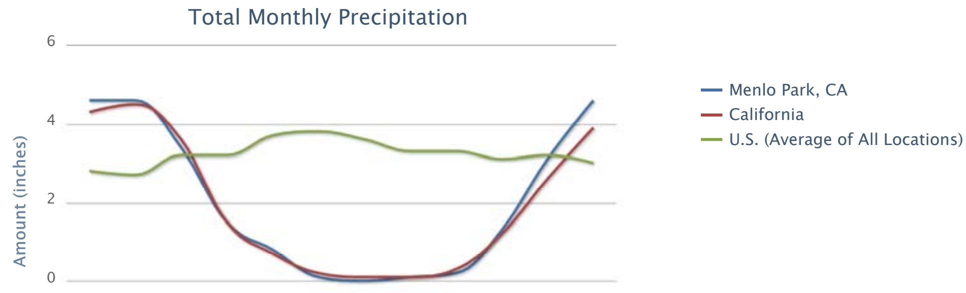


Ranks: Average Max. Temperature: #1561, Average Min. Temperature: #340

Precipitation

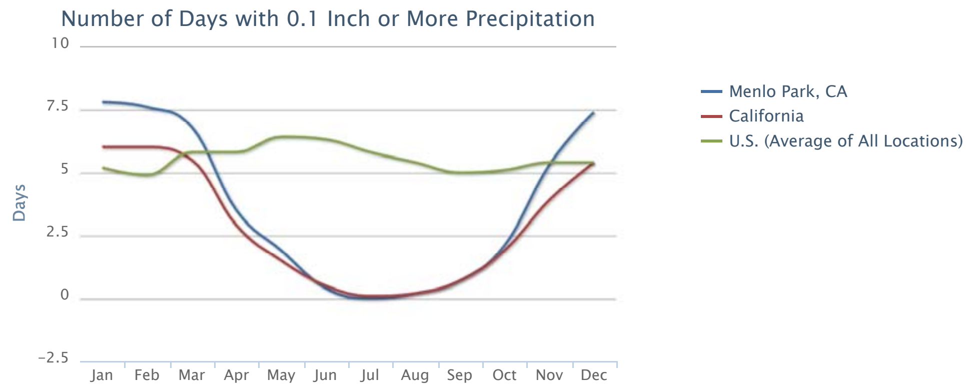
Average Annual Precipitation, #749

Menlo Park, CA	24.21 inches
California	22.97 inches
U.S.	38.67 inches



Average Number of Days with 0.1 Inch or More Precipitation in a Year (this gives an indication of the number of days in a year that it is useful to have an umbrella), #638

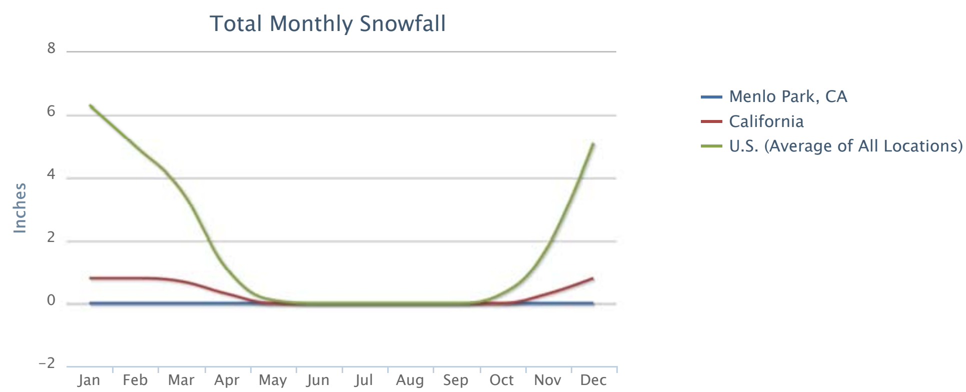
Menlo Park, CA	43.55 days
California	34.63 days
U.S.	66.51 days



Snow

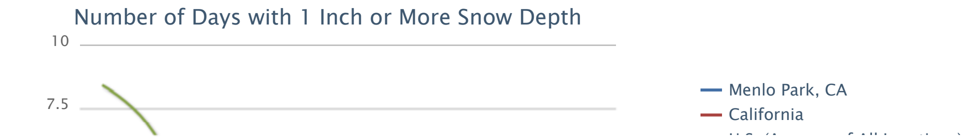
Average Annual Snowfall, #1192

Menlo Park, CA	0.00 inches
California	3.76 inches
U.S.	23.27 inches



Average Number of Days with 1 Inch or More Snow Depth in a Year, #868

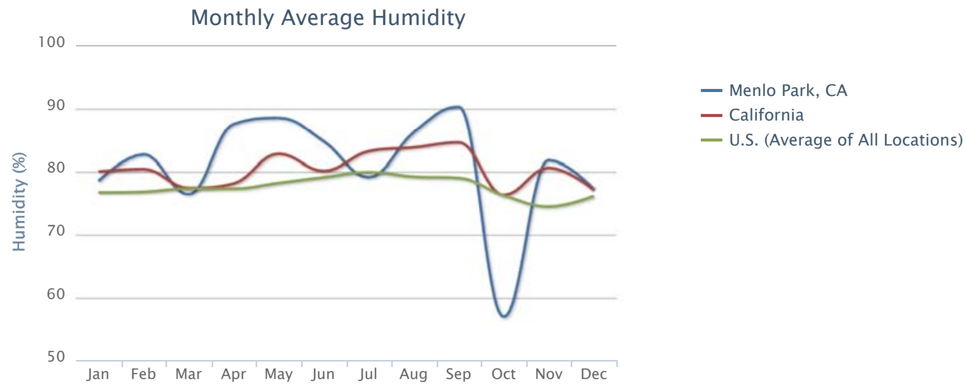
Menlo Park, CA	0.00 days
California	2.28 days
U.S.	27.17 days



Humidity

Annual Average Humidity, [#904](#)

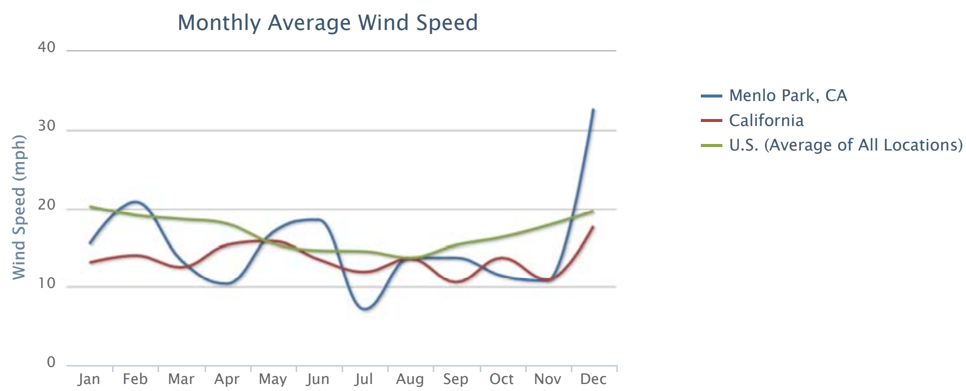
Menlo Park, CA	80.85%
California	80.36%
U.S.	77.52%



Wind Speed

Annual Average Wind Speed, [#838](#)

Menlo Park, CA	15.40 mph
California	13.54 mph
U.S.	16.93 mph



* The temperature, snow fall, and precipitation information on this page were calculated from the historical data of 18,000+ U.S weather stations for the period of time from 1980 to 2010. The humidity and wind speed information were calculated from data from 15,000 worldwide stations for the period of time from 1980 to 2010.

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Other – Area & Off-Road Emissions

Area Sources - Consumer Products

Source: CalEEMod Users Guide. Version 2013.2.2.

Residential Consumer Product Use

Emissions = EF x Building Area

SCAQMD EF = 2.04E-05 lbs/sqft/day

AVERAGE HOUSING SQFT ASSUMPTIONS

Year Structure was Built	Percent of Housing Stock [1]	Average Square Feet of New Single Family Homes[2]	Average Square Feet (Weighted)
2010 or later	1.7%	2,494	42
2000 to 2009	3.3%	2,400	79
1990 to 1999	4.6%	2,103	96
1980 to 1989	4.6%	1,792	82
1979 or earlier	85.9%	1,699	1,460
			1,759

Sources/Notes:

(1) United States Census Bureau, American FactFinder, City of Menlo Park, San Mateo County, California, Physical Housing Characteristics for Occupied Housing Units, 2012 American Community Survey 3-Year Estimates, Year structure built.

(2) United States Census Bureau, Characteristics of New Housing, Characteristics of New Single-Family Houses Completed, Median and Average Square Feet by Location. Obtained from http://www.census.gov/construction/chars/

	CEQA BASELINE	2040	2020
Housing Units	13,100	19,880	19,880
Residential SQFT	23,036,441	40,684,781	40,684,781
lbs VOC per day	470	830	830

Source

1 New housing units constructed post-2014 assumed to be 2,603 square feet.

Area Sources - Criteria Air Pollutants

CEQA Baseline 2015	Proportioned Based on:	ROG Exhaust	NO_x Exhaust	CO Exhaust	SO_2 Exhaust	PM_{10} Exhaust	$PM_{2.5}$ Exhaust*
				lbs/day			
Construction Equipment	The percentage of building permits issued in Menlo Park compared to San Mateo County.	69	443	517	1	27	27
Lawn & Garden Equipment	The percentage of residential units in Menlo Park compared to San Mateo County.	79	21	1,056	0	3	3
Light Commercial Equipment	The percentage of employment in Menlo Park compared to San Mateo County.	57	109	1,746	0	12	12
TOTAL		205	573	3,319	1	42	42

* assumes PM2.5 is 99 percent of PM10

EXISTING	Forecast Adjusted for:	ROG Exhaust	NO_x Exhaust	CO Exhaust	SO_2 Exhaust	PM10 Exhaust	PM2.5 Exhaust*
				lbs/day			
Construction Equipment	Annual assumed to be similar to historic	69	443	517	1	27	27
Lawn & Garden Equipment	Proportional to population growth	79	21	1,056	0	3	3
Light Commercial Equipment	Proportional to employment growth	57	109	1,746	0	12	12
TOTAL		205	573	3,319	1	42	42

2040 MAXIMUM	Forecast Adjusted for:	ROG Exhaust	NO_x Exhaust	CO Exhaust	SO_2 Exhaust	PM10 Exhaust	PM2.5 Exhaust*
				lbs/day			
Construction Equipment	Annual assumed to be similar to historic	69	443	517	1	27	27
Lawn & Garden Equipment	Proportional to population growth	121	32	1,616	0	4	4
Light Commercial Equipment	Proportional to employment growth	97	188	3,010	0	21	21
TOTAL		288	663	5,142	1	52	52

Sources

Building Permits

Source: U.S. Census Bureau

http://censtats.census.gov/bldg/bldgprmt.shtml

Employment

Source. U.S. Census Bureau. Longitudinal Employer-Household Dynamics. http://lehd.ces.census.gov/

Population

Source. U.S. Census Bureau.

Other Emissions Sources - Off-road Equipment

Source: OFFROAD2007. Based on equipment use in Menlo Park.

Year 2014 BAU	Proportioned Based on:	$MTCO_2e$
Construction Equipment	The percentage of building permits issued in Menlo Park compared to San Mateo County..	9,508
Lawn & Garden Equipment	The percentage of residential units in Menlo Park compared to San Mateo County.	646
Light Commercial Equipment	The percentage of employment in Menlo Park compared to San Mateo County.	2,541
TOTAL		12,696

		$MTCO_2e$		
		CEQA	2040	
	Forecast Adjusted for:	**Baseline**	**Maximum**	**AB 32 2020**
Construction Equipment	Annual assumed to be similar to historic	9,508	9,508	9,508
Lawn & Garden Equipment	Proportional to population growth	646	989	760
Light Commercial Equipment	Proportional to employment growth	2,541	4,380	2,807
TOTAL		12,696	14,877	13,075

Adjusted Business as Usual - Low Carbon Fuel Standard

		$MTCO_2e$		
		CEQA	2040	
	Notes	**Baseline**	**Maximum**	**AB 32 2020**
Construction Equipment	With LCFS (10% reduction)	8,557	8,557	8,557
Lawn&Garden Equipment	With LCFS (10% reduction)	582	890	684
Light Commercial Equipment	With LCFS (10% reduction)	2,287	3,942	2,526
TOTAL		11,426	13,389	11,768
reduction		1,270	1,488	1,308

Note- the newer OFFROAD2011 Model does not provide emissions by County

Construction

Equipment	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust (Tons/Day)	NOX Exhaust	CO Exhaust	SO2 Exhaust	PM Exhaust	CO2 Exhaust	N2O Exhaust	CH4 Exhaust	CO2e	CO2e (MTons/ Year)
Tampers/Rammers	San Mateo	SF	BA	8.48E+01	4.23E+01	8.54E+00	5.37E-04	4.20E-04	2.31E-02	1.82E-06	3.70E-04	4.41E-02	6.58E-05	3.34E-05	6.52E-02	21
Plate Compactors	San Mateo	SF	BA	7.28E+00	4.11E+00	8.29E-01	5.21E-05	4.08E-05	2.24E-03	1.76E-07	3.59E-05	4.28E-03	6.39E-06	3.24E-06	6.33E-03	2
Asphalt Pavers	San Mateo	SF	BA	1.85E+00	2.01E+00	1.21E+00	9.31E-05	6.78E-05	3.60E-03	1.61E-07	4.74E-05	5.65E-03	5.75E-06	4.97E-06	7.53E-03	2
Asphalt Pavers	San Mateo	SF	BA	3.16E+00	3.44E+00	5.21E+00	4.11E-04	2.62E-04	1.60E-02	5.98E-07	1.98E-04	2.36E-02	1.52E-05	2.20E-05	2.88E-02	9
Asphalt Pavers	San Mateo	SF	BA	1.55E+00	1.67E+00	3.91E+00	1.12E-04	1.59E-04	4.39E-03	3.70E-07	2.33E-06	3.04E-02	7.67E-06	5.99E-06	3.29E-02	10
Asphalt Pavers	San Mateo	SF	BA	8.53E-01	9.17E-01	3.55E+00	7.07E-05	1.98E-04	1.60E-03	3.04E-07	2.44E-06	3.15E-02	5.99E-06	3.77E-06	3.34E-02	11
Tampers/Rammers	San Mateo	SF	BA	3.91E+00	1.95E+00	9.78E-01	7.47E-05	5.42E-05	2.91E-03	1.31E-07	3.84E-05	4.58E-03	5.03E-06	3.99E-06	6.22E-03	2
Plate Compactors	San Mateo	SF	BA	1.44E+02	7.09E+01	1.33E+01	1.92E-03	8.49E-04	2.98E-02	2.55E-06	2.41E-05	7.39E-02	1.17E-04	1.03E-04	1.12E-01	35
Plate Compactors	San Mateo	SF	BA	1.52E+02	8.61E+01	3.83E+01	2.92E-03	2.13E-03	1.14E-01	5.11E-06	1.50E-03	1.79E-01	2.09E-04	1.56E-04	2.47E-01	78
Rollers	San Mateo	SF	BA	1.60E+01	3.64E+00	1.02E+00	1.25E-04	5.52E-05	2.55E-03	1.85E-07	1.74E-06	5.35E-03	6.79E-06	6.68E-06	7.59E-03	2
Rollers	San Mateo	SF	BA	2.59E+01	2.20E+01	1.24E+01	9.49E-04	6.91E-04	3.70E-02	1.66E-06	4.88E-04	5.82E-02	6.06E-05	5.07E-05	7.80E-02	25
Rollers	San Mateo	SF	BA	1.75E+01	1.49E+01	1.83E+01	1.43E-03	9.11E-04	5.60E-02	2.10E-06	6.95E-04	8.29E-02	5.84E-05	7.63E-05	1.03E-01	32
Rollers	San Mateo	SF	BA	1.09E+00	1.86E+00	5.08E+00	2.05E-04	2.52E-04	7.23E-03	4.48E-07	2.83E-06	3.69E-02	1.05E-05	1.09E-05	4.04E-02	13
Rollers	San Mateo	SF	BA	2.06E+00	3.50E+00	1.62E+01	4.93E-04	1.16E-03	1.02E-02	1.34E-06	1.08E-05	1.39E-01	2.99E-05	2.63E-05	1.49E-01	47
Paving Equipment	San Mateo	SF	BA	2.01E+02	9.37E+01	1.89E+01	2.70E-03	1.19E-03	4.28E-02	3.62E-06	3.41E-05	1.05E-01	1.59E-04	1.44E-04	1.57E-01	49
Paving Equipment	San Mateo	SF	BA	3.40E+02	1.87E+02	1.11E+02	8.48E-03	6.17E-03	3.32E-01	1.49E-05	4.37E-03	5.21E-01	5.28E-04	4.53E-04	6.94E-01	219
Paving Equipment	San Mateo	SF	BA	7.56E+00	4.15E+00	5.61E+00	4.38E-04	2.79E-04	1.72E-02	6.46E-07	2.14E-04	2.55E-02	1.71E-05	2.34E-05	3.13E-02	10
Paving Equipment	San Mateo	SF	BA	4.24E+00	2.04E+00	4.61E+00	7.49E-05	1.20E-04	3.71E-03	4.67E-07	2.94E-06	3.84E-02	7.30E-06	4.00E-06	4.07E-02	13
Paving Equipment	San Mateo	SF	BA	1.09E+00	5.25E-01	1.90E+00	1.76E-05	5.55E-05	5.04E-04	1.69E-07	1.35E-06	1.74E-02	2.30E-06	9.39E-07	1.82E-02	6
Surfacing Equipment	San Mateo	SF	BA	3.69E+01	2.02E+01	4.18E+00	6.20E-04	2.74E-04	9.23E-03	8.11E-07	7.66E-06	2.35E-02	3.56E-05	3.31E-05	3.52E-02	11
Surfacing Equipment	San Mateo	SF	BA	1.10E+02	1.51E+02	6.01E+01	4.81E-03	3.50E-03	1.79E-01	8.01E-06	2.35E-03	2.81E-01	3.54E-04	2.57E-04	3.96E-01	125
Surfacing Equipment	San Mateo	SF	BA	1.50E+00	2.07E+00	2.02E+00	1.65E-04	1.05E-04	6.17E-03	2.31E-07	7.65E-05	9.13E-03	7.37E-06	8.82E-06	1.16E-02	4
Signal Boards	San Mateo	SF	BA	4.56E-01	1.62E-01	5.44E-02	7.14E-06	3.15E-06	1.31E-04	1.01E-08	9.53E-08	2.92E-04	3.46E-07	3.81E-07	4.07E-04	0
Signal Boards	San Mateo	SF	BA	3.24E+00	2.53E+00	1.55E+00	1.18E-04	8.59E-05	4.63E-03	2.07E-07	6.10E-05	7.27E-03	7.25E-06	6.30E-06	9.65E-03	3
Trenchers	San Mateo	SF	BA	3.00E+01	3.57E+01	2.39E+01	1.87E-03	1.36E-03	7.11E-02	3.18E-06	9.35E-04	1.12E-01	1.09E-04	9.96E-05	1.47E-01	46
Trenchers	San Mateo	SF	BA	2.32E+01	2.77E+01	4.01E+01	3.21E-03	2.04E-03	1.23E-01	4.60E-06	1.52E-03	1.82E-01	1.20E-04	1.71E-04	2.22E-01	70
Trenchers	San Mateo	SF	BA	9.95E+00	1.10E+01	2.46E+01	8.54E-04	1.18E-03	2.96E-02	2.28E-06	1.44E-05	1.88E-01	5.44E-05	4.56E-05	2.05E-01	65
Trenchers	San Mateo	SF	BA	3.30E+00	3.64E+00	1.55E+01	3.91E-04	1.08E-03	7.99E-03	1.31E-06	1.05E-05	1.35E-01	2.89E-05	2.09E-05	1.45E-01	46
Bore/Drill Rigs	San Mateo	SF	BA	8.58E-01	2.92E-01	2.33E-01	1.72E-05	1.25E-05	6.95E-04	3.11E-08	9.15E-06	1.09E-03	9.46E-07	9.19E-07	1.40E-03	0
Bore/Drill Rigs	San Mateo	SF	BA	4.26E+00	1.45E+00	2.15E+00	1.62E-04	1.03E-04	6.59E-03	2.47E-07	8.18E-05	9.76E-03	6.17E-06	8.68E-06	1.19E-02	4
Bore/Drill Rigs	San Mateo	SF	BA	4.81E-01	1.41E-01	3.76E-01	9.86E-06	1.74E-05	3.27E-04	3.75E-08	2.36E-07	3.08E-03	7.37E-07	5.27E-07	3.32E-03	1
Bore/Drill Rigs	San Mateo	SF	BA	2.21E+00	6.48E-01	4.27E+00	7.72E-05	2.88E-04	1.54E-03	3.72E-07	2.98E-06	3.85E-02	6.23E-06	4.12E-06	4.05E-02	13
Bore/Drill Rigs	San Mateo	SF	BA	5.47E-01	1.60E-01	1.45E+00	1.55E-05	1.12E-04	4.60E-04	1.32E-07	1.06E-06	1.33E-02	1.97E-06	8.29E-07	1.39E-02	4
Concrete/Industrial Saws	San Mateo	SF	BA	1.57E+01	5.61E+00	1.54E+00	2.02E-04	8.94E-05	3.71E-03	2.86E-07	2.70E-06	8.29E-03	1.07E-05	1.08E-05	1.18E-02	4
Concrete/Industrial Saws	San Mateo	SF	BA	7.08E+01	6.02E+01	4.27E+01	3.26E-03	2.38E-03	1.27E-01	5.70E-06	1.68E-03	2.00E-01	1.87E-04	1.74E-04	2.62E-01	82
Concrete/Industrial Saws	San Mateo	SF	BA	2.21E+01	1.88E+01	2.60E+01	2.04E-03	1.30E-03	7.98E-02	2.99E-06	9.91E-04	1.18E-01	7.88E-05	1.09E-04	1.45E-01	46
Concrete/Industrial Saws	San Mateo	SF	BA	1.79E+00	3.00E+00	8.39E+00	9.21E-05	1.33E-04	6.32E-03	8.60E-07	5.42E-06	7.07E-02	9.92E-06	4.91E-06	7.39E-02	23
Concrete/Industrial Saws	San Mateo	SF	BA	1.03E+00	1.72E+00	8.13E+00	3.78E-05	8.51E-05	1.72E-03	7.30E-07	5.85E-06	7.56E-02	6.03E-06	2.02E-06	7.75E-02	24
Cement and Mortar Mixers	San Mateo	SF	BA	2.86E+02	7.21E+01	1.89E+01	2.42E-03	1.07E-03	4.63E-02	3.48E-06	3.28E-05	1.01E-01	1.33E-04	1.29E-04	1.45E-01	45
Cement and Mortar Mixers	San Mateo	SF	BA	4.84E+02	1.22E+02	6.01E+01	5.12E-03	2.99E-03	1.83E-01	7.78E-06	2.27E-03	2.73E-01	2.93E-04	2.73E-04	3.70E-01	116
Cement and Mortar Mixers	San Mateo	SF	BA	2.04E+00	5.14E-01	8.07E-01	6.74E-05	3.60E-05	2.51E-03	9.10E-08	2.98E-05	3.59E-03	2.16E-06	3.60E-06	4.33E-03	1
Cranes	San Mateo	SF	BA	5.47E-01	6.22E-01	1.23E+00	4.31E-05	5.93E-05	1.49E-03	1.14E-07	7.16E-07	9.34E-03	2.89E-06	2.30E-06	1.03E-02	3
Cranes	San Mateo	SF	BA	1.09E+00	1.24E+00	4.23E+00	1.08E-04	2.96E-04	2.21E-03	3.57E-07	2.86E-06	3.69E-02	8.79E-06	5.78E-06	3.98E-02	13
Cranes	San Mateo	SF	BA	4.37E-02	4.98E-02	2.68E-01	3.60E-06	2.25E-05	9.42E-05	2.41E-08	1.93E-07	2.43E-03	4.94E-07	1.92E-07	2.59E-03	1
Crushing/Proc. Equipment	San Mateo	SF	BA	7.78E-01	6.16E-01	4.77E-01	3.62E-05	2.64E-05	1.42E-03	6.36E-08	1.87E-05	2.23E-03	2.00E-06	1.94E-06	2.89E-03	1
Crushing/Proc. Equipment	San Mateo	SF	BA	5.09E-01	4.04E-01	5.73E-01	4.46E-05	2.84E-05	1.76E-03	6.59E-08	2.18E-05	2.60E-03	1.71E-06	2.38E-06	3.18E-03	1
Crushing/Proc. Equipment	San Mateo	SF	BA	6.34E-01	4.19E-01	3.28E+00	7.03E-05	2.25E-04	1.42E-03	2.82E-07	2.26E-06	2.92E-02	4.52E-06	3.76E-06	3.07E-02	10

Construction

						Tons/Day										MTons/ Year
Equipment	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	NOX Exhaust	CO Exhaust	SO2 Exhaust	PM Exhaust	CO2 Exhaust	N2O Exhaust	CH4 Exhaust	CO2e	CO2e
Rough Terrain Forklifts	San Mateo	SF	BA	2.19E-01	2.48E-01	8.32E-01	2.92E-05	4.02E-05	1.01E-03	7.70E-08	4.85E-07	6.33E-03	1.53E-06	1.56E-06	6.84E-03	2
Rough Terrain Forklifts	San Mateo	SF	BA	3.11E+00	3.52E+00	1.84E+01	4.70E-04	1.29E-03	9.61E-03	1.55E-06	1.25E-05	1.61E-01	3.13E-05	2.51E-05	1.71E-01	54
Rough Terrain Forklifts	San Mateo	SF	BA	1.09E-01	1.24E-01	1.02E+00	1.36E-05	8.52E-05	3.56E-04	9.14E-08	7.33E-07	9.20E-03	1.54E-06	7.27E-07	9.69E-03	3
Rubber Tired Loaders	San Mateo	SF	BA	5.47E-01	7.68E-01	1.91E+00	6.59E-05	8.67E-05	2.44E-03	1.74E-07	1.10E-06	1.43E-02	3.89E-06	3.52E-06	1.56E-02	5
Rubber Tired Loaders	San Mateo	SF	BA	3.63E+00	5.10E+00	1.94E+01	4.87E-04	1.25E-03	1.05E-02	1.63E-06	1.31E-05	1.69E-01	3.63E-05	2.60E-05	1.81E-01	57
Tractors/Loaders/Backhoes	San Mateo	SF	BA	1.92E+00	4.59E+00	1.36E+01	1.90E-04	4.28E-04	7.44E-03	1.15E-06	9.18E-06	1.19E-01	2.02E-05	1.01E-05	1.25E-01	39
Skid Steer Loaders	San Mateo	SF	BA	1.53E+00	1.34E+00	1.10E+00	8.49E-05	6.18E-05	3.27E-03	1.47E-07	4.31E-05	5.14E-03	4.52E-06	4.54E-06	6.64E-03	2
Skid Steer Loaders	San Mateo	SF	BA	1.02E+02	8.94E+01	1.03E+02	8.14E-03	5.19E-03	3.15E-01	1.18E-05	3.91E-03	4.66E-01	3.41E-04	4.35E-04	5.81E-01	183
Skid Steer Loaders	San Mateo	SF	BA	1.49E+01	1.27E+01	2.45E+01	2.92E-04	4.28E-04	2.04E-02	2.47E-06	1.56E-05	2.03E-01	3.58E-05	1.56E-05	2.15E-01	68
Skid Steer Loaders	San Mateo	SF	BA	8.92E+00	7.58E+00	3.25E+01	1.74E-04	4.28E-04	7.94E-03	2.90E-06	2.33E-05	3.00E-01	2.75E-05	9.27E-06	3.09E-01	97
Dumpers/Tenders	San Mateo	SF	BA	1.46E+01	5.96E+00	8.25E-01	1.22E-04	5.38E-05	1.83E-03	1.60E-07	1.51E-06	4.63E-03	8.43E-06	6.51E-06	7.38E-03	2
Dumpers/Tenders	San Mateo	SF	BA	3.11E+01	1.27E+01	4.86E+00	4.18E-04	2.55E-04	1.47E-02	6.33E-07	1.85E-04	2.22E-02	2.75E-05	2.23E-05	3.12E-02	10
Dumpers/Tenders	San Mateo	SF	BA	5.76E+00	2.36E+00	1.95E+00	1.65E-04	9.14E-05	6.03E-03	2.20E-07	7.24E-05	8.68E-03	7.24E-06	8.84E-06	1.11E-02	3
Dumpers/Tenders	San Mateo	SF	BA	3.94E-01	1.37E-01	3.52E-01	6.55E-06	2.38E-05	1.31E-04	3.06E-08	2.45E-07	3.17E-03	8.01E-07	3.50E-07	3.42E-03	1
Other Construction Equipment	San Mateo	SF	BA	1.53E+00	1.56E+00	8.57E+00	3.55E-05	1.10E-04	2.78E-03	7.77E-07	6.23E-06	7.82E-02	6.53E-06	1.90E-06	8.03E-02	25
Pavers	San Mateo	SF	BA	4.24E-01	9.54E-01	8.10E-01	1.11E-05	6.95E-05	3.72E-05	1.13E-07	3.12E-06	8.89E-03	0.00E+00	1.01E-06	8.91E-03	3
Pavers	San Mateo	SF	BA	2.46E+01	5.62E+01	7.34E+01	3.36E-03	7.79E-03	9.61E-03	1.02E-05	7.60E-04	7.86E-01	0.00E+00	3.03E-04	7.93E-01	249
Pavers	San Mateo	SF	BA	2.90E+01	6.63E+01	2.10E+02	4.09E-03	2.48E-02	1.65E-02	2.69E-05	2.11E-03	2.29E+00	0.00E+00	3.69E-04	2.30E+00	724
Pavers	San Mateo	SF	BA	1.81E+01	4.12E+01	2.41E+02	3.31E-03	2.50E-02	1.59E-02	2.97E-05	1.38E-03	2.64E+00	0.00E+00	2.98E-04	2.65E+00	833
Pavers	San Mateo	SF	BA	2.18E+00	4.96E+00	4.38E+01	4.61E-04	4.15E-03	1.39E-03	5.42E-06	1.59E-04	4.82E-01	0.00E+00	4.16E-05	4.83E-01	152
Pavers	San Mateo	SF	BA	2.23E+00	5.09E+00	5.39E+01	5.24E-04	4.60E-03	2.07E-03	5.83E-06	1.77E-04	5.94E-01	0.00E+00	4.73E-05	5.95E-01	187
Plate Compactors	San Mateo	SF	BA	9.10E+00	1.50E+01	2.95E+00	3.75E-05	2.35E-04	1.97E-04	5.02E-07	9.16E-06	3.23E-02	0.00E+00	3.39E-06	3.23E-02	10
Rollers	San Mateo	SF	BA	1.71E+01	3.26E+01	9.40E+00	1.20E-04	7.50E-04	6.28E-04	1.60E-06	2.93E-05	1.03E-01	0.00E+00	1.08E-05	1.03E-01	32
Rollers	San Mateo	SF	BA	7.15E+00	1.36E+01	8.27E+00	1.10E-04	6.93E-04	3.74E-04	1.15E-06	2.65E-05	9.08E-02	0.00E+00	9.89E-06	9.10E-02	29
Rollers	San Mateo	SF	BA	2.22E+01	4.28E+01	5.15E+01	1.86E-03	5.14E-03	5.88E-03	7.18E-06	4.45E-04	5.55E-01	0.00E+00	1.68E-04	5.59E-01	176
Rollers	San Mateo	SF	BA	1.19E+02	2.30E+02	6.19E+02	9.82E-03	6.30E-02	4.59E-02	7.94E-05	5.21E-03	6.77E+00	0.00E+00	8.86E-04	6.78E+00	2,136
Rollers	San Mateo	SF	BA	4.80E+01	9.23E+01	4.55E+02	5.09E-03	4.02E-02	2.84E-02	5.61E-05	2.17E-03	4.99E+00	0.00E+00	4.59E-04	5.00E+00	1,573
Rollers	San Mateo	SF	BA	6.81E+00	1.31E+01	9.08E+01	7.24E-04	7.16E-03	2.34E-03	1.13E-05	2.41E-04	1.00E+00	0.00E+00	6.53E-05	1.00E+00	316
Rollers	San Mateo	SF	BA	4.77E+00	9.18E+00	9.11E+01	6.73E-04	6.40E-03	2.57E-03	9.87E-06	2.23E-04	1.01E+00	0.00E+00	6.07E-05	1.01E+00	317
Scrapers	San Mateo	SF	BA	1.10E+00	3.35E+00	1.44E+01	2.79E-04	1.66E-03	1.14E-03	1.85E-06	1.42E-04	1.57E-01	0.00E+00	2.52E-05	1.58E-01	50
Scrapers	San Mateo	SF	BA	1.01E+01	3.07E+01	2.08E+02	2.87E-03	2.09E-02	1.39E-02	2.56E-05	1.17E-03	2.27E+00	0.00E+00	2.59E-04	2.28E+00	717
Scrapers	San Mateo	SF	BA	9.83E+00	2.99E+01	2.84E+02	3.02E-03	2.61E-02	8.83E-03	3.52E-05	9.94E-04	3.13E+00	0.00E+00	2.73E-04	3.14E+00	988
Scrapers	San Mateo	SF	BA	2.71E+01	8.24E+01	1.20E+03	1.19E-02	9.92E-02	4.40E-02	1.30E-04	3.83E-03	1.32E+01	0.00E+00	1.07E-03	1.33E+01	4,172
Scrapers	San Mateo	SF	BA	3.80E-01	1.16E+00	2.91E+01	2.89E-04	2.46E-03	1.07E-03	3.23E-06	9.38E-05	3.21E-01	0.00E+00	2.61E-05	3.21E-01	101
Paving Equipment	San Mateo	SF	BA	7.35E-01	1.67E+00	9.59E-01	1.27E-05	8.03E-05	4.34E-05	1.34E-07	3.08E-06	1.05E-02	0.00E+00	1.15E-06	1.06E-02	3
Paving Equipment	San Mateo	SF	BA	6.22E-01	1.42E+00	1.59E+00	7.27E-05	1.68E-04	2.06E-04	2.20E-07	1.65E-05	1.70E-02	0.00E+00	6.56E-06	1.72E-02	5
Paving Equipment	San Mateo	SF	BA	8.96E+00	2.05E+01	5.13E+01	9.93E-04	6.02E-03	3.99E-03	6.55E-06	5.15E-04	5.59E-01	0.00E+00	8.96E-05	5.61E-01	176
Paving Equipment	San Mateo	SF	BA	4.21E+00	9.65E+00	4.45E+01	6.04E-04	4.60E-03	2.90E-03	5.48E-06	2.54E-04	4.87E-01	0.00E+00	5.45E-05	4.88E-01	154
Paving Equipment	San Mateo	SF	BA	1.19E+00	2.72E+00	1.51E+01	1.55E-04	1.43E-03	4.68E-04	1.87E-06	5.35E-05	1.66E-01	0.00E+00	1.40E-05	1.66E-01	52
Surfacing Equipment	San Mateo	SF	BA	5.65E-01	7.01E-01	4.57E-01	1.43E-05	4.42E-05	4.67E-05	6.39E-08	3.54E-06	4.94E-03	0.00E+00	1.29E-06	4.97E-03	2
Surfacing Equipment	San Mateo	SF	BA	1.13E-01	1.40E-01	4.09E-01	5.88E-06	4.03E-05	2.91E-05	5.24E-08	3.07E-06	4.47E-03	0.00E+00	5.30E-07	4.48E-03	1
Surfacing Equipment	San Mateo	SF	BA	8.48E-02	1.05E-01	4.11E-01	4.13E-06	3.52E-05	2.47E-05	5.07E-08	1.76E-06	4.51E-03	0.00E+00	3.73E-07	4.51E-03	1
Surfacing Equipment	San Mateo	SF	BA	1.70E-01	2.10E-01	1.28E+00	9.36E-06	9.81E-05	3.28E-05	1.59E-07	3.25E-06	1.42E-02	0.00E+00	8.45E-07	1.42E-02	4
Surfacing Equipment	San Mateo	SF	BA	1.41E+00	1.75E+00	1.76E+01	1.18E-04	1.21E-03	5.04E-04	1.90E-06	4.10E-05	1.94E-01	0.00E+00	1.06E-05	1.94E-01	61
Surfacing Equipment	San Mateo	SF	BA	7.26E-02	9.01E-02	1.42E+00	9.61E-06	9.98E-05	4.07E-05	1.57E-07	3.35E-06	1.56E-02	0.00E+00	8.67E-07	1.56E-02	5
Signal Boards	San Mateo	SF	BA	7.95E+01	1.64E+02	4.61E+01	5.87E-04	3.67E-03	3.08E-03	7.84E-06	1.44E-04	5.04E-01	0.00E+00	5.29E-05	5.05E-01	159
Signal Boards	San Mateo	SF	BA	3.96E-01	5.80E-01	9.68E-01	2.69E-05	9.12E-05	9.35E-05	1.36E-07	7.05E-06	1.05E-02	0.00E+00	2.43E-06	1.05E-02	3

Construction

						Tons/Day										MTons/ Year
Equipment	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	NOX Exhaust	CO Exhaust	SO2 Exhaust	PM Exhaust	CO2 Exhaust	N2O Exhaust	CH4 Exhaust	CO2e	CO2e
Signal Boards	San Mateo	SF	BA	6.47E+00	9.49E+00	3.48E+01	4.60E-04	3.20E-03	2.43E-03	4.46E-06	2.49E-04	3.80E-01	0.00E+00	4.15E-05	3.81E-01	120
Signal Boards	San Mateo	SF	BA	4.01E+00	5.89E+00	4.14E+01	3.79E-04	3.31E-03	2.44E-03	5.11E-06	1.64E-04	4.54E-01	0.00E+00	3.42E-05	4.55E-01	143
Signal Boards	San Mateo	SF	BA	8.48E-01	1.24E+00	1.44E+01	8.79E-05	1.01E-03	3.17E-04	1.78E-06	2.94E-05	1.59E-01	0.00E+00	7.93E-06	1.59E-01	50
Trenchers	San Mateo	SF	BA	2.12E+00	3.59E+00	1.39E+00	1.77E-05	1.11E-04	9.27E-05	2.36E-07	4.32E-06	1.52E-02	0.00E+00	1.59E-06	1.52E-02	5
Trenchers	San Mateo	SF	BA	2.23E+00	3.78E+00	5.67E+00	7.50E-05	4.74E-04	2.56E-04	7.89E-07	1.78E-05	6.22E-02	0.00E+00	6.77E-06	6.23E-02	20
Trenchers	San Mateo	SF	BA	8.50E+01	1.47E+02	2.25E+02	1.02E-02	2.37E-02	2.86E-02	3.12E-05	2.29E-03	2.41E+00	0.00E+00	9.18E-04	2.43E+00	765
Trenchers	San Mateo	SF	BA	1.15E+02	1.99E+02	5.91E+02	1.14E-02	7.01E-02	4.57E-02	7.56E-05	5.85E-03	6.44E+00	0.00E+00	1.02E-03	6.46E+00	2,035
Trenchers	San Mateo	SF	BA	1.26E+01	2.18E+01	1.43E+02	1.92E-03	1.50E-02	9.27E-03	1.76E-05	8.12E-04	1.56E+00	0.00E+00	1.73E-04	1.57E+00	493
Trenchers	San Mateo	SF	BA	1.13E+00	1.95E+00	1.97E+01	2.05E-04	1.90E-03	6.35E-04	2.44E-06	7.31E-05	2.17E-01	0.00E+00	1.85E-05	2.18E-01	69
Trenchers	San Mateo	SF	BA	1.44E+00	2.49E+00	3.52E+01	3.35E-04	3.05E-03	1.41E-03	3.80E-06	1.18E-04	3.87E-01	0.00E+00	3.02E-05	3.87E-01	122
Trenchers	San Mateo	SF	BA	1.45E-02	2.51E-02	6.68E-01	6.39E-06	5.90E-05	2.68E-05	7.39E-08	2.26E-06	7.35E-03	0.00E+00	5.77E-07	7.36E-03	2
Bore/Drill Rigs	San Mateo	SF	BA	2.83E-01	6.28E-01	2.97E-01	3.78E-06	2.37E-05	1.98E-05	5.05E-08	9.24E-07	3.25E-03	0.00E+00	3.41E-07	3.25E-03	1
Bore/Drill Rigs	San Mateo	SF	BA	8.48E-01	1.88E+00	1.37E+00	1.82E-05	1.15E-04	6.20E-05	1.91E-07	4.40E-06	1.51E-02	0.00E+00	1.64E-06	1.51E-02	5
Bore/Drill Rigs	San Mateo	SF	BA	3.70E+00	8.54E+00	1.21E+01	9.99E-05	9.56E-04	9.54E-04	1.71E-06	3.20E-05	1.32E-01	0.00E+00	9.01E-06	1.33E-01	42
Bore/Drill Rigs	San Mateo	SF	BA	1.14E+01	2.62E+01	9.20E+01	4.92E-04	4.89E-03	6.12E-03	1.18E-05	2.10E-04	1.01E+00	0.00E+00	4.44E-05	1.01E+00	318
Bore/Drill Rigs	San Mateo	SF	BA	2.63E+00	6.06E+00	3.89E+01	1.87E-04	1.62E-03	2.28E-03	4.81E-06	5.99E-05	4.27E-01	0.00E+00	1.69E-05	4.28E-01	135
Bore/Drill Rigs	San Mateo	SF	BA	2.26E+00	5.22E+00	4.43E+01	1.77E-04	1.28E-03	8.92E-04	5.52E-06	3.75E-05	4.90E-01	0.00E+00	1.60E-05	4.90E-01	154
Bore/Drill Rigs	San Mateo	SF	BA	5.03E+00	1.16E+01	1.63E+02	6.48E-04	4.46E-03	3.19E-03	1.77E-05	1.37E-04	1.80E+00	0.00E+00	5.85E-05	1.81E+00	569
Bore/Drill Rigs	San Mateo	SF	BA	2.25E-01	5.19E-01	1.44E+01	5.74E-05	3.97E-04	2.82E-04	1.60E-06	1.21E-05	1.60E-01	0.00E+00	5.18E-06	1.60E-01	50
Bore/Drill Rigs	San Mateo	SF	BA	3.77E-01	8.70E-01	3.65E+01	1.55E-04	2.16E-03	7.19E-04	4.06E-06	5.19E-05	4.04E-01	0.00E+00	1.40E-05	4.04E-01	127
Excavators	San Mateo	SF	BA	1.05E+00	4.00E+00	2.99E+00	3.96E-05	2.51E-04	1.35E-04	4.17E-07	9.33E-06	3.29E-02	0.00E+00	3.58E-06	3.29E-02	10
Excavators	San Mateo	SF	BA	3.94E+01	1.53E+02	1.77E+02	4.97E-03	1.73E-02	2.05E-02	2.48E-05	1.28E-03	1.92E+00	0.00E+00	4.48E-04	1.93E+00	606
Excavators	San Mateo	SF	BA	1.07E+02	4.16E+02	1.40E+03	1.90E-02	1.20E-01	1.06E-01	1.80E-04	9.45E-03	1.53E+01	0.00E+00	1.71E-03	1.53E+01	4,831
Excavators	San Mateo	SF	BA	2.06E+02	8.03E+02	4.11E+03	4.22E-02	2.97E-01	2.67E-01	5.07E-04	1.62E-02	4.50E+01	0.00E+00	3.80E-03	4.51E+01	14,199
Excavators	San Mateo	SF	BA	8.39E+01	3.27E+02	2.35E+03	1.82E-02	1.46E-01	5.60E-02	2.91E-04	4.84E-03	2.59E+01	0.00E+00	1.64E-03	2.59E+01	8,161
Excavators	San Mateo	SF	BA	6.05E+01	2.36E+02	2.49E+03	1.86E-02	1.37E-01	5.84E-02	2.70E-04	4.86E-03	2.75E+01	0.00E+00	1.67E-03	2.75E+01	8,671
Excavators	San Mateo	SF	BA	1.14E-01	4.43E-01	7.77E+00	5.81E-05	4.39E-04	1.82E-04	8.62E-07	1.54E-05	8.57E-02	0.00E+00	5.25E-06	8.58E-02	27
Concrete/Industrial Saws	San Mateo	SF	BA	1.13E-01	1.83E-01	1.38E-01	1.82E-06	1.15E-05	6.22E-06	1.92E-08	4.33E-07	1.51E-03	0.00E+00	1.64E-07	1.51E-03	0
Concrete/Industrial Saws	San Mateo	SF	BA	9.89E-01	1.57E+00	2.19E+00	6.13E-05	2.08E-04	2.16E-04	3.07E-07	1.61E-05	2.37E-02	0.00E+00	5.53E-06	2.38E-02	8
Concrete/Industrial Saws	San Mateo	SF	BA	1.72E+00	2.74E+00	9.28E+00	1.22E-04	8.55E-04	6.52E-04	1.19E-06	6.65E-05	1.02E-01	0.00E+00	1.10E-05	1.02E-01	32
Concrete/Industrial Saws	San Mateo	SF	BA	5.65E-02	8.99E-02	6.55E-01	6.01E-06	5.20E-05	3.89E-05	8.09E-08	2.62E-06	7.19E-03	0.00E+00	5.42E-07	7.20E-03	2
Cement and Mortar Mixers	San Mateo	SF	BA	1.44E+01	1.19E+01	3.43E+00	4.38E-05	2.75E-04	2.29E-04	5.83E-07	1.13E-05	3.75E-02	0.00E+00	3.95E-06	3.76E-02	12
Cement and Mortar Mixers	San Mateo	SF	BA	1.30E+00	1.07E+00	8.55E-01	1.34E-05	7.77E-05	4.18E-05	1.19E-07	3.96E-06	9.38E-03	0.00E+00	1.21E-06	9.40E-03	3
Cranes	San Mateo	SF	BA	9.61E-01	3.37E+00	3.64E+00	1.44E-04	3.76E-04	4.60E-04	5.05E-07	3.41E-05	3.91E-02	0.00E+00	1.30E-05	3.93E-02	12
Cranes	San Mateo	SF	BA	1.05E+01	3.70E+01	8.49E+01	1.48E-03	8.91E-03	6.58E-03	1.09E-05	7.66E-04	9.27E-01	0.00E+00	1.33E-04	9.30E-01	293
Cranes	San Mateo	SF	BA	1.05E+01	3.70E+01	1.36E+02	1.70E-03	1.23E-02	8.86E-03	1.67E-05	6.99E-04	1.48E+00	0.00E+00	1.53E-04	1.49E+00	468
Cranes	San Mateo	SF	BA	2.04E+01	7.17E+01	3.64E+02	3.31E-03	2.97E-02	9.72E-03	4.52E-05	1.03E-03	4.02E+00	0.00E+00	2.99E-04	4.02E+00	1,267
Cranes	San Mateo	SF	BA	7.49E+00	2.63E+01	2.15E+02	1.83E-03	1.55E-02	6.12E-03	2.32E-05	5.60E-04	2.36E+00	0.00E+00	1.65E-04	2.37E+00	746
Cranes	San Mateo	SF	BA	4.72E-01	1.66E+00	2.27E+01	1.95E-04	1.69E-03	6.49E-04	2.52E-06	6.03E-05	2.51E-01	0.00E+00	1.76E-05	2.51E-01	79
Cranes	San Mateo	SF	BA	5.93E-01	2.08E+00	9.15E+01	9.02E-04	9.62E-03	3.01E-03	1.01E-05	2.88E-04	1.01E+00	0.00E+00	8.14E-05	1.01E+00	318
Graders	San Mateo	SF	BA	3.96E-01	1.03E+00	1.32E+00	4.61E-05	1.32E-04	1.59E-04	1.83E-07	1.12E-05	1.42E-02	0.00E+00	4.16E-06	1.43E-02	4
Graders	San Mateo	SF	BA	2.64E+01	6.87E+01	2.36E+02	3.71E-03	2.31E-02	1.80E-02	3.02E-05	1.90E-03	2.57E+00	0.00E+00	3.35E-04	2.58E+00	813
Graders	San Mateo	SF	BA	9.02E+01	2.35E+02	1.33E+03	1.52E-02	1.12E-01	8.59E-02	1.64E-04	6.16E-03	1.45E+01	0.00E+00	1.37E-03	1.46E+01	4,586
Graders	San Mateo	SF	BA	5.59E+01	1.46E+02	1.14E+03	9.65E-03	8.44E-02	2.95E-02	1.41E-04	2.91E-03	1.25E+01	0.00E+00	8.71E-04	1.25E+01	3,950
Graders	San Mateo	SF	BA	1.58E+00	4.12E+00	4.28E+01	3.43E-04	2.83E-03	1.18E-03	4.64E-06	1.02E-04	4.73E-01	0.00E+00	3.10E-05	4.73E-01	149
Graders	San Mateo	SF	BA	7.26E-03	1.89E-02	4.16E-01	3.35E-06	2.82E-05	1.15E-05	4.61E-08	1.00E-06	4.59E-03	0.00E+00	3.02E-07	4.60E-03	1
Off-Highway Trucks	San Mateo	SF	BA	1.84E+00	1.00E+01	5.71E+01	6.29E-04	4.29E-03	3.78E-03	7.03E-06	2.38E-04	6.25E-01	0.00E+00	5.67E-05	6.26E-01	197

Construction

Equipment	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	NOX Exhaust	CO Exhaust	SO2 Exhaust	PM Exhaust	CO2 Exhaust	N2O Exhaust	CH4 Exhaust	CO2e	CO2e
						Tons/Day										MTons/ Year
Off-Highway Trucks	San Mateo	SF	BA	1.36E+01	7.39E+01	5.57E+02	4.62E-03	3.62E-02	1.37E-02	6.92E-05	1.21E-03	6.15E+00	0.00E+00	4.17E-04	6.16E+00	1,938
Off-Highway Trucks	San Mateo	SF	BA	1.91E+01	1.04E+02	1.28E+03	1.02E-02	7.36E-02	3.09E-02	1.39E-04	2.62E-03	1.42E+01	0.00E+00	9.19E-04	1.42E+01	4,462
Off-Highway Trucks	San Mateo	SF	BA	1.52E+00	8.29E+00	1.66E+02	1.32E-03	9.80E-03	4.00E-03	1.84E-05	3.45E-04	1.83E+00	0.00E+00	1.19E-04	1.83E+00	577
Off-Highway Trucks	San Mateo	SF	BA	7.14E-01	3.89E+00	1.10E+02	9.45E-04	1.01E-02	2.88E-03	1.22E-05	2.92E-04	1.21E+00	0.00E+00	8.53E-05	1.21E+00	382
Crushing/Proc. Equipment	San Mateo	SF	BA	4.52E+00	1.18E+01	2.41E+01	8.22E-04	2.38E-03	2.75E-03	3.36E-06	2.04E-04	2.60E-01	0.00E+00	7.42E-05	2.62E-01	82
Crushing/Proc. Equipment	San Mateo	SF	BA	1.27E+01	3.34E+01	1.27E+02	1.94E-03	1.23E-02	9.41E-03	1.63E-05	1.05E-03	1.39E+00	0.00E+00	1.75E-04	1.39E+00	437
Crushing/Proc. Equipment	San Mateo	SF	BA	5.40E+00	1.41E+01	1.08E+02	1.17E-03	9.02E-03	6.75E-03	1.33E-05	4.94E-04	1.18E+00	0.00E+00	1.05E-04	1.18E+00	372
Crushing/Proc. Equipment	San Mateo	SF	BA	5.37E-01	1.41E+00	1.56E+01	1.16E-04	1.15E-03	3.63E-04	1.93E-06	3.55E-05	1.72E-01	0.00E+00	1.04E-05	1.72E-01	54
Crushing/Proc. Equipment	San Mateo	SF	BA	3.02E+00	7.92E+00	1.34E+02	9.32E-04	8.59E-03	3.08E-03	1.45E-05	2.85E-04	1.48E+00	0.00E+00	8.41E-05	1.48E+00	466
Crushing/Proc. Equipment	San Mateo	SF	BA	1.21E-02	3.17E-02	8.44E-01	5.88E-06	5.60E-05	1.93E-05	9.37E-08	1.82E-06	9.32E-03	0.00E+00	5.30E-07	9.33E-03	3
Crushing/Proc. Equipment	San Mateo	SF	BA	1.21E-02	3.17E-02	1.88E+00	1.54E-05	1.83E-04	4.90E-05	2.08E-07	5.10E-06	2.07E-02	0.00E+00	1.39E-06	2.07E-02	7
Rough Terrain Forklifts	San Mateo	SF	BA	3.14E+00	9.73E+00	1.52E+01	4.58E-04	1.49E-03	1.73E-03	2.13E-06	1.18E-04	1.65E-01	0.00E+00	4.13E-05	1.65E-01	52
Rough Terrain Forklifts	San Mateo	SF	BA	1.50E+02	4.66E+02	1.33E+03	1.86E-02	1.20E-01	9.92E-02	1.71E-04	9.78E-03	1.45E+01	0.00E+00	1.68E-03	1.46E+01	4,589
Rough Terrain Forklifts	San Mateo	SF	BA	1.92E+01	5.97E+01	3.40E+02	3.49E-03	2.61E-02	2.16E-02	4.19E-05	1.42E-03	3.73E+00	0.00E+00	3.15E-04	3.73E+00	1,175
Rough Terrain Forklifts	San Mateo	SF	BA	1.07E+00	3.33E+00	2.58E+01	1.94E-04	1.73E-03	6.08E-04	3.20E-06	5.63E-05	2.84E-01	0.00E+00	1.75E-05	2.85E-01	90
Rough Terrain Forklifts	San Mateo	SF	BA	7.06E-01	2.19E+00	2.55E+01	1.83E-04	1.49E-03	5.84E-04	2.76E-06	5.22E-05	2.81E-01	0.00E+00	1.65E-05	2.81E-01	89
Rubber Tired Loaders	San Mateo	SF	BA	3.96E-01	1.04E+00	8.00E-01	1.06E-05	6.69E-05	3.61E-05	1.11E-07	2.52E-06	8.78E-03	0.00E+00	9.55E-07	8.80E-03	3
Rubber Tired Loaders	San Mateo	SF	BA	7.68E+00	2.05E+01	2.97E+01	1.02E-03	2.96E-03	3.53E-03	4.13E-06	2.48E-04	3.20E-01	0.00E+00	9.18E-05	3.22E-01	101
Rubber Tired Loaders	San Mateo	SF	BA	2.09E+02	5.58E+02	1.50E+03	2.33E-02	1.46E-01	1.14E-01	1.93E-04	1.20E-02	1.64E+01	0.00E+00	2.10E-03	1.65E+01	5,187
Rubber Tired Loaders	San Mateo	SF	BA	1.18E+02	3.15E+02	1.53E+03	1.72E-02	1.27E-01	9.83E-02	1.88E-04	6.98E-03	1.67E+01	0.00E+00	1.55E-03	1.67E+01	5,272
Rubber Tired Loaders	San Mateo	SF	BA	1.17E+02	3.13E+02	2.11E+03	1.75E-02	1.55E-01	5.39E-02	2.62E-04	5.27E-03	2.33E+01	0.00E+00	1.58E-03	2.33E+01	7,343
Rubber Tired Loaders	San Mateo	SF	BA	4.87E+01	1.30E+02	1.40E+03	1.09E-02	9.09E-02	3.79E-02	1.51E-04	3.25E-03	1.54E+01	0.00E+00	9.85E-04	1.54E+01	4,861
Rubber Tired Loaders	San Mateo	SF	BA	2.93E-01	7.83E-01	1.72E+01	1.35E-04	1.15E-03	4.66E-04	1.91E-06	4.05E-05	1.90E-01	0.00E+00	1.22E-05	1.90E-01	60
Rubber Tired Loaders	San Mateo	SF	BA	3.15E-02	8.40E-02	2.26E+00	1.95E-05	2.22E-04	6.90E-05	2.51E-07	6.51E-06	2.49E-02	0.00E+00	1.76E-06	2.50E-02	8
Rubber Tired Dozers	San Mateo	SF	BA	2.83E-01	1.26E+00	7.45E+00	1.22E-04	8.76E-04	5.24E-04	9.16E-07	4.96E-05	8.14E-02	0.00E+00	1.10E-05	8.16E-02	26
Rubber Tired Dozers	San Mateo	SF	BA	6.92E+00	3.08E+01	2.57E+02	3.40E-03	2.81E-02	9.71E-03	3.18E-05	1.17E-03	2.83E+00	0.00E+00	3.07E-04	2.83E+00	892
Rubber Tired Dozers	San Mateo	SF	BA	1.07E+01	4.74E+01	5.72E+02	6.95E-03	5.68E-02	2.95E-02	6.16E-05	2.34E-03	6.28E+00	0.00E+00	6.27E-04	6.29E+00	1,980
Rubber Tired Dozers	San Mateo	SF	BA	3.22E-01	1.43E+00	2.60E+01	3.17E-04	2.62E-03	1.34E-03	2.87E-06	1.07E-04	2.86E-01	0.00E+00	2.86E-05	2.86E-01	90
Rubber Tired Dozers	San Mateo	SF	BA	2.18E-02	9.69E-02	2.61E+00	3.34E-05	3.31E-04	1.47E-04	2.88E-07	1.12E-05	2.87E-02	0.00E+00	3.01E-06	2.87E-02	9
Tractors/Loaders/Backhoes	San Mateo	SF	BA	7.97E+00	2.06E+01	1.49E+01	1.98E-04	1.26E-03	6.71E-04	2.07E-06	5.05E-05	1.63E-01	0.00E+00	1.78E-05	1.63E-01	51
Tractors/Loaders/Backhoes	San Mateo	SF	BA	4.76E+01	1.26E+02	1.76E+02	4.41E-03	1.67E-02	1.90E-02	2.47E-05	1.17E-03	1.91E+00	0.00E+00	3.98E-04	1.92E+00	604
Tractors/Loaders/Backhoes	San Mateo	SF	BA	6.37E+02	1.69E+03	3.98E+03	4.85E-02	3.26E-01	2.93E-01	5.11E-04	2.47E-02	4.35E+01	0.00E+00	4.38E-03	4.36E+01	13,738
Tractors/Loaders/Backhoes	San Mateo	SF	BA	4.75E+01	1.26E+02	5.81E+02	5.36E-03	3.97E-02	3.68E-02	7.17E-05	2.10E-03	6.37E+00	0.00E+00	4.84E-04	6.38E+00	2,008
Tractors/Loaders/Backhoes	San Mateo	SF	BA	1.54E+01	4.07E+01	3.16E+02	2.20E-03	1.84E-02	7.25E-03	3.93E-05	5.96E-04	3.49E+00	0.00E+00	1.98E-04	3.49E+00	1,100
Tractors/Loaders/Backhoes	San Mateo	SF	BA	2.48E+01	6.57E+01	1.02E+03	6.84E-03	5.27E-02	2.33E-02	1.27E-04	1.83E-03	1.13E+01	0.00E+00	6.17E-04	1.13E+01	3,564
Tractors/Loaders/Backhoes	San Mateo	SF	BA	1.46E+00	3.87E+00	9.07E+01	6.08E-04	4.80E-03	2.06E-03	1.13E-05	1.65E-04	1.00E+00	0.00E+00	5.49E-05	1.00E+00	316
Crawler Tractors	San Mateo	SF	BA	3.96E-01	1.13E+00	1.31E+00	5.74E-05	1.39E-04	1.74E-04	1.82E-07	1.31E-05	1.41E-02	0.00E+00	5.18E-06	1.42E-02	4
Crawler Tractors	San Mateo	SF	BA	2.24E+02	6.42E+02	1.94E+03	3.66E-02	2.18E-01	1.53E-01	2.48E-04	1.85E-02	2.11E+01	0.00E+00	3.31E-03	2.12E+01	6,666
Crawler Tractors	San Mateo	SF	BA	7.59E+01	2.17E+02	1.20E+03	1.64E-02	1.19E-01	8.01E-02	1.48E-04	6.66E-03	1.32E+01	0.00E+00	1.48E-03	1.32E+01	4,150
Crawler Tractors	San Mateo	SF	BA	6.53E+01	1.87E+02	1.41E+03	1.48E-02	1.26E-01	4.31E-02	1.74E-04	4.79E-03	1.55E+01	0.00E+00	1.33E-03	1.55E+01	4,887
Crawler Tractors	San Mateo	SF	BA	4.47E+01	1.28E+02	1.51E+03	1.47E-02	1.21E-01	5.34E-02	1.63E-04	4.68E-03	1.66E+01	0.00E+00	1.33E-03	1.66E+01	5,225
Crawler Tractors	San Mateo	SF	BA	1.94E-01	5.54E-01	1.17E+01	1.15E-04	9.61E-04	4.14E-04	1.29E-06	3.67E-05	1.29E-01	0.00E+00	1.03E-05	1.29E-01	41
Crawler Tractors	San Mateo	SF	BA	1.94E-01	5.53E-01	1.65E+01	1.74E-04	1.84E-03	6.56E-04	1.83E-06	5.73E-05	1.82E-01	0.00E+00	1.57E-05	1.82E-01	57
Skid Steer Loaders	San Mateo	SF	BA	5.42E+01	1.24E+02	7.79E+01	1.17E-03	6.97E-03	3.73E-03	1.08E-05	3.48E-04	8.55E-01	0.00E+00	1.06E-04	8.57E-01	270
Skid Steer Loaders	San Mateo	SF	BA	4.92E+02	1.15E+03	1.34E+03	2.17E-02	1.17E-01	1.22E-01	1.89E-04	6.49E-03	1.46E+01	0.00E+00	1.95E-03	1.46E+01	4,610
Skid Steer Loaders	San Mateo	SF	BA	2.58E+02	6.00E+02	1.17E+03	1.00E-02	8.09E-02	8.13E-02	1.50E-04	5.10E-03	1.28E+01	0.00E+00	9.05E-04	1.28E+01	4,042
Off-Highway Tractors	San Mateo	SF	BA	2.83E-02	8.63E-02	3.71E-01	8.21E-06	4.81E-05	3.04E-05	4.74E-08	4.10E-06	4.04E-03	0.00E+00	7.41E-07	4.06E-03	1

Construction

Equipment	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	NOX Exhaust	CO Exhaust	SO2 Exhaust	PM Exhaust	CO2 Exhaust	N2O Exhaust	CH4 Exhaust	CO2e	CO2e
						Tons/Day										MTons/ Year
Off-Highway Tractors	San Mateo	SF	BA	3.46E+01	1.06E+02	6.29E+02	9.85E-03	7.22E-02	4.33E-02	7.74E-05	4.06E-03	6.88E+00	0.00E+00	8.89E-04	6.90E+00	2,171
Off-Highway Tractors	San Mateo	SF	BA	3.27E+01	9.98E+01	5.91E+02	7.42E-03	6.30E-02	2.15E-02	7.31E-05	2.59E-03	6.50E+00	0.00E+00	6.69E-04	6.51E+00	2,050
Off-Highway Tractors	San Mateo	SF	BA	1.21E+00	3.71E+00	9.59E+01	1.11E-03	9.41E-03	4.68E-03	1.06E-05	3.80E-04	1.05E+00	0.00E+00	1.00E-04	1.06E+00	332
Off-Highway Tractors	San Mateo	SF	BA	1.28E-01	3.91E-01	1.45E+01	1.76E-04	1.80E-03	7.73E-04	1.60E-06	5.99E-05	1.59E-01	0.00E+00	1.59E-05	1.60E-01	50
Dumpers/Tenders	San Mateo	SF	BA	6.78E-01	1.23E+00	4.27E-01	5.74E-06	3.63E-05	1.94E-05	5.95E-08	1.55E-06	4.69E-03	0.00E+00	5.18E-07	4.70E-03	1
Other Construction Equipment	San Mateo	SF	BA	9.35E+00	1.77E+01	8.16E+00	1.04E-04	6.51E-04	5.45E-04	1.39E-06	2.54E-05	8.93E-02	0.00E+00	9.38E-06	8.95E-02	28
Other Construction Equipment	San Mateo	SF	BA	1.58E+00	2.99E+00	1.80E+00	2.38E-05	1.51E-04	8.14E-05	2.51E-07	5.78E-06	1.98E-02	0.00E+00	2.15E-06	1.98E-02	6
Other Construction Equipment	San Mateo	SF	BA	2.43E+00	4.67E+00	6.02E+00	1.39E-04	5.53E-04	5.85E-04	8.44E-07	3.79E-05	6.53E-02	0.00E+00	1.25E-05	6.56E-02	21
Other Construction Equipment	San Mateo	SF	BA	4.01E+00	7.71E+00	2.85E+01	3.18E-04	2.32E-03	2.00E-03	3.65E-06	1.70E-04	3.12E-01	0.00E+00	2.87E-05	3.12E-01	98
Other Construction Equipment	San Mateo	SF	BA	5.54E+00	1.06E+01	5.16E+01	4.23E-04	3.53E-03	3.12E-03	6.37E-06	1.76E-04	5.66E-01	0.00E+00	3.82E-05	5.67E-01	179
Other Construction Equipment	San Mateo	SF	BA	1.29E+01	2.47E+01	2.84E+02	1.62E-03	1.46E-02	6.13E-03	3.08E-05	4.86E-04	3.14E+00	0.00E+00	1.46E-04	3.14E+00	989
				6,636	12,883	48,801	0.609	3.909	4.560	0.006	0.239	530.998	0.003	0.053	533	167,830
				Population	Activity	Consumption	lbs/day					Tons/Day				MTons/Year
				376	730	2,765	69	443	517	1	27	30	0	0	30	9,508

As a percent of Total Building Permits issued. Percent 5.67%

SOURCE: U.S. Census Bureau. http://censtats.census.gov/cgi-bin/bldgprmt/bldgdisp.pl

Annual GHG emissions (MTons/Year) multiplied by 347 days/year to account for reduced/limited construction activity on weekends and holidays. This assumption is consistent with the California Air Resources Board's (CARB) methodology for transportation within the Climate Change Scoping Plan Measure Documentation Supplement.

Buildings Estimates with Imputation

	SM	Menlo Park	
2010	208	12	5.8%
2011	263	10	3.8%
2012	338	9	2.7%
2013	383	14	3.7%
2014	394	49	12.4%
avg	317	19	5.7%

Lawn & Garden

Equipment	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	NOX Exhaust	CO Exhaust	SO2 Exhaust	PM Exhaust	CO2 Exhaust	N2O Exhaust	CH4 Exhaust	CO2e	CO2e
						Tons/Day										MTons/Year
Lawn Mowers	San Mateo	SF	BA	9.59E+02	6.00E+02	6.79E+01	7.68E-03	2.07E-03	1.38E-01	1.69E-05	1.29E-03	4.09E-01	5.31E-04	4.77E-04	5.84E-01	193
Lawn Mowers	San Mateo	SF	BA	7.20E+03	3.06E+02	4.15E+01	7.79E-03	1.11E-03	1.03E-01	8.58E-06	6.71E-04	2.08E-01	2.65E-04	4.84E-04	3.01E-01	100
Chainsaws	San Mateo	SF	BA	1.72E+03	1.36E+03	8.11E+01	6.79E-02	1.08E-03	1.23E-01	1.37E-05	1.93E-04	3.32E-01	5.50E-04	4.22E-03	5.91E-01	196
Chainsaws	San Mateo	SF	BA	1.93E+04	2.59E+02	1.35E+01	6.16E-03	2.18E-04	2.77E-02	2.60E-06	9.76E-05	6.32E-02	1.07E-04	3.83E-04	1.05E-01	35
Chainsaws	San Mateo	SF	BA	1.21E+03	9.59E+02	1.38E+02	1.16E-01	1.84E-03	2.09E-01	2.33E-05	3.29E-04	5.65E-01	6.20E-04	7.18E-03	9.08E-01	301
Chainsaws	San Mateo	SF	BA	1.36E+04	1.83E+02	2.23E+01	9.67E-03	3.68E-04	4.50E-02	4.43E-06	1.80E-04	1.08E-01	1.20E-04	6.01E-04	1.58E-01	52
Chainsaws Preempt	San Mateo	SF	BA	1.51E+03	1.19E+03	1.72E+02	1.44E-01	2.29E-03	2.60E-01	2.90E-05	4.09E-04	7.03E-01	7.72E-04	8.94E-03	1.13E+00	374
Chainsaws Preempt	San Mateo	SF	BA	1.69E+04	2.27E+02	3.10E+01	1.60E-02	3.90E-04	6.59E-02	5.52E-06	1.50E-04	1.34E-01	1.38E-04	9.97E-04	1.98E-01	65
Trimmers/Edgers/Brush Cutters	San Mateo	SF	BA	5.60E+03	1.86E+03	8.26E+01	4.46E-02	1.29E-03	1.47E-01	1.63E-05	2.31E-04	3.97E-01	7.00E-04	2.77E-03	6.72E-01	222
Trimmers/Edgers/Brush Cutters	San Mateo	SF	BA	6.24E+04	3.68E+03	1.56E+02	7.01E-02	2.57E-03	2.90E-01	3.22E-05	4.56E-04	7.83E-01	1.39E-03	4.36E-03	1.30E+00	432
Leaf Blowers/Vacuums	San Mateo	SF	BA	8.36E+03	4.50E+03	2.40E+02	1.66E-01	3.47E-03	3.94E-01	4.38E-05	6.20E-04	1.06E+00	1.79E-03	1.03E-02	1.84E+00	608
Leaf Blowers/Vacuums	San Mateo	SF	BA	2.16E+04	2.83E+02	1.43E+01	6.51E-03	2.31E-04	2.94E-02	2.76E-06	1.04E-04	6.71E-02	1.16E-04	4.05E-04	1.11E-01	37
Shredders	San Mateo	SF	BA	4.23E+01	1.57E+01	6.89E+00	3.87E-04	3.04E-04	1.87E-02	1.47E-06	2.99E-04	3.57E-02	3.48E-05	2.41E-05	4.70E-02	16
Shredders	San Mateo	SF	BA	1.50E+03	3.71E+00	1.79E+00	3.25E-04	5.71E-05	4.82E-03	3.47E-07	7.07E-05	8.43E-03	7.16E-06	2.02E-05	1.11E-02	4
Commercial Turf Equipment	San Mateo	SF	BA	2.24E+01	4.91E+01	2.01E+01	9.06E-04	6.89E-04	5.47E-02	4.31E-06	4.87E-05	1.05E-01	9.18E-05	5.63E-05	1.34E-01	44
Commercial Turf Equipment	San Mateo	SF	BA	1.11E+01	2.42E+01	2.15E+01	9.37E-04	7.26E-04	6.05E-02	4.49E-06	5.08E-05	1.09E-01	6.79E-05	5.82E-05	1.31E-01	43
Other Lawn & Garden Equipment	San Mateo	SF	BA	9.47E+00	1.78E+00	9.93E-02	4.88E-05	1.59E-06	1.81E-04	2.01E-08	2.84E-07	4.88E-04	7.66E-07	3.03E-06	7.90E-04	0
Other Lawn & Garden Equipment	San Mateo	SF	BA	2.90E+02	3.42E+00	2.00E-01	8.92E-05	3.24E-06	4.12E-04	3.86E-08	1.45E-06	9.38E-04	1.51E-06	5.55E-06	1.52E-03	1
Other Lawn & Garden Equipment	San Mateo	SF	BA	4.12E+00	7.74E-01	2.16E-01	1.06E-04	3.46E-06	3.93E-04	4.38E-08	6.19E-07	1.06E-03	7.86E-07	6.60E-06	1.45E-03	0
Other Lawn & Garden Equipment	San Mateo	SF	BA	1.26E+02	1.49E+00	4.21E-01	1.79E-04	6.98E-06	8.54E-04	8.41E-08	3.42E-06	2.04E-03	1.54E-06	1.11E-05	2.75E-03	1
Lawn Mowers	San Mateo	SF	BA	5.68E+03	3.55E+03	4.35E+02	5.31E-02	1.33E-02	9.98E-01	8.37E-05	7.64E-03	2.42E+00	3.14E-03	2.83E-03	3.46E+00	1,145
Lawn Mowers	San Mateo	SF	BA	9.00E+04	3.82E+03	5.36E+02	5.05E-02	1.38E-02	1.51E+00	8.99E-05	6.25E-03	2.60E+00	3.19E-03	2.69E-03	3.65E+00	1,208
Tillers	San Mateo	SF	BA	5.89E+02	9.02E+01	1.31E+01	1.20E-03	2.96E-04	3.44E-02	2.36E-06	1.80E-04	6.83E-02	7.40E-05	6.42E-05	9.26E-02	31
Tillers	San Mateo	SF	BA	2.29E+03	1.13E+02	1.74E+01	1.77E-03	4.67E-04	4.85E-02	2.95E-06	2.14E-04	8.55E-02	1.02E-04	9.45E-05	1.19E-01	39
Trimmers/Edgers/Brush Cutters	San Mateo	SF	BA	1.04E+03	3.85E+02	1.21E+01	1.62E-03	7.17E-04	2.88E-02	2.27E-06	2.14E-05	6.56E-02	2.35E-04	8.67E-05	1.40E-01	46
Trimmers/Edgers/Brush Cutters	San Mateo	SF	BA	4.83E+03	2.84E+02	1.00E+01	1.36E-03	4.64E-04	2.73E-02	1.67E-06	4.70E-05	4.85E-02	1.61E-04	7.29E-05	1.00E-01	33
Leaf Blowers/Vacuums	San Mateo	SF	BA	2.64E+02	4.49E+01	3.06E+00	2.32E-04	5.64E-05	8.51E-03	5.29E-07	3.59E-05	1.53E-02	2.22E-05	1.24E-05	2.24E-02	7
Leaf Blowers/Vacuums	San Mateo	SF	BA	2.27E+02	2.98E+00	2.29E-01	2.01E-05	4.79E-06	7.10E-04	3.51E-08	2.03E-06	1.02E-03	1.63E-06	1.07E-06	1.54E-03	1
Rear Engine Riding Mowers	San Mateo	SF	BA	3.11E+03	2.31E+03	7.90E+02	3.75E-02	2.66E-02	2.38E+00	1.07E-04	1.74E-03	3.74E+00	3.72E-03	2.01E-03	4.94E+00	1,635
Rear Engine Riding Mowers	San Mateo	SF	BA	2.73E+03	2.11E+02	7.22E+01	3.33E-03	2.29E-03	2.18E-01	9.72E-06	1.36E-04	3.41E-01	3.27E-04	1.78E-04	4.46E-01	148
Rear Engine Riding Mowers	San Mateo	SF	BA	1.42E+01	1.06E+01	7.03E+00	3.22E-04	2.32E-04	2.18E-02	8.19E-07	1.50E-05	3.23E-02	2.40E-05	1.72E-05	4.01E-02	13
Rear Engine Riding Mowers	San Mateo	SF	BA	1.23E+01	9.47E-01	6.31E-01	2.89E-05	1.85E-05	1.96E-03	7.34E-08	1.16E-06	2.90E-03	2.01E-06	1.54E-06	3.55E-03	1
Front Mowers	San Mateo	SF	BA	1.42E+02	1.06E+02	5.78E+01	2.75E-03	1.95E-03	1.74E-01	7.81E-06	1.27E-04	2.74E-01	2.19E-04	1.47E-04	3.45E-01	114
Front Mowers	San Mateo	SF	BA	4.61E+03	3.56E+02	1.95E+02	8.99E-03	6.18E-03	5.89E-01	2.62E-05	3.67E-04	9.20E-01	7.09E-04	4.80E-04	1.15E+00	381
Front Mowers	San Mateo	SF	BA	1.12E+02	8.30E+01	6.10E+01	2.80E-03	2.01E-03	1.89E-01	7.11E-06	1.30E-04	2.80E-01	1.99E-04	1.49E-04	3.45E-01	114
Front Mowers	San Mateo	SF	BA	3.61E+03	2.79E+02	2.05E+02	9.40E-03	6.02E-03	6.39E-01	2.39E-05	3.76E-04	9.42E-01	6.24E-04	5.02E-04	1.15E+00	379
Shredders	San Mateo	SF	BA	1.12E+02	4.16E+01	1.17E+01	1.56E-03	6.88E-04	2.77E-02	2.18E-06	2.05E-05	6.30E-02	8.13E-05	8.32E-05	9.00E-02	30
Shredders	San Mateo	SF	BA	4.16E+03	1.03E+01	3.58E+00	3.26E-04	1.10E-04	1.13E-02	5.37E-07	2.37E-05	1.55E-02	1.59E-05	1.74E-05	2.08E-02	7
Lawn & Garden Tractors	San Mateo	SF	BA	5.70E+02	2.01E+02	1.32E+02	5.27E-03	3.77E-03	3.99E-01	1.79E-05	2.46E-04	6.27E-01	4.20E-04	2.82E-04	7.64E-01	253
Lawn & Garden Tractors	San Mateo	SF	BA	3.70E+03	1.48E+02	9.77E+01	4.05E-03	2.84E-03	2.96E-01	1.32E-05	1.68E-04	4.63E-01	3.12E-04	2.16E-04	5.64E-01	187
Lawn & Garden Tractors	San Mateo	SF	BA	2.25E+02	7.92E+01	8.29E+01	3.27E-03	2.23E-03	2.58E-01	9.69E-06	1.50E-04	3.82E-01	2.06E-04	1.75E-04	4.50E-01	149
Lawn & Garden Tractors	San Mateo	SF	BA	1.46E+03	5.84E+01	6.13E+01	2.55E-03	1.62E-03	1.91E-01	7.15E-06	1.03E-04	2.82E-01	1.50E-04	1.36E-04	3.31E-01	110
Lawn & Garden Tractors	San Mateo	SF	BA	3.25E+00	9.27E-01	1.44E+00	2.43E-05	4.66E-05	1.12E-03	1.46E-07	9.19E-07	1.20E-02	3.09E-06	1.30E-06	1.30E-02	4
Wood Splitters	San Mateo	SF	BA	1.91E+02	6.74E+01	2.03E+01	2.21E-03	5.49E-04	4.95E-02	3.80E-06	3.23E-04	1.10E-01	9.00E-05	1.18E-04	1.40E-01	47
Wood Splitters	San Mateo	SF	BA	4.78E+03	1.44E+01	5.34E+00	3.86E-04	1.01E-04	1.69E-02	8.13E-07	4.20E-05	2.35E-02	1.73E-05	2.06E-05	2.93E-02	10
Chippers/Stump Grinders	San Mateo	SF	BA	2.70E+00	9.33E+00	8.17E+00	6.57E-04	4.75E-04	2.45E-02	1.08E-06	3.18E-04	3.79E-02	3.31E-05	3.47E-05	4.89E-02	16
Chippers/Stump Grinders	San Mateo	SF	BA	4.82E+00	2.18E-01	1.97E-01	1.44E-05	7.65E-06	6.13E-04	2.52E-08	6.93E-06	8.85E-04	6.36E-07	7.70E-07	1.10E-03	0
Chippers/Stump Grinders	San Mateo	SF	BA	1.53E+01	5.30E+01	7.84E+01	6.45E-03	4.08E-03	2.42E-01	8.92E-06	2.95E-03	3.52E-01	2.35E-04	3.40E-04	4.32E-01	143
Chippers/Stump Grinders	San Mateo	SF	BA	2.73E+01	1.23E+00	1.86E+00	1.31E-04	6.46E-05	5.90E-03	2.08E-07	6.41E-05	8.19E-03	4.45E-06	7.00E-06	9.72E-03	3
Commercial Turf Equipment	San Mateo	SF	BA	2.02E+02	4.42E+02	2.45E+02	1.41E-02	9.87E-03	7.37E-01	3.28E-05	6.43E-04	1.15E+00	1.01E-03	7.50E-04	1.48E+00	490
Commercial Turf Equipment	San Mateo	SF	BA	9.94E+01	2.18E+02	2.15E+02	1.17E-02	8.79E-03	6.66E-01	2.48E-05	5.47E-04	9.79E-01	6.85E-04	6.20E-04	1.20E+00	399
Commercial Turf Equipment	San Mateo	SF	BA	4.01E+01	8.05E+01	1.36E+02	3.38E-03	5.56E-03	2.09E-01	1.18E-05	7.45E-05	9.73E-01	3.25E-04	1.80E-04	1.08E+00	357
Commercial Turf Equipment	San Mateo	SF	BA	2.65E-01	5.32E-01	1.31E+00	6.18E-06	3.62E-05	3.41E-04	1.16E-07	9.33E-07	1.20E-02	2.21E-06	3.30E-07	1.27E-02	4
Other Lawn & Garden Equipment	San Mateo	SF	BA	1.77E+02	3.33E+01	7.04E+00	6.40E-04	1.58E-04	1.84E-02	1.26E-06	9.62E-05	3.66E-02	3.32E-05	3.42E-05	4.76E-02	16
Other Lawn & Garden Equipment	San Mateo	SF	BA	5.43E+03	6.40E+01	1.58E+01	1.35E-03	3.27E-04	4.92E-02	2.43E-06	1.38E-04	7.02E-02	6.46E-05	7.23E-05	9.18E-02	30
Other Lawn & Garden Equipment	San Mateo	SF	BA	7.87E+01	1.48E+01	6.84E+00	2.76E-04	1.98E-04	2.07E-02	9.26E-07	1.29E-05	3.25E-02	2.58E-05	1.48E-05	4.08E-02	14
Other Lawn & Garden Equipment	San Mateo	SF	BA	2.41E+03	2.84E+01	1.35E+01	6.51E-04	4.09E-04	4.18E-02	1.78E-06	2.15E-05	6.24E-02	5.13E-05	3.48E-05	7.90E-02	26
Other Lawn & Garden Equipment	San Mateo	SF	BA	1.66E+00	3.12E-01	3.16E-01	1.26E-05	8.64E-06	9.85E-04	3.70E-08	5.79E-07	1.46E-03	8.03E-07	6.73E-07	1.72E-03	1
Other Lawn & Garden Equipment	San Mateo	SF	BA	5.13E+01	6.04E-01	6.27E-01	2.97E-05	1.68E-05	1.98E-03	7.14E-08	9.71E-07	2.82E-03	1.55E-06	1.59E-06	3.33E-03	1
Other Lawn & Garden Equipment	San Mateo	SF	BA	1.20E-01	2.01E-02	4.33E-02	8.27E-07	1.62E-06	3.28E-05	4.41E-09	2.78E-08	3.63E-04	8.52E-08	4.42E-08	3.90E-04	0
Other Lawn & Garden Equipment	San Mateo	SF	BA	2.89E-01	4.83E-02	2.67E-01	3.22E-06	1.49E-05	7.74E-05	2.36E-08	1.89E-07	2.44E-03	4.13E-07	1.72E-07	2.57E-03	1
Leaf Blowers/Vacuums	San Mateo	SF	BA	1.93E-01	6.34E-02	8.70E-03	9.89E-08	6.95E-07	5.82E-07	1.48E-09	2.79E-08	9.52E-05	0.00E+00	8.92E-09	9.54E-05	0
Leaf Blowers/Vacuums	San Mateo	SF	BA	1.69E-01	5.54E-02	1.23E-01	1.24E-06	1.04E-05	7.82E-06	1.58E-08	6.57E-07	1.35E-03	0.00E+00	1.12E-07	1.35E-03	0
Leaf Blowers/Vacuums	San Mateo	SF	BA	4.82E-02	1.58E-02	7.18E-02	3.26E-07	4.63E-06	1.48E-06	8.93E-09	1.21E-07	7.94E-04	0.00E+00	2.94E-08	7.94E-04	0
Lawn & Garden Tractors	San Mateo	SF	BA	4.65E+02	6.93E+02	2.94E+02	3.36E-03	2.36E-02	1.96E-02	5.01E-05	9.73E-04	3.22E+00	0.00E+00	3.03E-04	3.22E+00	1,067

Lawn & Garden

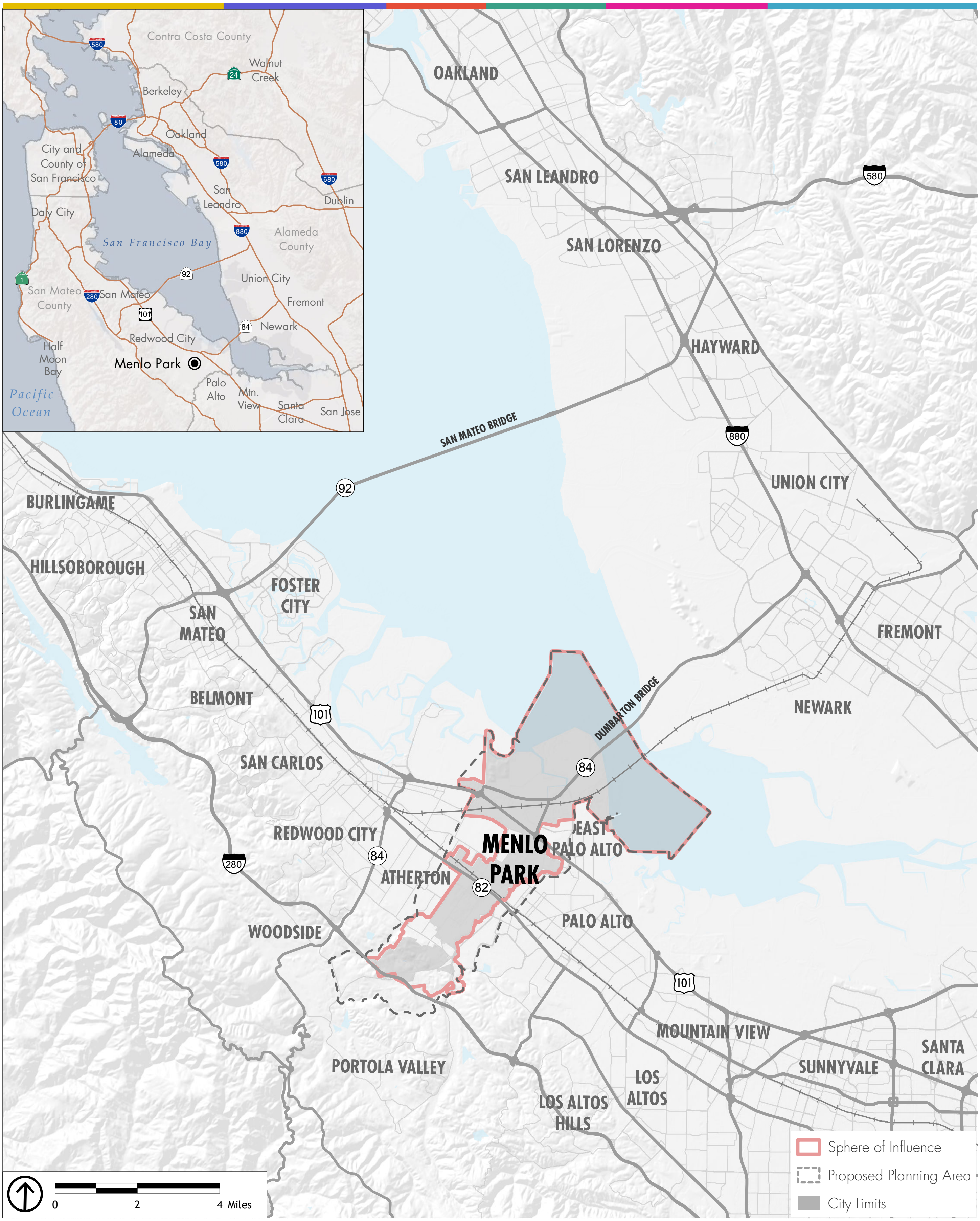
						Tons/Day										MTons/Year
Equipment	**County**	**Air Basin**	**Air Dist.**	**Population**	**Activity**	**Consumption**	**ROG Exhaust**	**NOX Exhaust**	**CO Exhaust**	**SO2 Exhaust**	**PM Exhaust**	**CO2 Exhaust**	**N2O Exhaust**	**CH4 Exhaust**	**CO2e**	**CO2e**
Lawn & Garden Tractors	San Mateo	SF	BA	3.64E+02	5.42E+02	3.53E+02	4.68E-03	2.97E-02	1.59E-02	4.91E-05	1.16E-03	3.87E+00	0.00E+00	4.22E-04	3.88E+00	1,285
Chippers/Stump Grinders	San Mateo	SF	BA	2.17E-01	2.76E-01	2.53E-01	3.35E-06	2.12E-05	1.14E-05	3.53E-08	7.96E-07	2.78E-03	0.00E+00	3.02E-07	2.78E-03	1
Chippers/Stump Grinders	San Mateo	SF	BA	5.98E+00	7.61E+00	2.64E+01	3.38E-04	2.42E-03	1.82E-03	3.39E-06	1.83E-04	2.89E-01	0.00E+00	3.05E-05	2.89E-01	96
Chippers/Stump Grinders	San Mateo	SF	BA	4.10E-01	5.22E-01	3.13E+00	2.77E-05	2.48E-04	1.82E-04	3.87E-07	1.21E-05	3.44E-02	0.00E+00	2.50E-06	3.44E-02	11
Chippers/Stump Grinders	San Mateo	SF	BA	9.64E-02	1.23E-01	1.24E+00	7.56E-06	8.67E-05	2.79E-05	1.53E-07	2.62E-06	1.36E-02	0.00E+00	6.82E-07	1.37E-02	5
Chippers/Stump Grinders	San Mateo	SF	BA	8.91E-01	1.14E+00	1.27E+01	7.11E-05	7.95E-04	2.87E-04	1.38E-06	2.51E-05	1.40E-01	0.00E+00	6.42E-06	1.40E-01	46
Chippers/Stump Grinders	San Mateo	SF	BA	1.01E+00	1.29E+00	3.47E+01	1.99E-04	2.24E-03	7.85E-04	3.85E-06	6.98E-05	3.83E-01	0.00E+00	1.79E-05	3.83E-01	127
Chippers/Stump Grinders	San Mateo	SF	BA	1.93E+00	2.45E+00	9.40E+01	6.44E-04	8.83E-03	2.38E-03	1.04E-05	2.32E-04	1.04E+00	0.00E+00	5.81E-05	1.04E+00	344
Commercial Turf Equipment	San Mateo	SF	BA	1.17E+01	3.43E+01	1.51E+01	1.71E-04	1.20E-03	1.01E-03	2.57E-06	4.69E-05	1.65E-01	0.00E+00	1.55E-05	1.66E-01	55
Commercial Turf Equipment	San Mateo	SF	BA	2.20E+02	6.44E+02	4.24E+02	5.62E-03	3.55E-02	1.92E-02	5.91E-05	1.32E-03	4.66E+00	0.00E+00	5.07E-04	4.67E+00	1,546
Other Lawn & Garden Equipment	San Mateo	SF	BA	1.69E-01	2.00E-01	1.12E-01	1.27E-06	8.91E-06	7.46E-06	1.90E-08	3.50E-07	1.22E-03	0.00E+00	1.14E-07	1.22E-03	0
Other Lawn & Garden Equipment	San Mateo	SF	BA	2.41E-02	2.86E-02	2.12E-02	2.81E-07	1.77E-06	9.58E-07	2.95E-09	6.67E-08	2.33E-04	0.00E+00	2.53E-08	2.33E-04	0
				306,456	30,653	5,932	0.913	0.240	12.175	0.001	0.032	36.460	0.024	0.055	45.005	14,902
				Population	**Activity**	**Consumption**	**lbs/day**					Tons/Day				MTons/Year
				13,291	1,329	257	79	21	1,056	0	3	2	0	0	2	**646**
As a percent of 2014 Total Population					SanMateo	758,581	MenloPark	32,900	Percent	4%						
SOURCE: U.S. Census Bureau.																

Light Commercial						Tons/Day										MTons/Year
Equipment	County	Air Basin	Air Dist.	Population	Activity	Consumption	ROG Exhaust	NOX Exhaust	CO Exhaust	SO2 Exhaust	PM Exhaust	CO2 Exhaust	N2O Exhaust	CH4 Exhaust	CO2e	CO2e
Generator Sets	San Mateo	SF	BA	6.44E+01	2.37E+01	1.33E+00	2.53E-04	5.51E-05	2.69E-03	3.14E-07	2.79E-05	7.63E-03	1.67E-05	1.57E-05	1.31E-02	4
Generator Sets	San Mateo	SF	BA	5.06E+01	1.25E+01	7.56E-01	1.77E-04	2.90E-05	1.65E-03	1.66E-07	1.54E-05	4.03E-03	8.78E-06	1.10E-05	6.98E-03	2
Generator Sets	San Mateo	SF	BA	6.50E-01	2.39E-01	1.34E-01	6.85E-06	4.97E-06	3.66E-04	2.85E-08	3.16E-07	6.92E-04	5.49E-07	4.26E-07	8.71E-04	0
Generator Sets	San Mateo	SF	BA	4.95E-01	1.22E-01	7.17E-02	7.48E-06	2.58E-06	1.97E-04	1.46E-08	3.01E-07	3.55E-04	2.81E-07	4.65E-07	4.52E-04	0
Pumps	San Mateo	SF	BA	2.56E+02	1.81E+02	9.44E+00	1.31E-03	3.77E-04	1.72E-02	2.43E-06	2.07E-04	5.91E-02	1.21E-04	8.12E-05	9.84E-02	33
Pumps	San Mateo	SF	BA	2.01E+02	9.56E+01	5.29E+00	9.11E-04	2.23E-04	1.04E-02	1.29E-06	1.12E-04	3.12E-02	6.76E-05	5.66E-05	5.34E-02	18
Pumps	San Mateo	SF	BA	6.90E+01	4.88E+01	2.47E+01	1.59E-03	1.24E-03	6.67E-02	5.25E-06	1.07E-03	1.27E-01	1.25E-04	9.87E-05	1.68E-01	56
Pumps	San Mateo	SF	BA	5.42E+01	2.58E+01	1.32E+01	8.97E-04	6.43E-04	3.58E-02	2.77E-06	5.64E-04	6.73E-02	6.54E-05	5.58E-05	8.88E-02	29
Pumps	San Mateo	SF	BA	8.35E-01	5.90E-01	6.53E-01	4.30E-05	2.95E-05	1.82E-03	1.35E-07	2.75E-05	3.28E-03	2.17E-06	2.67E-06	4.01E-03	1
Pumps	San Mateo	SF	BA	6.50E-01	3.09E-01	3.42E-01	2.25E-05	1.52E-05	9.54E-04	7.06E-08	1.44E-05	1.71E-03	1.13E-06	1.40E-06	2.09E-03	1
Generator Sets	San Mateo	SF	BA	8.46E+02	3.11E+02	7.40E+01	1.23E-02	3.15E-03	1.70E-01	1.38E-05	1.38E-03	4.00E-01	4.61E-04	6.58E-04	5.57E-01	185
Generator Sets	San Mateo	SF	BA	6.64E+02	1.64E+02	4.16E+01	7.33E-03	1.67E-03	1.03E-01	7.31E-06	7.16E-04	2.12E-01	2.43E-04	3.92E-04	2.95E-01	98
Generator Sets	San Mateo	SF	BA	2.32E+03	8.54E+02	5.30E+02	3.34E-02	2.20E-02	1.60E+00	7.06E-05	1.30E-03	2.47E+00	2.10E-03	1.79E-03	3.16E+00	1,048
Generator Sets	San Mateo	SF	BA	1.83E+03	4.51E+02	2.89E+02	2.25E-02	1.18E-02	8.85E-01	3.73E-05	6.79E-04	1.31E+00	1.12E-03	1.20E-03	1.68E+00	556
Generator Sets	San Mateo	SF	BA	1.25E+03	4.59E+02	6.17E+02	3.75E-02	2.47E-02	1.91E+00	7.11E-05	1.48E-03	2.81E+00	1.68E-03	2.00E-03	3.37E+00	1,116
Generator Sets	San Mateo	SF	BA	9.81E+02	2.43E+02	3.33E+02	2.45E-02	1.28E-02	1.04E+00	3.76E-05	7.70E-04	1.48E+00	8.73E-04	1.31E-03	1.78E+00	590
Generator Sets	San Mateo	SF	BA	4.15E+02	1.31E+02	2.98E+02	6.09E-03	1.15E-02	2.51E-01	2.99E-05	1.88E-04	2.46E+00	5.82E-04	3.26E-04	2.64E+00	875
Generator Sets	San Mateo	SF	BA	8.02E+01	2.52E+01	1.34E+02	1.76E-03	7.60E-03	4.32E-02	1.18E-05	9.42E-05	1.22E+00	2.13E-04	9.40E-05	1.28E+00	425
Generator Sets	San Mateo	SF	BA	7.58E+00	2.39E+00	2.15E+01	1.68E-04	1.35E-03	6.77E-03	1.95E-06	1.57E-05	1.97E-01	2.82E-05	8.97E-06	2.06E-01	68
Pumps	San Mateo	SF	BA	3.00E+02	2.12E+02	3.58E+01	5.96E-03	2.57E-03	7.35E-02	7.17E-06	9.41E-05	2.08E-01	3.51E-04	3.18E-04	3.23E-01	107
Pumps	San Mateo	SF	BA	2.36E+02	1.12E+02	2.02E+01	3.63E-03	1.30E-03	4.56E-02	3.79E-06	1.08E-04	1.10E-01	1.81E-04	1.94E-04	1.70E-01	56
Pumps	San Mateo	SF	BA	3.25E+02	2.30E+02	1.28E+02	1.00E-02	7.28E-03	3.82E-01	1.71E-05	5.03E-03	6.00E-01	6.35E-04	5.36E-04	8.08E-01	268
Pumps	San Mateo	SF	BA	2.55E+02	1.21E+02	6.85E+01	5.57E-03	3.73E-03	2.06E-01	9.04E-06	2.66E-03	3.17E-01	3.30E-04	2.98E-04	4.26E-01	141
Pumps	San Mateo	SF	BA	8.33E+01	5.88E+01	7.20E+01	5.69E-03	3.63E-03	2.21E-01	8.28E-06	2.74E-03	3.27E-01	2.32E-04	3.04E-04	4.05E-01	134
Pumps	San Mateo	SF	BA	6.54E+01	3.11E+01	3.81E+01	3.01E-03	1.89E-03	1.17E-01	4.37E-06	1.45E-03	1.73E-01	1.21E-04	1.61E-04	2.14E-01	71
Pumps	San Mateo	SF	BA	3.32E+01	2.01E+01	4.53E+01	8.95E-04	1.41E-03	4.02E-02	4.51E-06	2.84E-05	3.71E-01	7.82E-05	4.78E-05	3.96E-01	131
Pumps	San Mateo	SF	BA	4.21E+01	2.54E+01	1.53E+02	1.87E-03	5.89E-03	4.83E-02	1.35E-05	1.08E-04	1.39E+00	1.69E-04	1.00E-04	1.45E+00	480
Pumps	San Mateo	SF	BA	1.27E+00	7.67E-01	6.94E+00	5.13E-05	3.04E-04	2.25E-03	6.29E-07	5.04E-06	6.33E-02	6.74E-06	2.74E-06	6.54E-02	22
Air Compressors	San Mateo	SF	BA	1.08E+02	1.68E+02	3.79E+01	6.30E-03	2.78E-03	7.59E-02	7.67E-06	7.25E-05	2.22E-01	3.28E-04	3.36E-04	3.31E-01	110
Air Compressors	San Mateo	SF	BA	8.52E+01	8.86E+01	2.00E+01	3.33E-03	1.47E-03	4.00E-02	4.06E-06	3.83E-05	1.17E-01	1.74E-04	1.78E-04	1.75E-01	58
Air Compressors	San Mateo	SF	BA	5.49E+01	8.49E+01	3.38E+01	2.70E-03	1.97E-03	1.00E-01	4.49E-06	1.32E-03	1.58E-01	1.99E-04	1.44E-04	2.22E-01	74
Air Compressors	San Mateo	SF	BA	4.31E+01	4.49E+01	1.78E+01	1.39E-03	1.01E-03	5.30E-02	2.37E-06	6.98E-04	8.32E-02	1.04E-04	7.44E-05	1.17E-01	39
Air Compressors	San Mateo	SF	BA	7.40E+00	1.14E+01	1.14E+01	9.34E-04	5.95E-04	3.49E-02	1.31E-06	4.32E-04	5.16E-02	4.12E-05	4.98E-05	6.54E-02	22
Air Compressors	San Mateo	SF	BA	5.82E+00	6.05E+00	6.02E+00	4.85E-04	3.09E-04	1.84E-02	6.91E-07	2.29E-04	2.73E-02	2.16E-05	2.59E-05	3.45E-02	11
Air Compressors	San Mateo	SF	BA	1.26E+01	1.67E+01	3.72E+01	1.21E-03	1.57E-03	4.54E-02	3.44E-06	2.17E-05	2.83E-01	7.65E-05	6.46E-05	3.08E-01	102
Air Compressors	San Mateo	SF	BA	4.09E+01	5.42E+01	2.07E+02	4.81E-03	1.22E-02	1.04E-01	1.75E-05	1.41E-04	1.81E+00	3.66E-04	2.57E-04	1.93E+00	640
Air Compressors	San Mateo	SF	BA	2.75E+00	3.65E+00	2.51E+01	3.05E-04	1.78E-03	8.81E-03	2.26E-06	1.81E-05	2.27E-01	3.69E-05	1.63E-05	2.39E-01	79
Welders	San Mateo	SF	BA	2.12E+02	1.21E+02	6.97E+01	5.88E-03	3.79E-03	2.10E-01	9.13E-06	2.67E-03	3.20E-01	3.32E-04	3.14E-04	4.30E-01	142
Welders	San Mateo	SF	BA	7.66E+02	4.36E+02	3.96E+02	3.21E-02	1.97E-02	1.22E+00	4.54E-05	1.50E-02	1.79E+00	1.46E-03	1.71E-03	2.28E+00	754
Welders	San Mateo	SF	BA	6.60E+01	3.75E+01	9.20E+01	2.37E-03	3.75E-03	8.57E-02	9.05E-06	5.70E-05	7.44E-01	1.75E-04	1.27E-04	8.01E-01	265
Welders	San Mateo	SF	BA	6.73E+01	3.83E+01	1.30E+02	2.28E-03	7.37E-03	4.82E-02	1.13E-05	9.05E-05	1.17E+00	2.32E-04	1.22E-04	1.24E+00	411
Welders	San Mateo	SF	BA	4.64E+00	2.64E+00	1.60E+01	1.58E-04	1.05E-03	5.17E-03	1.44E-06	1.16E-05	1.45E-01	2.35E-05	8.45E-06	1.53E-01	51
Pressure Washers	San Mateo	SF	BA	2.27E+02	8.35E+01	2.95E+01	4.35E-03	1.18E-03	6.39E-02	5.80E-06	5.74E-04	1.68E-01	1.48E-04	2.32E-04	2.19E-01	73
Pressure Washers	San Mateo	SF	BA	1.78E+02	4.41E+01	1.70E+01	2.88E-03	6.92E-04	4.11E-02	3.07E-06	3.00E-04	8.88E-02	8.25E-05	1.54E-04	1.18E-01	39
Pressure Washers	San Mateo	SF	BA	2.03E+02	7.45E+01	4.49E+01	2.84E-03	1.86E-03	1.35E-01	5.99E-06	1.10E-04	2.10E-01	1.81E-04	1.51E-04	2.69E-01	89
Pressure Washers	San Mateo	SF	BA	1.59E+02	3.94E+01	2.45E+01	1.91E-03	9.98E-04	7.51E-02	3.16E-06	5.76E-05	1.11E-01	9.59E-05	1.02E-04	1.43E-01	47
Pressure Washers	San Mateo	SF	BA	3.81E+01	1.40E+01	2.22E+01	1.27E-03	8.78E-04	6.88E-02	2.57E-06	5.29E-05	1.01E-01	5.55E-05	6.80E-05	1.20E-01	40
Pressure Washers	San Mateo	SF	BA	2.99E+01	7.39E+00	1.19E+01	8.31E-04	4.64E-04	3.72E-02	1.36E-06	2.77E-05	5.36E-02	2.92E-05	4.44E-05	6.35E-02	21
Pressure Washers	San Mateo	SF	BA	3.71E+00	1.17E+00	2.97E+00	5.28E-05	8.97E-05	2.26E-03	3.02E-07	1.90E-06	2.49E-02	4.75E-06	2.82E-06	2.64E-02	9
Generator Sets	San Mateo	SF	BA	5.97E+00	1.88E+00	1.18E+01	6.71E-06	4.52E-04	2.47E-03	0.00E+00	7.01E-06	7.89E-02	0.00E+00	5.62E-05	8.01E-02	27
Generator Sets	San Mateo	SF	BA	4.95E+00	1.56E+00	1.70E+01	7.65E-06	6.45E-04	2.96E-03	0.00E+00	1.02E-05	1.15E-01	0.00E+00	6.41E-05	1.16E-01	39
Gas Compressors	San Mateo	SF	BA	9.28E-01	2.16E+01	7.39E+01	4.20E-05	1.53E-03	7.45E-03	0.00E+00	3.89E-05	5.08E-01	0.00E+00	3.52E-04	5.15E-01	171
Gas Compressors	San Mateo	SF	BA	1.92E+00	4.47E+01	4.32E+02	2.29E-04	9.03E-03	1.19E-01	0.00E+00	2.21E-04	2.85E+00	0.00E+00	1.92E-03	2.89E+00	958
Gas Compressors	San Mateo	SF	BA	3.09E-01	7.20E+00	1.11E+02	6.39E-05	2.42E-03	2.42E-02	0.00E+00	5.91E-05	7.42E-01	0.00E+00	5.36E-04	7.54E-01	250
Gas Compressors	San Mateo	SF	BA	2.48E-01	5.76E+00	1.15E+02	4.92E-05	2.34E-03	2.79E-02	0.00E+00	6.80E-05	7.65E-01	0.00E+00	4.12E-04	7.74E-01	256
Gas Compressors	San Mateo	SF	BA	2.17E-01	5.04E+00	1.62E+02	6.93E-05	3.30E-03	3.93E-02	0.00E+00	9.58E-05	1.08E+00	0.00E+00	5.81E-04	1.09E+00	361
Generator Sets	San Mateo	SF	BA	1.56E+02	1.44E+02	6.72E+01	9.53E-04	6.56E-03	4.72E-03	1.14E-05	3.53E-04	7.35E-01	0.00E+00	8.60E-05	7.37E-01	244
Generator Sets	San Mateo	SF	BA	1.14E+02	1.05E+02	8.48E+01	1.28E-03	7.93E-03	4.32E-03	1.18E-05	4.10E-04	9.29E-01	0.00E+00	1.16E-04	9.31E-01	308
Generator Sets	San Mateo	SF	BA	1.39E+02	1.29E+02	1.81E+02	4.18E-03	1.66E-02	1.54E-02	2.55E-05	1.17E-03	1.97E+00	0.00E+00	3.78E-04	1.98E+00	655
Generator Sets	San Mateo	SF	BA	2.12E+02	1.96E+02	6.96E+02	8.28E-03	6.20E-02	4.66E-02	8.94E-05	4.43E-03	7.62E+00	0.00E+00	7.47E-04	7.64E+00	2,529
Generator Sets	San Mateo	SF	BA	1.25E+01	1.16E+01	7.47E+01	6.06E-04	5.77E-03	4.23E-03	9.23E-06	2.63E-04	8.21E-01	0.00E+00	5.47E-05	8.22E-01	272
Generator Sets	San Mateo	SF	BA	6.99E+00	6.46E+00	6.21E+01	3.33E-04	4.19E-03	1.32E-03	7.72E-06	1.15E-04	6.86E-01	0.00E+00	3.00E-05	6.87E-01	227
Generator Sets	San Mateo	SF	BA	1.55E+01	1.44E+01	2.19E+02	1.06E-03	1.32E-02	4.69E-03	2.37E-05	3.81E-04	2.42E+00	0.00E+00	9.56E-05	2.42E+00	802
Generator Sets	San Mateo	SF	BA	9.66E+00	8.93E+00	2.20E+02	1.10E-03	1.37E-02	4.70E-03	2.44E-05	3.90E-04	2.43E+00	0.00E+00	9.91E-05	2.43E+00	804
Generator Sets	San Mateo	SF	BA	2.51E+00	2.33E+00	1.10E+02	7.25E-04	1.00E-02	2.67E-03	1.22E-05	2.57E-04	1.22E+00	0.00E+00	6.54E-05	1.22E+00	404

Light Commercial						Tons/Day										MTons/Year
Equipment	**County**	**Air Basin**	**Air Dist.**	**Population**	**Activity**	**Consumption**	**ROG Exhaust**	**NOX Exhaust**	**CO Exhaust**	**SO2 Exhaust**	**PM Exhaust**	**CO2 Exhaust**	**N2O Exhaust**	**CH4 Exhaust**	**CO2e**	**CO2e**
Pumps	San Mateo	SF	BA	1.17E+02	1.29E+02	4.38E+01	6.98E-04	4.32E-03	3.07E-03	7.45E-06	2.54E-04	4.79E-01	0.00E+00	6.30E-05	4.80E-01	159
Pumps	San Mateo	SF	BA	3.50E+01	3.86E+01	3.43E+01	5.81E-04	3.21E-03	1.75E-03	4.76E-06	1.74E-04	3.76E-01	0.00E+00	5.24E-05	3.77E-01	125
Pumps	San Mateo	SF	BA	6.10E+01	6.72E+01	1.06E+02	2.65E-03	9.84E-03	9.47E-03	1.49E-05	7.17E-04	1.15E+00	0.00E+00	2.39E-04	1.16E+00	384
Pumps	San Mateo	SF	BA	1.20E+02	1.32E+02	4.69E+02	5.82E-03	4.24E-02	3.19E-02	6.02E-05	3.13E-03	5.13E+00	0.00E+00	5.25E-04	5.15E+00	1,704
Pumps	San Mateo	SF	BA	1.29E+01	1.43E+01	9.10E+01	7.73E-04	7.12E-03	5.22E-03	1.12E-05	3.36E-04	9.99E-01	0.00E+00	6.98E-05	1.00E+00	331
Pumps	San Mateo	SF	BA	9.32E+00	1.03E+01	9.36E+01	5.28E-04	6.42E-03	2.02E-03	1.16E-05	1.80E-04	1.03E+00	0.00E+00	4.76E-05	1.03E+00	343
Pumps	San Mateo	SF	BA	1.84E-01	2.03E-01	3.17E+00	1.62E-05	1.93E-04	6.90E-05	3.43E-07	5.72E-06	3.50E-02	0.00E+00	1.46E-06	3.50E-02	12
Pumps	San Mateo	SF	BA	3.07E-02	3.38E-02	8.72E-01	4.59E-06	5.49E-05	1.90E-05	9.69E-08	1.61E-06	9.64E-03	0.00E+00	4.15E-07	9.65E-03	3
Pumps	San Mateo	SF	BA	6.74E-01	7.44E-01	4.56E+01	3.10E-04	4.19E-03	1.12E-03	5.06E-06	1.08E-04	5.03E-01	0.00E+00	2.79E-05	5.04E-01	167
Air Compressors	San Mateo	SF	BA	1.59E+00	3.56E+00	1.17E+00	1.87E-05	1.16E-04	8.23E-05	2.00E-07	6.81E-06	1.28E-02	0.00E+00	1.69E-06	1.29E-02	4
Air Compressors	San Mateo	SF	BA	3.16E+00	7.04E+00	4.64E+00	7.86E-05	4.34E-04	2.36E-04	6.45E-07	2.36E-05	5.08E-02	0.00E+00	7.09E-06	5.10E-02	17
Air Compressors	San Mateo	SF	BA	2.87E+01	6.40E+01	6.60E+01	2.20E-03	6.45E-03	7.28E-03	9.20E-06	5.47E-04	7.12E-01	0.00E+00	1.99E-04	7.16E-01	237
Air Compressors	San Mateo	SF	BA	1.91E+02	4.26E+02	9.15E+02	1.37E-02	8.83E-02	6.69E-02	1.17E-04	7.45E-03	1.00E+01	0.00E+00	1.24E-03	1.00E+01	3,319
Air Compressors	San Mateo	SF	BA	7.24E+00	1.61E+01	6.51E+01	6.84E-04	5.44E-03	4.02E-03	8.02E-06	2.93E-04	7.13E-01	0.00E+00	6.18E-05	7.15E-01	237
Air Compressors	San Mateo	SF	BA	1.02E+01	2.27E+01	1.35E+02	9.60E-04	9.91E-03	3.12E-03	1.67E-05	3.02E-04	1.49E+00	0.00E+00	8.66E-05	1.49E+00	493
Air Compressors	San Mateo	SF	BA	1.33E+01	2.96E+01	3.10E+02	2.06E-03	1.99E-02	7.13E-03	3.36E-05	6.49E-04	3.43E+00	0.00E+00	1.86E-04	3.43E+00	1,136
Air Compressors	San Mateo	SF	BA	4.97E+00	1.11E+01	1.79E+02	1.20E-03	1.19E-02	4.12E-03	1.99E-05	3.84E-04	1.98E+00	0.00E+00	1.09E-04	1.98E+00	657
Air Compressors	San Mateo	SF	BA	1.23E-01	2.73E-01	6.02E+00	4.60E-05	5.84E-04	1.57E-04	6.68E-07	1.61E-05	6.64E-02	0.00E+00	4.15E-06	6.65E-02	22
Welders	San Mateo	SF	BA	5.29E+01	9.32E+01	2.64E+01	4.21E-04	2.60E-03	1.85E-03	4.50E-06	1.53E-04	2.89E-01	0.00E+00	3.80E-05	2.90E-01	96
Welders	San Mateo	SF	BA	4.66E+01	8.20E+01	4.22E+01	7.15E-04	3.95E-03	2.15E-03	5.87E-06	2.14E-04	4.62E-01	0.00E+00	6.45E-05	4.64E-01	154
Welders	San Mateo	SF	BA	1.43E+02	2.52E+02	3.03E+02	9.30E-03	2.90E-02	3.12E-02	4.23E-05	2.36E-03	3.27E+00	0.00E+00	8.39E-04	3.29E+00	1,089
Welders	San Mateo	SF	BA	1.11E+02	1.96E+02	3.54E+02	4.99E-03	3.34E-02	2.52E-02	4.54E-05	2.71E-03	3.87E+00	0.00E+00	4.50E-04	3.88E+00	1,284
Welders	San Mateo	SF	BA	5.52E-01	9.71E-01	4.34E+00	4.26E-05	3.56E-04	2.61E-04	5.36E-07	1.84E-05	4.76E-02	0.00E+00	3.84E-06	4.77E-02	16
Welders	San Mateo	SF	BA	1.23E-01	2.16E-01	1.16E+00	7.65E-06	8.36E-05	2.63E-05	1.44E-07	2.49E-06	1.28E-02	0.00E+00	6.90E-07	1.28E-02	4
Welders	San Mateo	SF	BA	3.07E-01	5.39E-01	4.09E+00	2.48E-05	2.58E-04	9.23E-05	4.43E-07	8.18E-06	4.52E-02	0.00E+00	2.24E-06	4.52E-02	15
Pressure Washers	San Mateo	SF	BA	7.24E+00	2.87E+00	6.41E-01	9.09E-06	6.26E-05	4.50E-05	1.09E-07	3.37E-06	7.01E-03	0.00E+00	8.20E-07	7.03E-03	2
Pressure Washers	San Mateo	SF	BA	1.69E+00	6.69E-01	2.18E-01	3.30E-06	2.04E-05	1.11E-05	3.03E-08	1.05E-06	2.39E-03	0.00E+00	2.98E-07	2.40E-03	1
Pressure Washers	San Mateo	SF	BA	3.34E+00	1.33E+00	8.67E-01	1.53E-05	7.71E-05	6.28E-05	1.22E-07	4.77E-06	9.47E-03	0.00E+00	1.38E-06	9.50E-03	3
Pressure Washers	San Mateo	SF	BA	1.38E+00	5.47E-01	6.01E-01	6.23E-06	5.12E-05	3.85E-05	7.72E-08	3.29E-06	6.58E-03	0.00E+00	5.62E-07	6.60E-03	2
				14,413	7,527	10,159	0.333	0.643	10.276	0.001	0.071	85.488	0.014	0.024	90.327	29,909
				Population	**Activity**	**Consumption**	**lbs/day**					Tons/Day				MTons/Year
				1,225	640	863	57	109	1,746	0	12	7	0	0	8	**2,541**
As a percent of 2010 Total Employment					SanMateo	363,644	MenloPark	30,900	Percent	8%						

SOURCE: U.S. Census Bureau. Longitudinal Employer-Household Dynamics. http://lehd.ces.census.gov/ for Santa Clara County. Third Quarter 2012 total employment in San Mateo County.

APPENDIX F:
CULTURAL RESOURCES DATA



CONNECTMENLO
menlo park land use & mobility update

FIGURE 1: MENLO PARK REGIONAL LOCATION

CONNECTMENLO
menlo park land use & mobility update

FIGURE 2: M-2 AREA

Local Government Tribal Consultation List Request

Native American Heritage Commission

1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710 916-373-5471
– Fax nahc@nahc.ca.gov

Type of List Requested

☐ **CEQA Tribal Consultation List (AB 52)** ***– Per Public Resources Code § 21080.3.1, subs. (b), (d), (e) and 21080.3.2***

☐ **General Plan (SB 18)** ***-Per Government Code § 65352.3.***

Local Action Type:

___ General Plan ___ General Plan Element X General Plan Amendment

___ Specific Plan ___ Specific Plan Amendment ___ Pre-planning Outreach Activity

Required Information

Project Title: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Local Government/Lead Agency: City of Menlo Park

Contact Person: Deanna Chow

Street Address: 701 Laurel Street

City: Menlo Park Zip: 94025 Phone: (650) 330-6733

Fax:(510) 848-3815 Email: DMChow@menlopark.org

Specific Area Subject to Proposed Action: City of Menlo Park

County: San Mateo City/Community: Menlo Park

Project Description:

The City of Menlo Park is in the process of undergoing a General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update. This project is also known as ConnectMenlo. The City of Menlo Park is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks,

Additional Request

☐ **Sacred Lands File Search** ***-Required Information:***

USGS Quadrangle Name(s):Palo Alto

Township: T5S and T6S Range: R3W Section(s): Pulgas

Local Government Tribal Consultation List Request

Native American Heritage Commission

1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710 916-373-5471
– Fax nahc@nahc.ca.gov

Type of List Requested

☐ **CEQA Tribal Consultation List (AB 52)** – ***Per Public Resources Code § 21080.3.1, subs. (b), (d), (e) and 21080.3.2***

☒ **General Plan (SB 18)** -***Per Government Code § 65352.3.***

Local Action Type:

___ General Plan ___ General Plan Element X General Plan Amendment

___ Specific Plan ___ Specific Plan Amendment ___ Pre-planning Outreach Activity

Required Information

Project Title: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Local Government/Lead Agency: City of Menlo Park

Contact Person: Deanna Chow

Street Address: 701 Laurel Street

City: Menlo Park Zip: 94025 Phone: (650) 330-6733

Fax:(510) 848-3815 Email: DMChow@menlopark.org

Specific Area Subject to Proposed Action: City of Menlo Park

County: San Mateo City/Community: Menlo Park

Project Description:

The City of Menlo Park is in the process of undergoing a General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update. This project is also known as ConnectMenlo. The City of Menlo Park is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks,

Additional Request

☒ **Sacred Lands File Search -*Required Information:***

USGS Quadrangle Name(s):Palo Alto

Township: T5S and T6S Range: R3W Section(s): Pulgas

PLACEWORKS

1625 Shattuck Avenue, Suite 300 | Berkeley, California 94709

014H15202733
$0.49⁰
12/21/2015
Mailed From 94709
HASLER
US POSTAGE

Costanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
240 East 1st Street
Pomona, CA 91766

NIXIE 917 NFE 1 1510001/07/16
RETURN TO SENDER
NOT DELIVERABLE AS ADDRESSED
UNABLE TO FORWARD
BC: 94709166775 *2708-05278-07-35

94709@1667
91766180248

Sacred Lands File & Native American Contacts List Request

Native American Heritage Commission
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
916-373-3710
916-373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

County: San Mateo County

USGS Quadrangle

Name: Palo Alto

Township: T5S and T6S Range: R3W Section(s): Pulgas

Company/Firm/Agency: City of Menlo Park
Contact Person: Deanna Chow

Street Address: 701 Laurel Street

City: Menlo Park Zip: 94025

Phone: (650) 330-6733

Fax: (510) 848-4315

Email: DMChow@menlopark.org

Project Description:

The City of Menlo Park is in the process of undergoing a General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update. This project is also known as ConnectMenlo. The City of Menlo Park is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 - Fax

February 12, 2016

Deanna Chow
City of Menlo Park

Sent by Email: DMChow@menlopark.org
Number of Pages: 2

RE: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update, San Mateo County

Dear Ms. Chow:

Government Code §65352.3 requires local governments to consult with California Native American tribes identified by the Native American Heritage Commission (NAHC) for the purpose of protecting, and/or mitigating impacts to cultural places in creating or amending general plans, including specific plans. Attached is a consultation list of tribes traditionally and culturally affiliated with the location referenced above.

As a part of consultation, the NAHC recommends that local governments conduct record searches through the NAHC and the appropriate archaeological Information Center of the California Historic Resources Information System (CHRIS) (http://ohp.parks.ca.gov/?page_id=1068) to determine if any tribal cultural resources are located within the area(s) affected by the proposed action. A record search of the NAHC Sacred Lands File was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the Sacred Lands File does not indicate the absence of tribal cultural resources in any APE. Records maintained by the NAHC and CHRIS is not exhaustive, and a negative response to these searches does not preclude the existence of tribal cultural resources. A tribe may be the only source of information regarding the existence of tribal cultural resources within any APE.

The list should provide a starting place to locate areas of potential adverse impact within the APE. I suggest you contact all of those listed, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes on the attached list, please notify me. With your assistance we are able to assure that our consultation list contains current information.

If you have any questions, please contact me at my email address: sharay.souza@nahc.ca.gov.

Sincerely,

Sharaya Souza

Sharaya Souza
Staff Services Analyst

Native American Heritage Commission
Tribal Consultation List
San Mateo County
February 11, 2016

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road — Ohlone/Costanoan
Woodside, CA 94062
amahmutsuntribal@gmail.com
(650) 400-4806 Cell

Coastanoan Rumsen Carmel Tribe
Tony Cerda, Chairperson
240 E. 1st Street — Ohlone/Costanoan
Pomona, CA 91766
rumsen@aol.com
(909) 524-8041 Cell
(909) 629-6081

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28 — Ohlone/Costanoan
Hollister, CA 95024
ams@indiancanyon.org
(831) 637-4238

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
P.O. Box 360791 — Ohlone / Costanoan
Milpitas, CA 95036
muwekma@muwekma.org
(408) 314-1898
(510) 581-5194

The Ohlone Indian Tribe
Andrew Galvan
P.O. Box 3152 — Ohlone/Costanoan
Fremont, CA 94539 — Bay Miwok
chochenyo@AOL.com — Plains Miwok
(510) 882-0527 Cell — Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable only for consultation with Native American tribes under Government Code Sections 65352.3 and 65362.4 et seq for the proposed Connect Menlo: General Plan Land Use & Circulation Elements Bayfront Area Zoning, San Mateo County.

Ashley James

From: Claudia Garcia
Sent: Friday, January 15, 2016 5:05 PM
To: nahc@nahc.ca.gov
Cc: Terri McCracken; DMChow@menlopark.org
Subject: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update
Attachments: Local-Government-Tribal-Consultation-List-Request-Form-Update.pdf; TribalConsultation_Sacred_Lands_File_and_NativeAmericanContactList.pdf

January 15, 2016
Native American Heritage Commission
1550 Harbor Blvd
Suite 100
West Sacramento, CA 95691

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Hello:
I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702 or DMChow@menlopark.org.

The Local Government Tribal Consultation List Request and Native American Contacts List Request forms are attached to this message. The forms were also faxed to the following number; (916) 373-5471.

Sincerely,
Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

CLAUDIA GARCIA
Project Planner
1625 Shattuck Avenue, Suite 300
Berkeley, California 94709
510.848.3815
cgarcia@placeworks.com
placeworks.com

From:	Claudia Garcia
To:	"amahmutsuntribal@gmail.com"
Cc:	"DMChow@menlopark.org"; Terri McCracken
Subject:	Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update
Date:	Monday, December 21, 2015 2:32:00 PM
Attachments:	Figure_1_RegionalLocation.pdf Figure_2 M-2 Area.pdf image001.jpg image003.jpg

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December 21, 2015
Irene Zwierlein, Chairperson
Amah/Mutsun Tribal Band
789 Canada Road
Woodside, CA 94062

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Irene Zwierlein:
I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702 or DMChow@menlopark.org.

A regional and vicinity map showing the project's location are attached to this message. Hard copies of the attached maps were also mailed to the address listed at the top of this message.

Sincerely,
Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

CLAUDIA GARCIA
Project Planner

1625 Shattuck Avenue, Suite 300
Berkeley, California 94709
510.848.3815
cgarcia@placeworks.com
placeworks.com

PLACEWORKS

December 21, 2015

Irene Zwierlein, Chairperson
Amah/Mutsun Tribal Band
789 Canada Road
Woodside, CA 94062

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Irene Zwierlein:

I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702.

Enclosed is a regional and vicinity map showing the project's location.

Sincerely,

Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

Ashley James

From: Claudia Garcia
Sent: Monday, December 21, 2015 2:00 PM
To: 'rumsen@aol.com'
Cc: 'DMChow@menlopark.org'; Terri McCracken
Subject: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

December 21, 2015
Tony Cerda, Chairperson
Costanoan Rumsen Carmel Tribe
240 E. 1st Street
Pomona, CA 91766

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Tony Cerda:
I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702 or DMChow@menlopark.org.

A regional and vicinity map showing the project's location are attached to this message.

Sincerely,
Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

CLAUDIA GARCIA
Project Planner
1625 Shattuck Avenue, Suite 300
Berkeley, California 94709
510.848.3815
cgarcia@placeworks.com
placeworks.com

December 21, 2015

Tony Cerda, Chairperson
Costanoan Rumsen Carmel Tribe
240 E. 1st Street
Pomona, CA 91766

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Tony Cerda:

I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702.

Enclosed is a regional and vicinity map showing the project's location.

Sincerely,

Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

Ashley James

From: Claudia Garcia
Sent: Monday, December 21, 2015 2:07 PM
To: 'rumsen@aol.com'
Cc: 'DMChow@menlopark.org'; Terri McCracken
Subject: FW: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update
Attachments: Figure_1_RegionalLocation.pdf; Figure_2 M-2 Area.pdf

Hello Tony,
Here are the attachments, I also sent the maps via USPS to the address listed below.

Best,
Claudia

From: Claudia Garcia
Sent: Monday, December 21, 2015 2:00 PM
To: 'rumsen@aol.com'
Cc: 'DMChow@menlopark.org'; Terri McCracken
Subject: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

December 21, 2015
Tony Cerda, Chairperson
Costanoan Rumsen Carmel Tribe
240 E. 1st Street
Pomona, CA 91766

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Tony Cerda:
I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

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A regional and vicinity map showing the project's location are attached to this message.

Sincerely,
Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

YEARS 1975-2015
PLACEWORKS

CLAUDIA GARCIA
Project Planner
1625 Shattuck Avenue, Suite 300

Berkeley, California 94709
510.848.3815
cgarcia@placeworks.com
placeworks.com

Ashley James

From: Claudia Garcia
Sent: Monday, December 21, 2015 2:15 PM
To: 'ams@indiancanyon.org'
Cc: 'DMChow@menlopark.org'; Terri McCracken
Subject: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update
Attachments: Figure_1_RegionalLocation.pdf; Figure_2 M-2 Area.pdf

December 21, 2015
Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Ann Marie Sayers:

I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702 or DMChow@menlopark.org

A regional and vicinity map showing the project's location are attached to this message. Hard copies of the attached maps were also mailed to the address listed at the top of this message.

Sincerely,
Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

CLAUDIA GARCIA
Project Planner
1625 Shattuck Avenue, Suite 300
Berkeley, California 94709
510.848.3815
cgarcia@placeworks.com
placeworks.com

PLACEWORKS

December 21, 2015

Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Ann Marie Sayers:

I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702.

Enclosed is a regional and vicinity map showing the project's location.

Sincerely,

Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

Ashley James

From: Claudia Garcia
Sent: Monday, December 21, 2015 2:19 PM
To: 'muwekma@muwekma.org'
Cc: 'DMChow@menlopark.org'; Terri McCracken
Subject: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update
Attachments: Figure_1_RegionalLocation.pdf; Figure_2 M-2 Area.pdf

December 21, 2015
Rosemary Cambra, Chairperson
Muwekma Ohlone Indian Tribe of the SF Bay Area
P.O. Box 360791
Milpitas, CA 95036

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Dear Rosemary Cambra:

I am writing to notify you of a proposed City of Menlo Park General Plan Update (Land Use and Circulation Elements) and Bayfront Area Zoning Update, also known as ConnectMenlo, within San Mateo County, for which our firm is preparing an Environmental Impact Report (EIR). The city is generally bounded by San Francisco Bay to the north and east; the cities of East Palo Alto and Palo Alto and Stanford University to the southeast; and Atherton, unincorporated North Fair Oaks, and Redwood City to the northwest.

Project Manager Deanna Chow, City of Menlo Park Community Development Department's Planning Division, is reviewing the project for CEQA compliance and can be reached at (650) 330-6702 or DMChow@menlopark.org.

A regional and vicinity map showing the project's location are attached to this message. Hard copies of the attached maps were also mailed to the address listed at the top of this message.

Sincerely,
Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

CLAUDIA GARCIA
Project Planner
1625 Shattuck Avenue, Suite 300
Berkeley, California 94709
510.848.3815
cgarcia@placeworks.com
placeworks.com

PLACEWORKS

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Project Planner

Cc: Deanna Chow, City of Menlo Park

Ashley James

From: Claudia Garcia
Sent: Monday, December 21, 2015 2:22 PM
To: 'chochenyo@aol.com'
Cc: 'DMChow@menlopark.org'; Terri McCracken
Subject: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update
Attachments: Figure_1_RegionalLocation.pdf; Figure_2 M-2 Area.pdf

December 21, 2015
Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Fremont, CA 94539

Subject: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

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Sincerely,

Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

Ashley James

From: Claudia Garcia
Sent: Tuesday, December 22, 2015 11:43 AM
To: Andy Galvan
Cc: DMChow@menlopark.org; Terri McCracken
Subject: RE: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Hello Andrew,
I hope this email finds you well . Thank you for following up so quickly. The proposed ConnectMenlo project is an effort by the City of Menlo Park to update the Land Use and Circulation Elements of their General Plan and the zoning within the Bayfront Area. Thus, there are no development projects proposed at this time and our firm is preparing a program level environmental impact report. Any Phase 1 literature searches or foot surveys would be conducted at the time a development project is proposed as required. Please let me know if you have any further questions.

Best,
Claudia Garcia

CLAUDIA GARCIA
Project Planner
1625 Shattuck Avenue, Suite 300
Berkeley, California 94709
510.848.3815
cgarcia@placeworks.com
placeworks.com

From: Andy Galvan [mailto:chochenyo@aol.com]
Sent: Tuesday, December 22, 2015 8:23 AM
To: Claudia Garcia
Cc: DMChow@menlopark.org; Terri McCracken
Subject: Re: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Hi there,

can you tell me if a Phase I Literature Search and/or a Foot Survey have been under taken for this project? And if so, may I have a copy of that report?

Thank you,

Andrew Galvan
An Ohlone Man

-----Original Message-----
From: Claudia Garcia <cgarcia@placeworks.com>
To: chochenyo <chochenyo@aol.com>
Cc: DMChow <DMChow@menlopark.org>; Terri McCracken <tmccracken@placeworks.com>

Sent: Mon, Dec 21, 2015 2:23 pm
Subject: Notification: ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

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P.O. Box 3152
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Claudia Garcia
Project Planner

Cc: Deanna Chow, City of Menlo Park

YEARS 1975-2015
PLACEWORKS

CLAUDIA GARCIA
Project Planner
1625 Shattuck Avenue, Suite 300
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APPENDIX G:
NOISE DATA








City of Menlo Park General Plan

Open Space/ Conservation, Noise and Safety Elements

Adopted May 21, 2013

City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

@HOME IN MENLO PARK

Section III

Noise Goals, Policies and Programs

A The Importance of Noise Attenuation

The purpose of the Noise Element is to appraise existing noise problems in the community and to provide guidance to the community and developers for avoiding problems in the future. It also can provide the basis for code enforcement and other regulations, including implementation of the City's Noise Ordinance to control nuisance noise.

Noise is part of everyday life in a community and is generally defined as unwanted sound. Whether a sound is unwanted depends on when and where it occurs, what the listener is doing when it occurs, characteristics of the sound (loudness, pitch and duration, speech or music content, irregularity), and how intrusive it is above background sound levels. Acceptable levels of noise vary from land use to land use. Also, in any one location, the noise level will vary over time, from the lowest background or ambient levels to that of passing airplanes or construction equipment. Various techniques have been developed that measure the effects of noise levels over a period of time.

It is difficult to specify noise levels that are generally acceptable to everyone. What is annoying to one person may be unnoticed by another. Standards may be based on documented complaint activity in response to noise levels, or based on studies on the ability of people to sleep, talk, or work under various noise conditions. All such studies, however, recognize that individual responses vary considerably. Standards usually address the needs of most of the general population. With this caution in mind, noise standards for planning purposes need to examine outdoor and indoor noise levels acceptable for different uses. The standards must relate to existing conditions in the City so that they are realistically enforceable and consistent with other General Plan policies.

B Noise Goal

Goal N1 — ACHIEVE ACCEPTABLE NOISE LEVELS

It is the goal of Menlo Park to have acceptable noise levels.

Excessive noise is a concern for many residents of Menlo Park. These concerns can be managed with proper mitigation or through the implementation of the City's noise ordinance. The City of Menlo Park recognizes the issue of noise and has standards to protect the peace, health and safety of residents and the community from unreasonable noise from any and all sources in the community and to strive to locate uses compatible to the area to minimize escalation of noise from mobile and stationary sources.

C Noise Policies and Implementing Programs

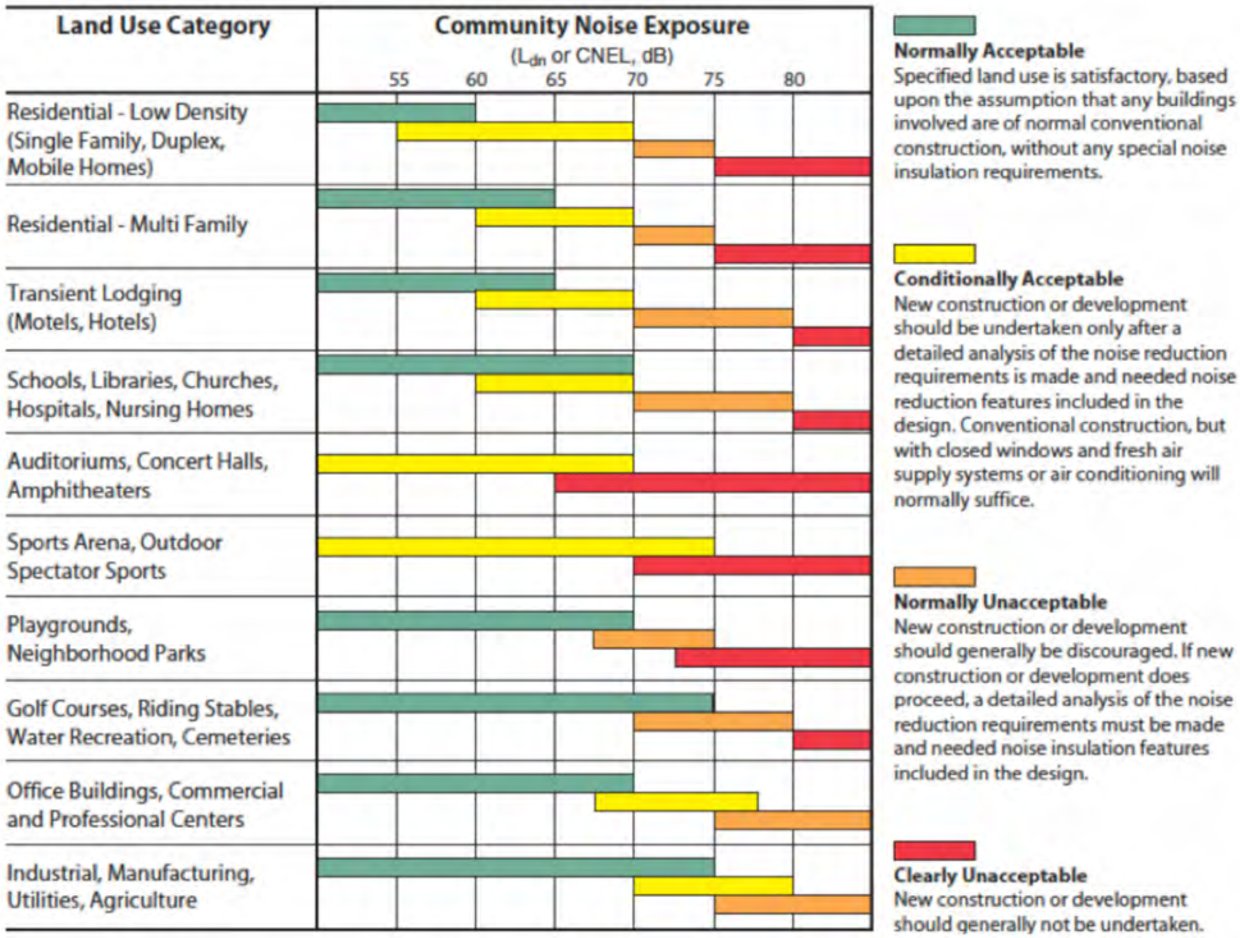
Goal N1
ACHIEVE ACCEPTABLE NOISE LEVELS

Policies

N1.1 **Compliance with Noise Standards.** Consider the compatibility of proposed land uses with the noise environment when preparing or revising community and/or specific plans. Require new projects to comply with the noise standards of local, regional, and building code regulations, including but not limited to the City's Municipal Code, Title 24 of the California Code of Regulations, and subdivision and zoning codes.

N1.2 **Land Use Compatibility Noise Standards.** Protect people in new development from excessive noise by applying the City's Land Use Compatibility Noise Standards for New Development (see chart on the next page) to the siting and required mitigation for new uses in existing noise environments.

Land Use Compatibility Noise Standards for New Development



N1.3 **Exterior and Interior Noise Standards for Residential Use Areas.** Strive to achieve acceptable interior noise levels and exterior noise levels for backyards and/or common usable outdoor areas in new residential development, and reduce outdoor noise levels in existing residential areas where economically and aesthetically feasible.

N1.4 **Noise Sensitive Uses.** Protect existing residential neighborhoods and noise sensitive uses from unacceptable noise levels and vibration impacts. Noise sensitive uses include, but are not limited to, hospitals, schools, religious facilities, convalescent homes and businesses with highly sensitive equipment. Discourage the siting of noise-sensitive uses in areas in excess of 65 dBA CNEL without appropriate mitigation and locate noise sensitive uses away from noise sources unless mitigation measures are included in development plans.

N1.5 **Planning and Design of New Development to Reduce Noise Impacts.** Design residential developments to minimize the transportation-related noise impacts to adjacent residential areas and encourage new development to be site planned and architecturally designed to minimize noise impacts on noise-sensitive spaces. Proper site planning can be effective in reducing noise impacts.

N1.6 **Noise Reduction Measures.** Encourage the use of construction methods, state-of-the-art noise abating materials and technology and creative site design including, but not limited to, open space, earthen berms, parking, accessory buildings, and landscaping to buffer new and existing development from noise and to reduce potential conflicts between ambient noise levels and noise-sensitive land uses. Use sound walls only when other methods are not practical or when recommended by an acoustical expert.

N1.7 **Noise and Vibration from New Non-Residential Development.** Design non-residential development to minimize noise impacts on nearby uses. Where vibration impacts may occur, reduce impacts on residences and businesses through the use of setbacks and/or structural design features that reduce vibration to levels at or below the guidelines of the Federal Transit Administration near rail lines and industrial uses.

N1.8 **Potential Annoying or Harmful Noise.** Preclude the generation of annoying or harmful noise on stationary noise sources, such as construction and property maintenance activity and mechanical equipment.

N1.9 **Transportation Related Noise Attenuation.** Strive to minimize traffic noise through land use policies, traffic-calming methods to reduce traffic speed, law enforcement and street improvements, and encourage other agencies to reduce noise levels generated by roadways, railways, rapid transit, and other facilities.

N1.10 **Nuisance Noise.** Minimize impacts from noise levels that exceed community sound levels through enforcement of the City's Noise Ordinance. Control unnecessary, excessive and annoying noises within the City where not preempted by Federal and State control through implementation and updating of the Noise Ordinance.

Implementing Programs

N1.A **Require Acoustical Studies.** Require acoustical studies for all new multi-family residential projects within the projected Ldn 60 dB noise contours so that noise mitigation measures can be incorporated into project design and site planning.

N1.B **Reduce Existing Vehicular Noise Through Enforcement.** Actively enforce the provisions of the California Motor Vehicle Code pertaining to vehicle speed and noise emission.

N1.C **Consider Noise Impacts in Street Design.** Employ noise mitigation practices and materials, as necessary, when designing future streets and when improvements occur along existing road segments. Mitigation measures should consider quieter pavements and emphasize the establishment of natural buffers or setbacks between the arterial roadways and adjoining noise-sensitive areas. Strive to maintain smooth street surfaces adjacent to land uses that are sensitive to noise intrusion.

N1.D **Minimize Construction Activity Noise.** Minimize the exposure of nearby properties to excessive noise levels from construction-related activity through CEQA review, conditions of approval and enforcement of the City's Noise Ordinance.

N1.E **Consider Noise Levels in City Equipment Purchases.** Include noise specifications in requests for equipment information and bids for new City equipment and consider this information as part of evaluation of the bids. The City of Menlo Park should consider noise emission when purchasing vehicles, construction equipment, etc. This consideration should be balanced with the required performance and cost.

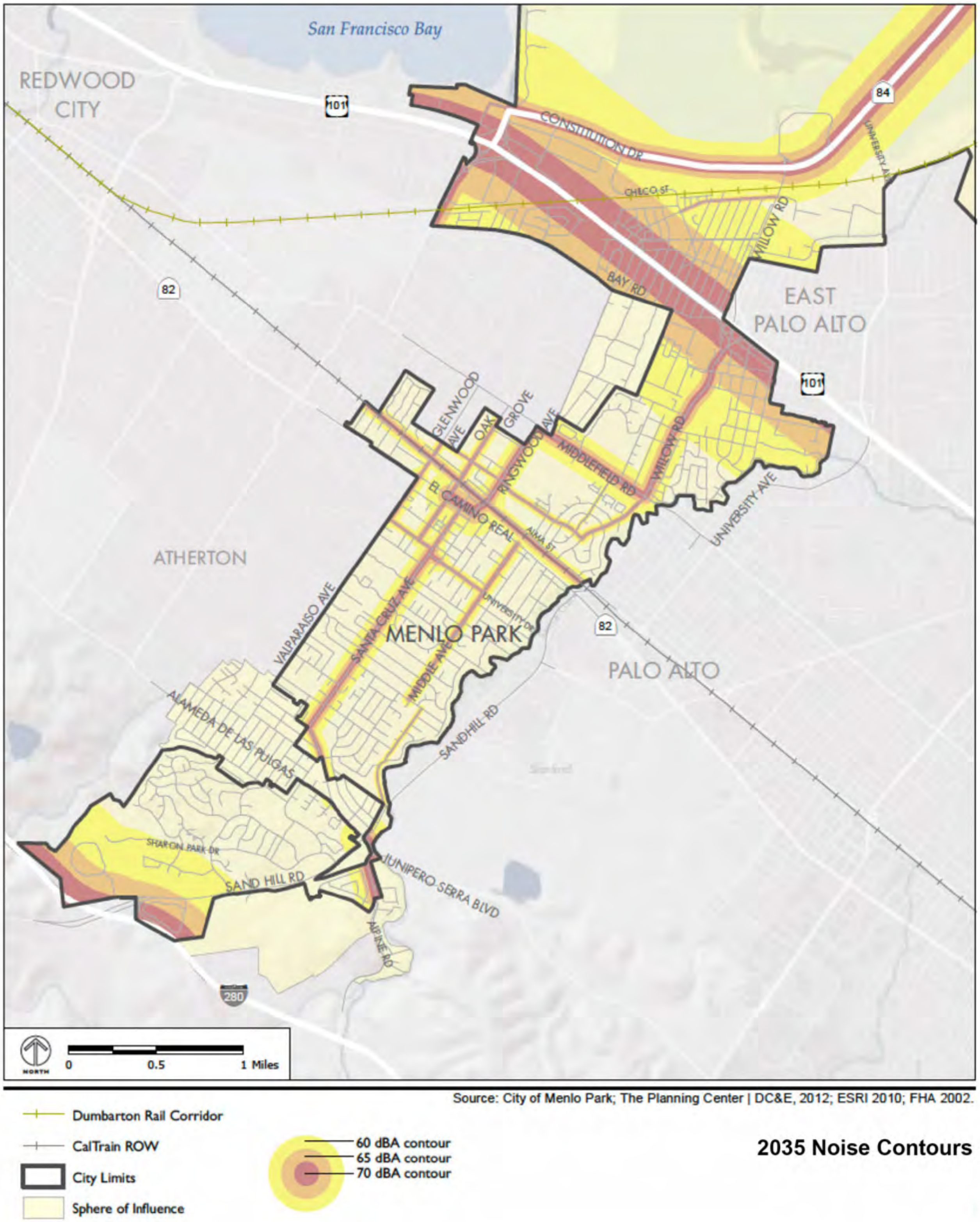
N1.F **Work with Other Agencies to Reduce Transportation-Related Noise Levels.** Work closely with Caltrans, San Mateo County Department of Public Works and other jurisdictions to reduce noise levels along State highways and county roadways through or near the City.

N1.G **Monitor Airport Noise.** Engage airport authorities and participate in regional planning efforts to ensure future activities and flight patterns at commercial airports do not negatively impact noise levels in the city.

N1.H **Work with Railroad Operators to Reduce Noise and Vibration Levels.** Work with the railroad operators (e.g, Caltrain, Union Pacific, etc.) to reduce, to the extent possible, the contribution of railroad train noise and vibration to Menlo Park's noise environment.

N1.I **Work with Neighboring Communities When Implementing Noise Policies and Programs.** Work with neighboring communities to ensure compliance with the land use and noise compatibility policies contained in this Noise Element at Menlo Park's boundaries.

N1.J **Evaluate Noise Related Impacts of City Actions as Appropriate.** Analyze in detail the potential noise impacts of any actions that the City may take or act upon which could significantly alter noise level in the community.



Source: City of Menlo Park; The Planning Center | DC&E, 2012; ESRI 2010; FHA 2002.

2035 Noise Contours

City of Menlo Park Municipal Code

Chapter 8.06
NOISE

Sections:

8.06.010 Declaration of policy.

It is declared to be the policy of the city to protect the peace, health and safety of its citizens from unreasonable noises from all sources including, but not limited to, those specified in this chapter. (Ord. 892 § 2 (part), 1999).

8.06.020 Definitions.

The definitions set forth in this section shall govern its construction.

(1) **"A-Weighting"** means a filter network designed to transform a frequency spectrum to that which is heard by the human ear.

(2) **"Construction activities"** means the grading, demolition, alteration, repair or remodeling of existing structures and construction of new structures including the use of power equipment in connection with activities. "Construction activities" does not include radios or other forms of amplified music on a construction site.

(3) **"Daytime"** means the period from seven (7) a.m. to ten (10) p.m. daily.

(4) **"Decibel (dB)"** means a unit for measuring the amplitude of sound, equal to twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound measured to the reference pressure, which is twenty (20) micropascals.

(5) **"Delivery"** means the delivery or pickup or the arrival for delivery or pickup of goods, wares and merchandise by the use of a motorized vehicle, other than an automobile or train.

(6) **"Equivalent-energy level (Leq)"** means the level of a steady-state noise that has the same sound energy as a given time-varying noise.

(7) **"Holidays"** means the follow days: New Year's Day, Martin Luther King Day, President's Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving, and Christmas Day.

(8) **"Impulsive sound"** means sound of short duration, usually less than one (1) second, with an abrupt onset and rapid decay. Examples of impulsive sounds include explosions, drop impacts and firearm discharge.

(9) **"Motor vehicles"** means any and all self-propelled vehicles as defined in the Vehicle Code of the state, including all on-highway types of vehicles subject to registration under said code and all off-highway type of motor vehicle subject to identification under said code.

(10) **"Multifamily dwelling"** means any housing unit where two (2) or more dwellings are separated by a common wall, floor or ceiling, including but not limited to apartments, condominiums and townhouses.

(11) **"Nighttime"** means the period from ten (10) p.m. to seven (7) a.m. daily.

(12) **"Noise disturbance"** means any source of sound which exceeds the noise limitations permitted in Section 8.06.030. For purposes of this section sources of sound shall include but not be limited to the following: amplified music, loudspeakers, radios, televisions, stereos, musical instruments, powered toys or models, swimming pools or spas, industrial machinery, manufacturing equipment, pile drivers, air compressors, paint sprayers, motors, pumps, blowers, air conditioners, cooling towers, ventilating fans, fork lifts, loaders, tractors, animals, concerts, mechanical equipment, human voices, electrical appliances, vacuum cleaners, powered equipment, chain saws, beepers, motor vehicles and attached equipment not operated on a street or highway, etc.

(13) **"Noise level"** means the amplitude of sound pressure referenced to twenty (20) micropascals, measured in decibels, using the A-weighting network (for the purposes of this chapter).

(14) **"Noise level measurement"** means the procedure of measuring sound consisting of the usage of a precision sound level meter (SLM), as defined in the section, set to "fast" response. If the sound level meter is analog with a VU meter, then the response shall be "slow" unless the noise issue is impulsive. The meter must be calibrated before any measurements and the microphone shall be a minimum of three and one-half (3 1/2) feet from any wall, floor or other large sound reflecting surface. The meter

shall be protected from wind or other extraneous noise by the use of screens, shields or other appropriate devices.

(15) **"Precision sound level meter"** means a sound pressure level measuring instrument which conforms to the American National Standards Institute (ANSI) specification S1.4 for Type 1 or Type 2 measuring instruments.

(16) **"Powered equipment"** means a motorized device powered by electricity or fuel used for construction, demolition and property or landscape maintenance or repairs. Powered equipment includes but is not limited to: lawn mowers, hedgers, parking lot sweepers, saws, sanders, motors, pumps, generators, blowers, wood chippers, vacuums, drills and nail guns (but specifically excluding internal fuel combustion engine leaf blowers).

(17) **"Residential property"** means any property legally used for a single family or multifamily dwelling as defined in Section 16.04.240.

(18) **"Sound-amplifying equipment"** means any machine or equipment or device for the amplification of the human voice, music or any other sound. Sound-amplifying equipment shall not be construed as including automobile radios (which are covered by the California Vehicle Code), warning devices on authorized emergency vehicles or horns or other warning devices on other vehicles used for traffic safety purposes.

(19) **"Work personally done by resident or property owner"** means work undertaken by the property owner/resident. Resident/property owner may be assisted by a family member, friend or other persons. (Ord. 895 § 5, 1999; Ord. 892 § 2 (part), 1999).

8.06.030 Noise limitations.

(a) Except as otherwise permitted in this chapter, any source of sound in excess of the sound level limits set forth in Section 8.06.030 shall constitute a noise disturbance. For purposes of determining sound levels from any source of sound, sound level measurements shall be made at a point on the receiving property nearest where the sound source at issue generates the highest sound level. Sound level measurements shall be made with a precision sound level meter (Type 1 or 2) set to A-weighting, and "fast" response for fluctuating sound. Slow or fast response may be used for continual sources. For repetitive, impulsive sound, the one (1) second rms maximum level (Lmax) shall be used. For continuous sound, use the average level or Leq. In multifamily residential structures, the microphone shall be placed no closer than three and one-half (3 1/2) feet from the wall through which the source of sound at issue is transmitting. The microphone shall also be placed five (5) feet above the floor regardless of whether the source of sound at issue transmits through the floor, ceiling or wall.

(1) For all sources of sound measured from any residential property:

(A) "Nighttime" hours—fifty (50) dBA,

(B) "Daytime" hours—sixty (60) dBA;

(2) For all sources of sound within a multifamily residential structure transmitting through a common interior partition (wall, floor or ceiling) from one (1) dwelling unit to another:

(A) "Nighttime" hours—thirty-five (35) dBA,

(B) "Daytime" hours—forty-five (45) dBA;

(3) Corrections for character of sound: In the event the alleged offensive noise contains a steady, audible tone, such as a whine, screech, beating, pulsating, throbbing or hum the standards set forth in Section 8.06.030(a)(1) and (2) shall be reduced by five (5) dB.

(b) Any and all excessively annoying, loud or unusual noises or vibrations such as offend the peace and quiet of persons of ordinary sensibilities and which interfere with the comfortable enjoyment of life or property and affect at the same time an entire neighborhood or any considerable number of persons shall be considered a noise disturbance.

(c) It shall be unlawful to create, permit, allow or maintain a noise disturbance in Menlo Park. (Ord. 892 § 2 (part), 1999).

8.06.040 Exceptions.

The following are exceptions to the noise limitations set forth in Section 8.06.030. These activities may occur at other times provided they meet the noise levels set forth in Section 8.06.030.

(a) **Construction Activities.**

(1) Construction activities between the hours of eight (8) a.m. and six (6) p.m. Monday through Friday,

(2) Residents/property owners personally undertaking construction activities to maintain or improve their property on Saturdays, Sundays or holidays between the hours of nine (9) a.m. and five (5) p.m.,

(3) A sign, containing the permitted hours of construction activities exceeding the noise limits set forth in Section 8.06.030, shall be posted at all entrances to a construction site upon the commencement of construction, for the purpose of informing contractors and subcontractors and all other persons at the construction site of the basic requirements of this chapter. The sign shall be at least five (5) feet above ground level and shall consist of a white background with black letters,

(4) Notwithstanding any other provision set forth above, all powered equipment shall comply with the limits set forth in Section 8.06.040(b);

(b) **Powered Equipment.**

(1) Powered equipment used on a temporary, occasional or infrequent basis operated between the hours of eight (8) a.m. and six (6) p.m. Monday through Friday. No piece of equipment shall generate noise in excess of eighty-five (85) dBA at fifty (50) feet,

(2) Residents/property owners personally using powered equipment to maintain their property and/or residence on Saturdays, Sundays or holidays between the hours of nine (9) a.m. and five (5) p.m. No piece of equipment shall generate noise in excess of eighty-five (85) dBA at fifty (50) feet.

(c) **Internal Fuel Combustion Engine.** Gasoline powered leaf blowers operated in accordance with and during hours as permitted by Chapter 8.07 (Leaf Blowers);

(d) **Deliveries.**

(1) Deliveries to food retailers and restaurants,

(2) Deliveries to other commercial and industrial businesses between the hours of seven (7) a.m. and six (6) p.m. Monday through Friday and nine (9) a.m. to five (5) p.m. Saturdays, Sundays and holidays;

(e) **Occasional Social Gatherings.** Occasional social gatherings between eleven (11) a.m. and eleven-thirty (11:30) p.m.; provided, the noise level for the occasional social gathering measured from any adjacent residential property does not exceed sixty-five (65) dBA;

(f) **Street Sweeping/Parking Lot Sweeping.** Street sweeping/parking lot sweeping Monday through Friday between the hours of seven (7) a.m. and six (6) p.m. anywhere in the city; and street sweeping between the hours of four-thirty (4:30) a.m. to six (6) p.m., Monday through Friday on the following streets/public parking plazas: El Camino Real, Santa Cruz Avenue (between Merrill Street and Johnson), Oak Grove Avenue (between University Drive and Merrill Street), Menlo Avenue, Doyle Street, Curtis Street, Chestnut Street, Evelyn (between Santa Cruz and Menlo Avenue), Crane Street (between Menlo Avenue and Oak Grove Avenue), Maloney Lane, Johnson Lane, University Avenue (between Menlo Avenue and Oak Grove Avenue), Merrill Street, Willow Road (between Bay Front Expressway and Middlefield Road), O'Brien Drive, Hamilton Avenue (south of Willow Road), Adams Drive, Adams Court, Casey Court, Hamilton Court, Haven Avenue, Independence Drive, Chrysler Drive, Jefferson Drive, Constitution Drive, Kelly Court, Haven Court, Commonwealth Drive, Chilco Street (from Bay Front Expressway to the Dumbarton spur railway line), and Sand Hill Road (from Highway 280 to Santa Cruz), and all public parking plazas in the central business district (the area between El Camino Real, University Avenue, Menlo Avenue and Oak Grove Avenue);

(g) **Garbage Collection.** Garbage collection Monday through Friday between the hours of six (6) a.m. to six (6) p.m., throughout the city; and between the hours of two (2) a.m. to six (6) p.m., Monday through Friday, and between the hours of six (6) a.m. and six (6) p.m., on Saturdays, for properties abutting the following streets: El Camino Real, Santa Cruz Avenue (between Merrill Street and Johnson), Oak Grove Avenue (between University Drive and Merrill Street), Menlo Avenue, Doyle Street, Curtis Street, Chestnut Street, Evelyn (between Santa Cruz and Menlo Avenue), Crane Street (between Menlo Avenue and Oak Grove Avenue), University Avenue (between Menlo Avenue and Oak Grove Avenue), Merrill Street, Willow Road (between Bay Front Expressway and Gilbert), O'Brien Drive, Hamilton Avenue (south of Willow Road), Adams Drive, Adams Court, Casey Court, Hamilton Court, Haven Avenue, Independence Drive, Kelly Court, Haven Court, Commonwealth Drive, Chilco Street (between Bayfront Expressway to the Dumbarton spur railway line), Chrysler Drive, Jefferson Drive and Constitution Drive;

(h) **Animals.** Sounds from animals or birds unless such animal or bird howls, barks, meows, squawks, or makes other noises continuously and/or incessantly for a period of five (5) minutes or intermittently for one-half (1/2) hour. For the purposes of this section, the animal or bird noise shall not be deemed a disturbance if a person is trespassing or threatening to trespass upon private property in or upon which the animal or bird is situated or if the noise is for any other legitimate cause, such as someone teasing or provoking the animal or bird. (Ord. 895 § 6, 1999; Ord. 892 § 2 (part), 1999).

8.06.050 Exemptions.

The following noise disturbances shall be exempt from the noise limitations set forth in Section 8.06.030:

(a) **Sound Generated by Motor Vehicles.** Sound generated by motor vehicles, trucks and buses operated on streets and highways, aircraft, trains, and other public transport.

(1) This exemption shall not apply to the operation of any vehicle including any equipment attached to any vehicle (such as attached refrigeration and/or heating units or any attached auxiliary equipment) for a period in excess of ten (10) minutes in any hour while the vehicle is stationary, for reasons other than traffic congestion.

(2) This exemption shall not apply to vehicles equipped with sound amplifiers which are not exempt. No person shall operate or drive any vehicle or cause any vehicle to be operated or driven, or otherwise used, on any public street, which vehicle is equipped with a sound amplifying device or other machine or device for the production or reproduction of sound, which causes sound to carry onto private property or causes sound to be heard by others using the public streets or thoroughfares which exceeds the noise levels established in Section 8.06.030;

(b) **Emergencies.** Emergency repairs that deal with health or safety risk and emergency generators or powered equipment used during a power outage or other emergency;

(c) **Emergency Warning Devices.** Emergency warning devices such as fire alarms, burglar alarms, warning devices on emergency vehicles and train horns. This exemption shall not apply to the sounding of any burglar or fire alarm or any motor vehicle burglar alarm, except for emergency purposes, unless such alarm is terminated within ten (10) minutes of activation and no more than two (2) false activations within a four (4) hour period;

(d) **City and State Projects.** City and state construction work performed by the city and/or the state, their respective agents or contractors, for city and/or state maintenance, repair or construction projects which cannot be performed from seven (7) a.m. to six (6) p.m. Monday through Friday;

(e) **Special Events.** Any event or use for which a special event permit has been issued by the city that specifically allows noise levels to be exceeded;

(f) **Use Permits.** Any use for which a use permit has been issued by the city that specifically allows noise levels to be exceeded;

(g) **Athletic Fields/Playgrounds/Parks/Public Tennis Courts/Public Recreation Facilities.** From seven (7) a.m. to ten (10) p.m. any organized athletic events or activities occurring on athletic fields, playgrounds, parks, tennis courts or other public recreation facilities owned or operated by a school district, the city or the county; provided, no amplified music or sound system is utilized. (Ord. 892 § 2 (part), 1999).

8.06.060 Temporary permits, special event permits and use permits.

(a) If an applicant can demonstrate that a diligent investigation of available noise abatement techniques indicates that compliance with the requirements of this chapter would be impractical or unreasonable, the director of community development may issue a permit to allow an exclusion from the provisions contained in all or part of this chapter with appropriate conditions to minimize the public detriment caused by such exclusions. Any such permit shall be of as short duration as possible up to three (3) months, but renewable once for up to an additional three (3) month period upon showing of good cause, and shall be conditioned upon details and a schedule for compliance.

(b) The director of community development, or his/her designee, shall have authority to issue special event permits for special events which occur no more frequently than twice per calendar year. The nature, time and notice procedures of such permit process, including criteria for approval, shall be established by the director of community development. Any person dissatisfied with the decision of the director of community development may appeal such decision within ten (10) days of the date of such decision in accordance with Section 16.92.210.

(c) If an applicant can demonstrate that a diligent investigation of available noise abatement techniques indicates that compliance with the requirements of this chapter would be impractical or unreasonable, a use permit to allow an exclusion from the provisions contained in all or part of this chapter may be issued by the planning commission pursuant to the terms and provisions of Chapter 16.82, with appropriate conditions to minimize the public detriment caused by such exclusion. (Ord. 892 § 2 (part), 1999).

8.06.065 Ministerial permits.

(a) The director of community development, or his/her designee, shall issue a permit exempting an existing industrial facility from the provisions of this chapter and the provisions of Section 16.08.095 if the following objective standards are met by the applicant:

(1) The facility is on land that is zoned for industrial uses as of the effective date of the ordinance codified in this chapter* and is located on the San Francisco Bay side of State Highway 101 and north of the Dumbarton spur railway line.

(2) The facility is at least twenty (20) acres in size. (The facility may be comprised of one (1) or more contiguous parcels under common ownership and use.)

(3) As of January 1, 1999, the facility conducted multi-shift operations that included night-time and weekend operations.

(4) All stationary sources of noise from the facility do not exceed the following noise levels as measured at a residential property line that is closest to the fence-line of the facility: sixty (60) dBA between the hours of six (6) a.m. and ten (10) p.m.; and fifty-seven (57) dBA between the hours of ten (10) p.m. and six (6) a.m. (If multiple residential property lines are the same distance from the facility fence-line and no one residence is closer, the facility operator shall carry-out qualification noise monitoring at the residential property line that receives the greatest amount of noise from the facility.) The date of the qualification noise monitoring by the applicant shall be specified by the director of community development. The qualification noise monitoring on the date specified by the director shall occur during four (4), ten (10) minute periods with one (1) each at mid-morning (nine (9) to ten (10) a.m.), mid-afternoon (three (3) to four (4) p.m.), late evening (ten (10) to eleven (11) p.m.), and early morning (five (5) to six (6) a.m.). An independent noise consultant chosen and paid for by the applicant, and subject to the approval of the director, shall conduct the qualification noise testing.

(5) The initial application for a permit pursuant to this Section 8.06.065 is filed with the director of community development within six (6) months of the effective date of this chapter.*

(b) A facility that has been issued a permit pursuant to this Section 8.06.065 shall operate its permitted facility in such a manner that all sources of noise on the facility do not exceed sixty (60) dBA as measured at residential property lines between the hours of six (6) a.m. and ten (10) p.m., or fifty-seven (57) dBA as measured at residential property lines between the hours of ten (10) p.m. and six (6) a.m.; provided, however, that mobile sources of noise on the facility (i.e., conventional over-the-road vehicles and powered industrial tractors or forklifts) may exceed the noise limits of this section for brief periods when vehicles are entering and exiting the site as part of shift changes.

(c) Every facility that is issued a permit pursuant to this Section 8.06.065 shall:

(1) Identify an individual with primary responsibility for noise monitoring and noise control at the facility;

(2) Maintain a log of any noise complaints received by the facility and a log of actions taken to respond to such complaints;

(3) Maintain a formal internal engineering review process that will ensure that any proposed changes at the facility that could significantly increase the noise from the facility are identified prior to the change and appropriately engineered so that the facility does not exceed the noise limitations specified in Section 8.06.065(b);

(4) For equipment located outside of buildings or on rooftops that is a significant noise source, at the time of replacement because of equipment breakdown, inefficiency, inadequate capacity or obsolescence, put forth a good-faith effort to replace such existing equipment with equipment that is designed and installed so as to reduce the noise level from the facility;

(5) Establish a formal inspection and preventive maintenance program for all pieces of equipment located outside of buildings or on rooftops that are significant noise sources at the facility (such a

program should be designed to prevent noise problems from developing because of mechanical problems with the equipment and to detect significant changes in equipment noise levels during inspections so as to prevent nuisance noise complaints);

(6) Undertake an annual program of noise monitoring. The annual program of monitoring shall include, at a minimum, monitoring for three (3) consecutive weekdays and two (2) consecutive weekend days during which noise monitoring measurements occur for ten (10) minute periods, four (4) times per day during: mid-morning (nine (9) to ten (10) a.m.); mid-afternoon (three (3) to four (4) p.m.); late evening (ten (10) to eleven (11) p.m.); and early morning (five (5) to six (6) a.m.). The annual program of noise monitoring shall be designed to: (A) ensure compliance with the requirements of Section 8.06.065(b); (B) identify any significant changes in noise levels; and (C) identify possible opportunities for noise reduction. The annual program shall be a self-monitoring program at the option of the facility; provided, however, the director of community development shall have discretion to periodically request independent verification of such monitoring data by an independent noise consultant chosen and paid for by the facility and subject to the approval of the director;

(7) Prepare and submit to the director of community development a report on the efforts to monitor and reduce the noise associated with the operation of the facility and to respond to any noise complaints (the noise monitoring and abatement report). The operator shall submit the noise monitoring and abatement report annually on February 1st following the issuance or renewal of a permit pursuant to this section. The noise monitoring and abatement report shall include a summary list of any noise complaints received during the reporting period and the actions taken, and describe: the results of the annual program of noise monitoring as set forth above; ongoing monitoring and maintenance of existing equipment in order to control noise; any specific noise reduction efforts during the reporting period, including specific projects and capital outlays, to reduce the amount of noise from the permitted facility; and any future plans to attempt to further reduce the noise generated from the operation of the facility.

(d) A permit issued pursuant to this Section 8.06.065 may be revoked by the director of community development if the director establishes by a preponderance of the evidence that sources of noise from the facility consistently exceeded the limits as specified above in Section 8.06.065(b) for eight (8) days within any twenty-eight (28) day period, except for construction work undertaken by the facility under a city building permit and conducted between the hours of eight (8) a.m. and six (6) p.m. Monday through Friday.

(e) A permit issued pursuant to this Section 8.06.065 shall be valid for an initial term of ten (10) years. A facility may apply for the renewal of a permit at any time prior to the expiration of the prior permit. The term of any renewed permit shall be five (5) years.

(f) Any decision of the director of community development pursuant to this Section 8.06.065 shall be subject to appeal as provided in Section 16.92.210. (Ord. 892 § 2 (part), 1999).

* **Editor's Note:** Ordinance 892, which enacted Chapter 8.06, is effective on May 20, 1999.

8.06.070 Time for compliance.

(a) Nonresidential operations in existence prior to May 20, 1999, shall be granted a six (6) month period within which to comply with provisions of this chapter. Any facility not in compliance by the end of such six (6) month period may apply for a temporary permit, as described in Section 8.06.060(a) to be excluded from the provisions of this chapter. This section shall apply only to nonresidential facilities already in existence or for which work of improvement had commenced prior to the date this chapter went into effect.*

(b) Except as provided in subsection (a) of this section, or as provided in Section 8.06.065, all other operations in existence prior to the date this chapter went into effect* shall have three (3) months to comply with the provisions of this chapter or apply for a temporary permit for additional time to comply. (Ord. 892 § 2 (part), 1999).

* **Editor's Note:** Ordinance 892, which enacted Chapter 8.06, is effective on May 20, 1999.

8.06.080 Administration.

The provisions of this chapter shall be administered by the chief of police and his or her authorized representatives, except where expressly provided otherwise. All other officers and employees of the city shall assist and cooperate in the administration and enforcement of this chapter. (Ord. 892 § 2 (part), 1999).

8.06.090 Violations.

First time violators will be warned and subsequent violations of the provisions of this chapter shall be guilty of an infraction and shall be punished as provided in Chapter 1.12.010(b). (Ord. 892 § 2 (part), 1999

Chapter 16.78
SPECIAL USES

Sections:

16.78.010 Generally.

All of the uses listed in this chapter, and all matters directly related thereto are declared to be uses possessing characteristics of such unique and special form as to make impractical their inclusion in any class or use set forth in the various districts herein defined, and therefore the authority for and location of the operation of any of the uses designated herein shall be subject to the issuance of a use permit in accordance with the provision of Chapter 16.82. (Prior code § 30.503 (part)).

16.78.020 Consideration factors prior to permit issuance.

In addition to the criteria for determining whether or not a use permit should be issued as set forth in Chapter 16.82, the planning commission shall consider the following additional factors to determine that the characteristics of the listed uses will not be unreasonably incompatible with uses permitted in surrounding areas:

(1) Damage or nuisance from noise, smoke, odor, dust or vibration;

(2) Hazard from explosion, contamination or fire;

(3) Hazard occasioned by unusual volume or character of traffic or the congregation of a large number of people or vehicles. (Prior code § 30.503 (part)).

16.78.030 Uses designated.

The uses referred to in this chapter are as follows:

(1) Heliports, except in residential zoning districts;

(2) Cemeteries, except in residential zoning districts;

(3) The mining of natural mineral resources, together with the necessary building and appurtenances incident thereto, except in residential zoning districts;

(4) Removal or deposit of earth other than excavations or deposits in connection with construction of buildings, roadways or public improvements, except in residential zoning districts;

(5) Secondhand stores, except in residential zoning districts;

(6) Adult entertainment establishments, except in residential zoning districts;

(7) Retail sale of beer, wine, alcoholic beverages off sale or on sale, except in residential zoning districts;

(8) Massage establishment, except in residential zoning districts;

(9) Retail sale of drug paraphernalia, except in residential zoning districts;

(10) Storage for recreational vehicles, except in residential zoning districts;

(11) Recycling centers for empty beverage containers pursuant to the California Beverage Container Recycling and Litter Redemption Act, except in single-family residential and R-2 zoning districts;

(12) Well-patient/short stay facility for surgery, medical and post operative care, requiring overnight stay except in residential zoning districts;

(13) Recreational facilities privately operated, except in residential zoning districts;

(14) Private schools and churches. Churches shall have a minimum site area of twenty thousand square feet;

(15) Emergency services facilities, except in residential zoning districts;

(16) Child care centers;

(17) Retail sale or wholesale of firearms, cannons, guns, pistols, revolvers, rifles, air guns, BB guns or pellet guns or any instruments of any kind, character or description which throw or project bullets or missiles of any kind to any distance by means of elastic force, air or any explosive substance; ammunition or any projectiles that can be projected or propelled; and related merchandise, except within one hundred fifty feet (150’) of residential zoning districts. (Ord. 893 § 1, 1999; Ord. 845 § 1, 1993; Ord. 808 § 1, 1990; Ord. 805 § 2, 1990; Ord. 786 § 9, 1988: Ord. 780 § 1, 1988; Ord. 757 § 1, 1987; Ord. 656 § (a), 1980; Ord. 654 § (a), 1980; Ord. 575 § 2, 1975; Prior code § 30.503 (part)).

Noise Measurements

Existing ambient noise levels were measured at 16 locations in the City to document representative noise levels at several locations. These locations are shown on Figure 4.10-1. Short-term (ST) noise level measurements were taken at thirteen locations for a minimum period of 15 minutes during the daytime on December 6, 2012 and December 10, 2012, all between the hours of 10:00 a.m. and 6:00 p.m.

Long-term (LT) noise level measurements were taken at three locations for a period of 24 hours on December 10 and 11, 2012. The noise levels were measured using a Larson-Davis Model 820 sound level meter, which satisfies the American National Standards Institute for Type 1 general environmental noise measurement instrumentation. The sound level meter and microphone were mounted on a tripod 5 feet above the ground and equipped with a windscreen during all short-term measurements. For long-term measurements, the microphone and windscreen were attached to available objects including a fence and two sturdy trees/shrubs.

The sound level meters were programmed to record noise levels with the "slow" time constant and using the "A" weighting filter network. Meteorological conditions during the measurement periods were favorable and were noted to be representative of typical conditions for the season. Generally, conditions included clear to partly cloudy skies, daytime temperatures of approximately 60 to 70 degrees Fahrenheit (°F), and less than 5-mile-per-hour winds. The following describes the noise level measurement locations:

Long-Term Location 1

Long-term noise monitoring Location 1 was located in a grassy area adjacent to a Union Pacific railway and directly across the street from the U.S. Post Office at 3875 Bohannon Drive. The microphone was positioned approximately 20 feet from the centerline of Bohannon Drive and 64 feet from the center of the adjacent railroad track. 24-hour noise readings commenced at 2:20 p.m. on Monday, December 10, 2012, at which time the air temperature was 68°F and winds were less than 5 miles per hour (mph).

In addition to the adjacent post office, immediate nearby land use to long-term Location 1 is primarily commercial, with moderately-sized, freestanding office buildings with surrounding parking lots. Some light industrial uses, primarily warehousing, are located approximately 500 feet to the east of the site, and residential uses are present approximately 450 feet to the west of the site and 100 feet to the south, across the railroad tracks. The noise environment of this site was characterized primarily by noise from vehicles along Marsh Road and Bohannon Drive, as well as in the post office parking lot and loading area. Noise from more distant traffic along Highway 101 was also noted. Given the site's close proximity to the post office, it is likely that the area experiences additional noise at certain times of day by deliveries and vehicle arrivals and departures. Though there is a railroad track adjacent to the site, this railway terminates shortly past the site and is currently little used. Consequently, no train passages were noted during site set up, and it is possible that none occurred during the monitoring period.

Long-Term Location 2

Long-term noise monitoring Location 2 was located in a landscaped area adjacent to a parking lot serving a collection of commercial buildings at 155 Linfield Road, adjacent to its intersection with Middlefield Road. The microphone was positioned 55 feet from the centerline of Middlefield Road and 40 feet from the centerline of Linfield Drive. 24-hour noise readings commenced at 4:00 p.m. on Monday, December 10, 2012, at which time the temperature was 67°F and the winds were calm.

Land uses surrounding long-term Location 2 are generally commercial, with small office buildings and associated parking lots. The area across Middlefield Road from the site is characterized by mix of governmental and religious institutional uses, including the Menlo Park Fire Department and St. Patrick's Seminary and University. Additional, residential land uses can be found approximately 550 feet to both the southwest and northeast of this site. The noise environment of Location 2 was dominated by the sound of traffic along Middlefield Road. Though no other noises were noted as making significant contributions to the noise environment, it is likely that emergency vehicles from the adjacent fire station do occasionally contribute to the noise environment and that other noises may become discernible at times of low traffic along Middlefield Road.

Long-Term Location 3

Long-term noise monitoring Location 3 was located in a heavily treed strip located between Sand Hill Road and the parking area for the Sharon Heights Country Club. The microphone was positioned at the following approximate distances: 50 feet from the centerline of a local-access segment of Sand Hill Road; 160 feet from the centerline of the west-bound lanes of the main Sand Hill Road; 310 feet from the centerline of the east-bound lanes of the main Sand Hill Road; and 780 feet from the centerline of nearby Interstate 280. The 24-hour noise readings commenced at 5:02 p.m. on Monday, December 10, 2012, at which time the air temperature was 58°F and winds were calm.

Roadways and parking lots are the primary land uses in the immediate vicinity of long-term Location 3, and the nearest non-transportation, human-occupied structures are located 330, 430, and 500 feet from the site. Aside from the country club, nearby land uses are commercial and research and development offices. The nearest residential uses are approximately 750 feet from the site. The noise environment of long-term Location 3 is heavily dominated by traffic along Interstate 280 and Sand Hill Road, especially traffic using Sand Hill road to access Interstate 280. Traffic noise at this site was constant and sufficiently loud as to prevent the discernment of any other significant noise sources.

Short-Term Location 1

Short-term noise monitoring Location 1 was located on the site of a vacant commercial structure at 557 Willow Road on the northwest side of the street. The microphone and sound meter were positioned approximately 45 feet from the centerline of Willow Road. Fifteen minutes of noise measurements were taken beginning at 3:57 p.m. on Thursday, December 6, 2012, at which time the air temperature was 58°F and winds were calm.

Land uses in the vicinity of short-term Location 1 consisted primarily of low-to-medium density residential and low-intensity commercial, with a small surgical hospital located across Willow Road. The noise environment of the site is dominated by traffic along Willow Road and at its intersection with Coleman Avenue. Some noise from aircraft was also briefly noted at the site.

Short-Term Location 2

Short-term noise monitoring Location 2 was located adjacent to the sidewalk on an industrial property at 3705 Haven Avenue. The microphone and sound meter were positioned approximately 40 feet from the centerline of Haven Avenue. Fifteen minutes of noise measurements were taken beginning at 2:38 p.m. on Monday, December 10, 2012, at which time the air temperature was 68°F and winds were calm.

Land uses in the vicinity of short-term Location 2 are primarily light to medium industrial, with some incidental office uses. The nearest non-industrial uses are medium-density residential uses located approximately 700 feet to the southwest of the site across Highway 101. The noise environment of short-term Location 2 was dominated by the sound of passing cars and trucks on Haven Avenue, as well as by the ongoing background noise of traffic along Highway 101. Additional noise included the sound of idling vehicles visiting the industrial uses along Haven Avenue, as well as the occasional sound of distant machinery.

Short-Term Location 3

Short-term noise monitoring Location 3 was located in an area of landscaped grass and shrubs adjacent to a small strip commercial center on the northwest corner of the intersection of Hamilton Avenue and Willow Road. The microphone and sound meter were positioned approximately 230 feet from Hamilton Avenue, 320 feet from the centerline of Willow Road, and 60 feet from the center of the adjacent Union Pacific railway. 15 minutes of noise measurements were taken beginning at 4:55 p.m. on Thursday, December 6, 2012, at which time the air temperature was 56°F and winds were calm.

The land uses immediately adjacent to short-term Location 3 are a mix of low-intensity commercial retail and light industrial. Adjacent commercial uses currently include mostly small, quick-service restaurants, as well as a service station, located across Hamilton Avenue from the site. The existing adjacent light industrial uses relate primarily to storage and distribution, with some industrial research and development located across Willow Road from the site. The railroad located adjacent to the site is near the end of the same rail line mentioned in the description of long-term monitoring Location 1. Likely due to the lack of train connections and relatively few industrial operations that appear to use the line, no train passages were observed at short-term Location 3, and it is likely that very few trains pass through this are on a regular basis. The current noise environment of this site is dominated by the sound of passing traffic along Willow Road, the Bayfront Expressway, and Hamilton Avenue. Other sources of noise included vehicles and human voices in the parking lot of the small strip retail center.

Short-Term Location 4

Short-term noise monitoring Location 4 was located in a shared yard adjacent to a parking area serving multiple medium-density apartment buildings in the vicinity of 1307 Willow Road. The parking area and adjacent yard were separated from Willow road by a low stone wall approximately 4 feet in height. The microphone and sound meter were positioned approximately 102 feet from the centerline of Willow Road and 60 feet from the low wall. Fifteen minutes of noise measurements were taken beginning at 4:29 p.m. on Thursday, December 6, 2012, at which time the air temperature was 56°F and winds were calm.

Land uses immediately adjacent to Location 4 were primarily medium-density, multi-family residential with a small stand-alone retail market located approximately 116 feet to the southwest of the site. Land uses across Willow Street from the site were primarily industrial. The noise environment of short-term Location 4 was characterized mainly by the sound of passing traffic along Willow Road, but also included the frequent sounds of passing vehicles and people in the parking area of the apartment buildings. Additional noise came from a passing school bus, as well as from the arrival, departure, and idling of large trucks serving the industrial uses across Willow Road.

Short-Term Location 5

Short-term noise monitoring Location 5 was located in a grassy landscaped area adjacent to a currently vacant, low-intensity office building. The microphone and sound meter were positioned approximately 740 feet from the centerline of Middlefield Road, 40 feet from the centerline of Homewood Place, and 60 feet from the centerline of Linfield Drive. 15 minutes of noise measurements were taken beginning at 1:50 p.m. on Thursday, December 6, 2012, at which time the air temperature was 59°F and winds were less than 5 mph.

The land uses immediately adjacent to short-term Location 5 are a mix of single-family and low-density multifamily residential, with additional low-intensity office uses located immediately to the northwest and approximately 330 feet to the northeast of the site. The site was notably quiet with most noise coming from the occasional passing of vehicles along Linfield Drive and, to a lesser extent, Homewood Place. It was also possible to discern the sound of distant traffic on Middlefield road, as well as occasional noise from small aircraft and from human activity in the adjacent neighborhood.

Short-Term Location 6

Short-term noise monitoring Location 6 was located on a sidewalk adjacent to a large parking lot serving Downtown Menlo Park. The microphone and sound meter were positioned approximately 20 feet from the centerline of Crane Street and 30 feet from the centerline of Oak Grove Avenue. 15 minutes of noise measurements were taken beginning at 2:32 p.m. on Thursday, December 6, 2012, at which time the air temperature was 60°F and winds were calm.

Land uses surrounding short-term Location 6 are primarily commercial, with a mixture of low-to-medium intensity office and small retail shops. The area immediately adjacent to the site is entirely devoted to parking which serves downtown Menlo Park. Some scattered, low and medium density residential uses are present in the general vicinity of the site, with the nearest residential use located about 275 feet to the Northwest of the site. The noise environment of Location 6 is dominated by the sound of passing traffic along Crane Street and Oak Grove Avenue. Other noise included the sound of passing people, as well as sounds from the adjacent parking lot. It was also possible to hear the distant sound of trains and train whistles from the Caltrain tracks approximately 0.3-mile to the northeast.

Short-Term Location 7

Short-term noise monitoring Location 7 was located in the center median of Sharon Park Drive at its intersection with Sand Hill Road. The microphone and sound meter were positioned approximately on the centerline of Sharon Park Drive and approximately 100 feet from the centerline of Sand Hill Road. Fifteen minutes of noise measurements were taken beginning at 11:12 a.m. on Thursday, December 6, 2012, at which time the air temperature was 58°F and winds were less than 5 mph.

The land uses immediately surrounding short-term Location 7 include low-intensity commercial and low-density residential. The adjacent commercial use is a busy neighborhood-serving shopping center; additional commercial office uses are also present as near as approximately 550 feet from the site. The noise environment of Location 7 is dominated by the sound of traffic on both Sand Hill Road and Sharon Park Drive, and no other significant sources of noise could be discerned.

Short-Term Location 8

Short-term noise monitoring Location 8 was located in a small landscaped area adjacent to a single-family home at the intersection of North Lemon and Santa Cruz Avenues. The microphone and sound meter were positioned approximately 40 feet from the centerline of Santa Cruz Avenue and 32 feet from the Centerline of North Lemon Avenue. Fifteen minutes of noise measurements were taken beginning at 11:48 a.m. on Thursday, December 6, 2012, at which time the air temperature was 59°F and winds were calm.

Land use in the vicinity of Location 8 is entirely single-family residential with some scattered educational and religious institutional uses. The nearest commercial land uses are more than 0.33-mile from the site. The noise environment of Location 8 is characterized primarily by traffic along Santa Cruz Avenue. Although it was possible at times to discern other noises from the surrounding neighborhood, vehicle traffic is the dominant source of noise.

Short-Term Location 9

Short-term noise monitoring Location 9 was located at the intersection of Alma Street and Burgess Drive, on a sidewalk adjacent to a parking area serving the athletic fields at the Menlo Park Civic Center. The microphone and sound meter were positioned approximately 35 feet from the centerline of Burgess Avenue, 50 feet from the Centerline of Alma Street, and 140 feet from the center of the Caltrain railroad tracks. 15 minutes of noise measurements were taken beginning at 12:56 p.m. on Thursday, December 6, 2012, at which time the air temperature was 59°F and wind speeds were less than 5 mph.

The land uses immediately surrounding short-term Location 9 include recreational, medium-density residential, and low-intensity commercial office. Other nearby land uses include single-family residential, commercial retail, and civic uses. The noise environment of Location 9 was characterized by the sound of passing traffic, primarily that on Alma Street. Other notable sources of noise included team sports on the adjacent athletic fields, sound from passing pedestrians, and the passage of a train on the Caltrain tracks.

Short-Term Location 10

Short-term noise monitoring Location 10 was located across from 1090 Creek Drive, alongside San Francisquito Creek on the southeastern border of Menlo Park. The microphone and sound meter were positioned approximately 12 feet from the centerline of Creek Drive. The 15 minutes of noise measurements were taken beginning at 3:11 p.m. on Thursday, December 6, 2012, at which time the air temperature was 59°F and winds were calm.

The land uses immediately adjacent to short-term Location 10 are entirely single-family residential; however, institutional uses and medium-density senior-living facilities are located across San Francisquito Creek, at respective distances of 300 and 225 feet from the site. It should be noted that these land uses fall within the City of Palo Alto. Additionally, there exists a small community-center type use along Arbor Road, approximately 320 feet from the site. Location 10 was situated on a narrow street in a notably quiet area, and its noise environment was most consistently characterized by the faint sound of distant traffic, with only an occasional vehicle passage along Creek Drive. Other common sounds included human activity in the surrounding neighborhood, as well as the sound of water in San Francisquito Creek. More occasionally, it was possible to discern the sound of small aircraft and distant train whistles.

Short-Term Location 11

Short-term noise monitoring Location 11 was located at 333 Ravenswood Avenue in a treed landscaped area between Ravenswood Avenue and a parking area serving a large-scale institutional use. The microphone and sound meter were positioned approximately 50 feet from the centerline of Ravenswood Avenue. The property across Ravenswood Avenue from the monitoring site included a long cinderblock soundwall, approximately 12 feet in height. The 15 minutes of noise measurements were taken beginning at 1:22 p.m. on Thursday, December 6, 2012, at which time the air temperature was 58°F and wind speeds were less than 5 mph.

The area surrounding short-term Location 11 was dominated by the institutional land use of SRI International, a research institution associated with Stanford University. Though currently undeveloped, the area immediately across Ravenswood Avenue from the site—and located behind the sound-wall noted above—is also institutional to and belongs the Corpus Christi Monastery. Other nearby land uses include low- to medium-density residential, low-intensity commercial, and other institutional uses. The noise environment of Location 11 was dominated by passing traffic along Ravenswood Avenue, and no other significant sources of noise were readily discernible.

Short-Term Location 12

Short-term noise monitoring Location 12 was located at 1140 Arbor Road adjacent to a small parking lot serving a private, parochial elementary school. The microphone and sound meter were positioned approximately 16 feet from the centerline of Arbor Road, 45 feet from the adjacent school building, and 360 feet from the centerline of Santa Cruz Avenue. The 15 minutes of noise measurements were taken beginning at 12:18 p.m. on Thursday, December 6, 2012, at which time the air temperature was 59°F and winds were calm.

Aside from the adjacent church and associated parochial school, land uses immediately surrounding Location 12 are entirely single family residential, with some more distant low-intensity multi-family uses.

The nearest non-residential land uses are commercial retail, located approximate 1,100 feet to the northeast of the site. The noise environment of Location 12 was characterized primarily by the sound of children at play in the schoolyard of the adjacent elementary school, with occasional vehicle passages on Arbor Road. At times it was also possible to hear the sound of distant traffic on Santa Cruz Avenue. Otherwise, no significant sources of noise were noted.

Short-Term Location 13

Short-term noise monitoring Location 13 was located in a small unpaved area at 2199 Sharon Road, at its intersection with Altschul Avenue. The microphone and sound meter were positioned approximately 24 feet from the centerline of Sharon Road and 32 feet from the centerline of Altschul Avenue. The microphone was also located approximately 5 feet from an area of shrubbery; however no fence or wall was present. The 15 minutes of noise measurements were taken beginning at 10:20 a.m. on Thursday, December 6, 2012, at which time the air temperature was 57°F and wind speeds were less than 5 mph.

Land uses immediately adjacent to short-term Location 13 included the institutional use of a public middle school as well as both single-family, low-density residential and multi-family, medium-density residential. The nearest commercial uses are located approximately 1,100 feet to the north of the site. The noise environment of Location 13 was characterized primarily by the sound of passing vehicles, primarily on Sharon Road, as well as by the sound of children at play at the adjacent middle school. Other sources of noise included birds and occasional passersby. No other significant sources of noise were noted.

Site Name: LT-1

Number of one-hour measurements: 24

Unweighted Leq: 61.38382 **CNEL:** 67.0549 **LDN:** 66.81009

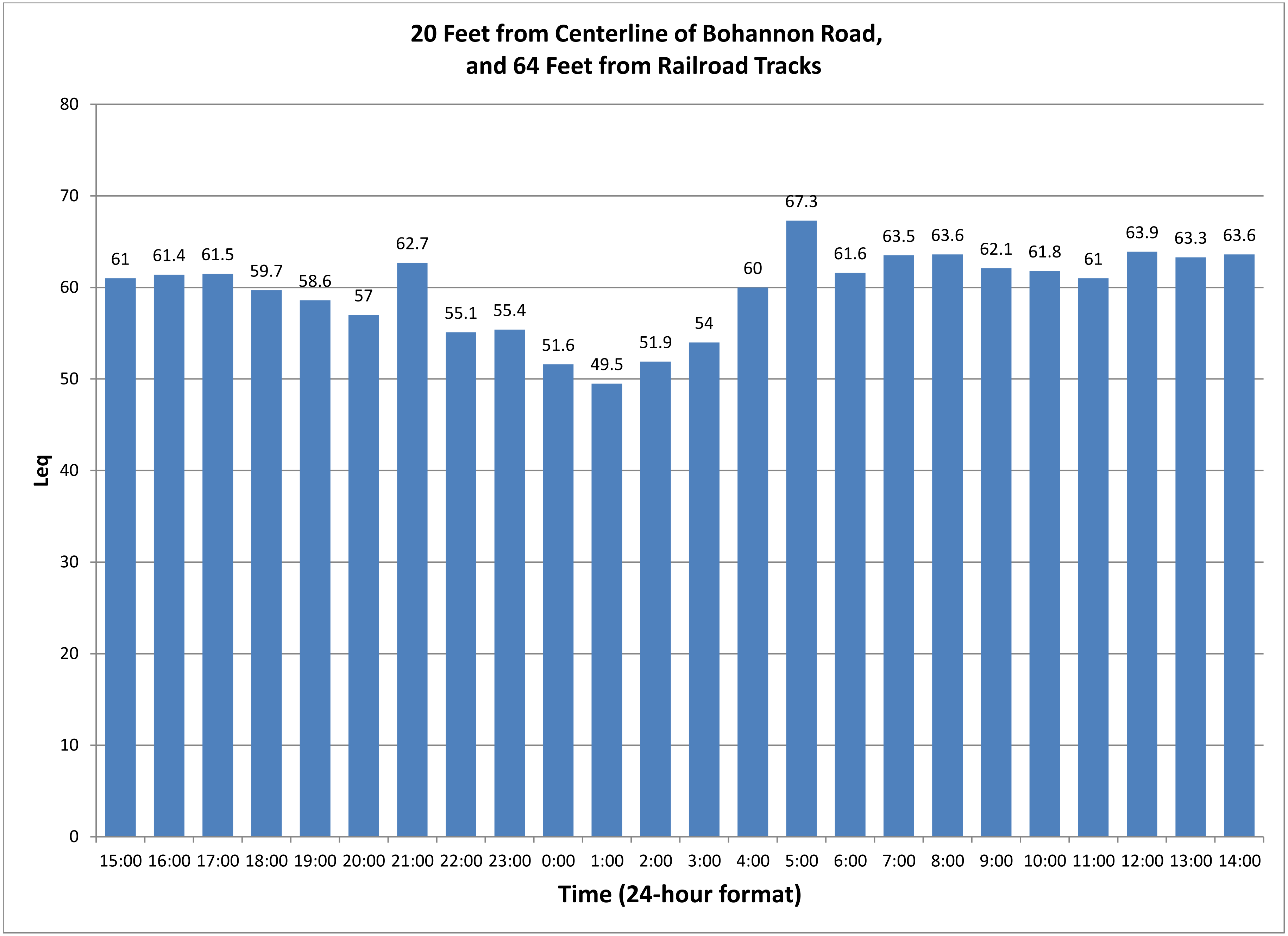
Hour	Time	Leq	CNEL Penalty	Adj. Leq	LDN Penalty	Adj. Leq
1	15:00	61	0	61	0	61
2	16:00	61.4	0	61.4	0	61.4
3	17:00	61.5	0	61.5	0	61.5
4	18:00	59.7	0	59.7	0	59.7
5	19:00	58.6	5	63.6	0	58.6
6	20:00	57	5	62	0	57
7	21:00	62.7	5	67.7	0	62.7
8	22:00	55.1	10	65.1	10	65.1
9	23:00	55.4	10	65.4	10	65.4
10	0:00	51.6	10	61.6	10	61.6
11	1:00	49.5	10	59.5	10	59.5
12	2:00	51.9	10	61.9	10	61.9
13	3:00	54	10	64	10	64
14	4:00	60	10	70	10	70
15	5:00	67.3	10	77.3	10	77.3
16	6:00	61.6	10	71.6	10	71.6
17	7:00	63.5	0	63.5	0	63.5
18	8:00	63.6	0	63.6	0	63.6
19	9:00	62.1	0	62.1	0	62.1
20	10:00	61.8	0	61.8	0	61.8
21	11:00	61	0	61	0	61
22	12:00	63.9	0	63.9	0	63.9
23	13:00	63.3	0	63.3	0	63.3
24	14:00	63.6	0	63.6	0	63.6

Site Description

Long-term noise monitoring Site 1 was located in a grassy area adjacent to a Union Pacific railway and directly across the street from the U.S. Post Office at 3875 Bohannon Drive. The microphone was positioned approximately 20 feet from the centerline of Bohannon Drive and 64 feet from the center of the adjacent railroad track, and was attached to an immobile chain-link fence at a height of approximately 5.5 feet. There were no obstructions or noise-reflective surfaces in the immediate vicinity of the microphone. 24-hour noise readings commenced at 2:20 PM on Monday, December 10th, 2012, at which time the air temperature was 68 degrees Fahrenheit and winds were less than 5 mph.

In addition to the adjacent post office, immediate nearby land use to long-term Site 1 is primarily commercial, with moderately-sized, freestanding office buildings with surrounding parking lots. Some light industrial uses, primarily warehousing, are located approximately 500 feet to the east of the site, and residential uses are present approximately 450 feet to the west of the site and 100 feet to the south, across the railroad tracks. The noise environment of this site was characterized primarily by noise from vehicles along Marsh Road and Bohannon Drive, as well as in the post office parking lot and loading area. Noise from more distant traffic along Highway 101 was also noted. Given the site's close proximity to the post office, it is likely that the noise environment is dominated at certain times of day by deliveries and vehicle arrivals and departures. However it should be noted that the microphone was positioned such that there was not direct line of sight of the post office vehicle

LT-1 Histrogram



Site Name: LT-2
Number of one-hour measurements: 24
Unweighted Leq: 65.77811 **CNEL:** 68.5997 **LDN:** 68.18911

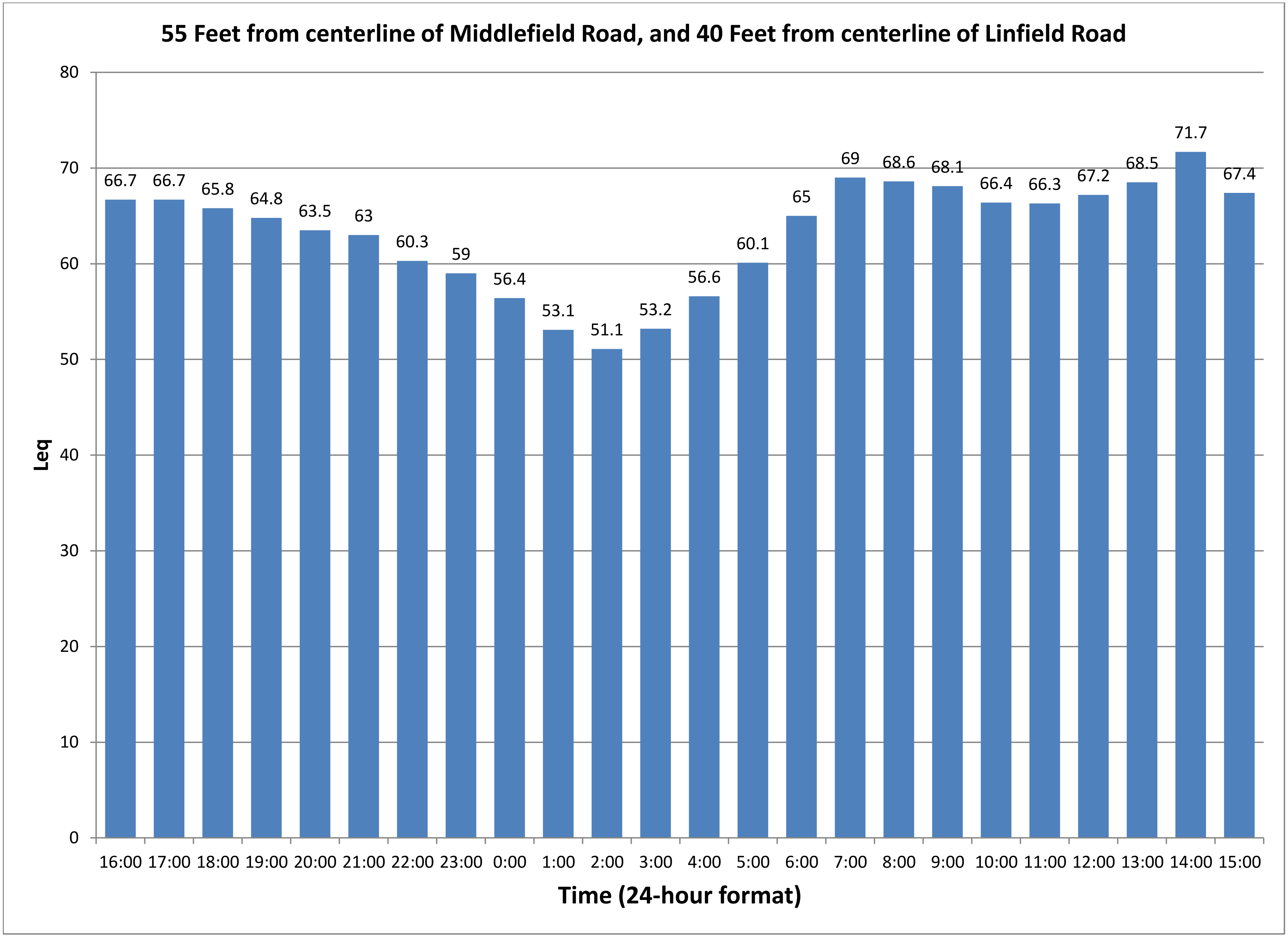
Hour	Time	Leq	CNEL Penalty	Adj. Leq	LDN Penalty	Adj. Leq
1	16:00	66.7	0	66.7	0	66.7
2	17:00	66.7	0	66.7	0	66.7
3	18:00	65.8	0	65.8	0	65.8
4	19:00	64.8	5	69.8	0	64.8
5	20:00	63.5	5	68.5	0	63.5
6	21:00	63	5	68	0	63
7	22:00	60.3	10	70.3	10	70.3
8	23:00	59	10	69	10	69
9	0:00	56.4	10	66.4	10	66.4
10	1:00	53.1	10	63.1	10	63.1
11	2:00	51.1	10	61.1	10	61.1
12	3:00	53.2	10	63.2	10	63.2
13	4:00	56.6	10	66.6	10	66.6
14	5:00	60.1	10	70.1	10	70.1
15	6:00	65	10	75	10	75
16	7:00	69	0	69	0	69
17	8:00	68.6	0	68.6	0	68.6
18	9:00	68.1	0	68.1	0	68.1
19	10:00	66.4	0	66.4	0	66.4
20	11:00	66.3	0	66.3	0	66.3
21	12:00	67.2	0	67.2	0	67.2
22	13:00	68.5	0	68.5	0	68.5
23	14:00	71.7	0	71.7	0	71.7
24	15:00	67.4	0	67.4	0	67.4

Site Description

Long-term noise monitoring Site 2 was located in a landscaped area adjacent to a parking lot serving a collection of commercial buildings at 155 Linfield Road, adjacent to its intersection with Middlefield Road. The microphone was firmly attached to a shrub at a height of approximately 5 feet and was positioned 55 feet from the centerline of Middlefield Road and 40 feet from the centerline of Linfield Drive. 24-hour noise readings commenced at 4:00 p.m. on Monday, December 10th, 2012, at which time the temperature was 67 degrees Fahrenheit and the winds were calm.

Land uses surrounding long-term Site 2 are generally commercial, with small office buildings and associated parking lots. The area across Middlefield Road from the site is characterized by mix of governmental and religious institutional uses, including the Menlo Park Fire Department and St. Patrick's Seminary and University. Additional, residential land uses can be found approximately 550 feet to both the southwest and northeast of this site. The noise environment of Site 2 was dominated by the sound of traffic along Middlefield Road. Though no other noises were noted as making significant contributions to the noise environment, it is likely that emergency vehicles from the adjacent fire station do occasionally contribute to the noise environment and that other noises may become discernible at times of low traffic along Middlefield Road.

LT-2 Histrogram



Site Name: LT-3

Number of one-hour measurements: 24

Unweighted Leq: 62.95346 **CNEL:** 67.4756 **LDN:** 66.91048

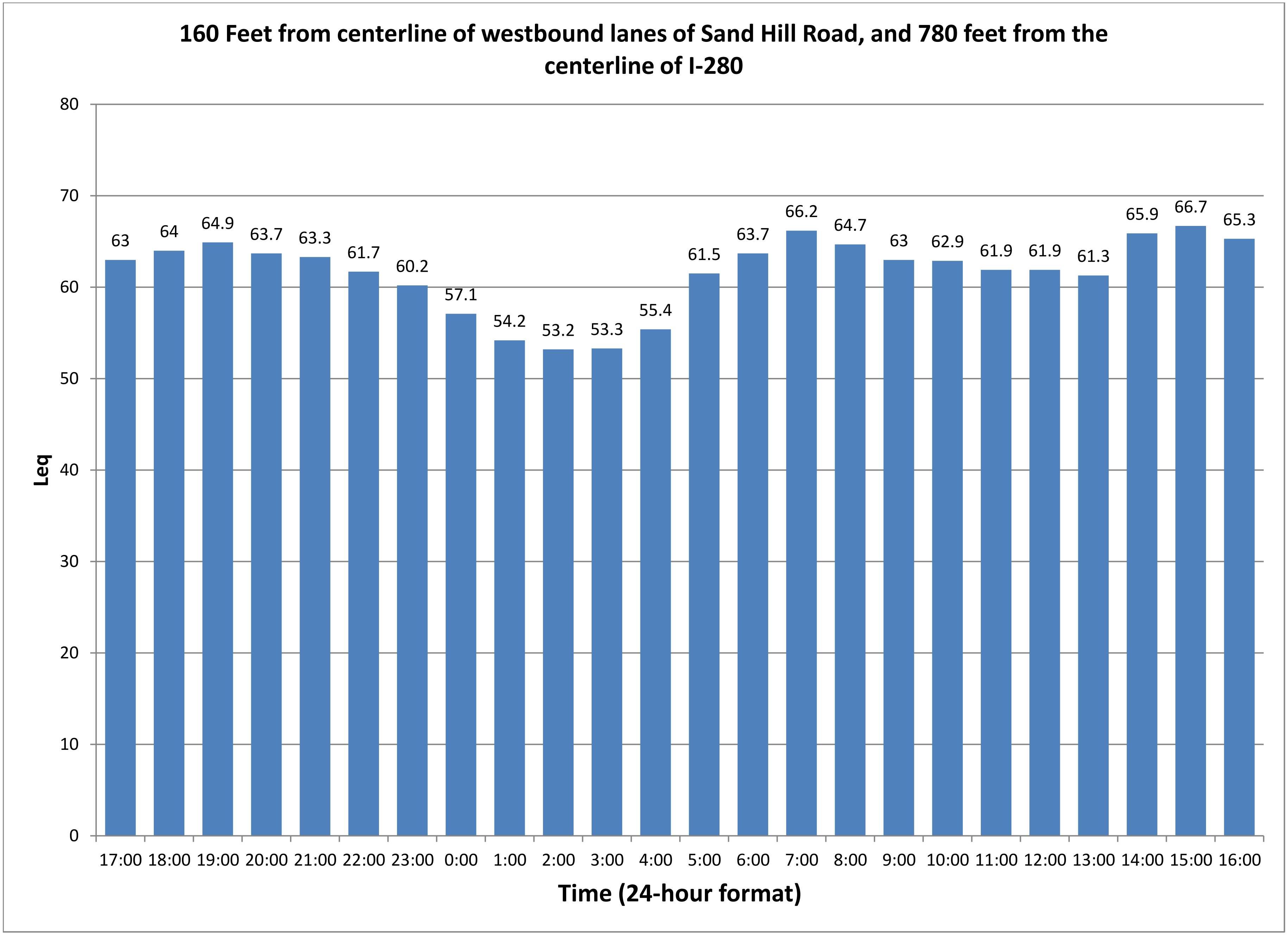
Hour	Time	Leq	CNEL Penalty	Adj. Leq	LDN Penalty	Adj. Leq
1	17:00	63	0	63	0	63
2	18:00	64	0	64	0	64
3	19:00	64.9	5	69.9	0	64.9
4	20:00	63.7	5	68.7	0	63.7
5	21:00	63.3	5	68.3	0	63.3
6	22:00	61.7	10	71.7	10	71.7
7	23:00	60.2	10	70.2	10	70.2
8	0:00	57.1	10	67.1	10	67.1
9	1:00	54.2	10	64.2	10	64.2
10	2:00	53.2	10	63.2	10	63.2
11	3:00	53.3	10	63.3	10	63.3
12	4:00	55.4	10	65.4	10	65.4
13	5:00	61.5	10	71.5	10	71.5
14	6:00	63.7	10	73.7	10	73.7
15	7:00	66.2	0	66.2	0	66.2
16	8:00	64.7	0	64.7	0	64.7
17	9:00	63	0	63	0	63
18	10:00	62.9	0	62.9	0	62.9
19	11:00	61.9	0	61.9	0	61.9
20	12:00	61.9	0	61.9	0	61.9
21	13:00	61.3	0	61.3	0	61.3
22	14:00	65.9	0	65.9	0	65.9
23	15:00	66.7	0	66.7	0	66.7
24	16:00	65.3	0	65.3	0	65.3

Site Description

Long-term noise monitoring Site 3 was located in a heavily treed strip located between Sand Hill Road and the parking area for the Sharon Heights Country Club. The microphone was securely affixed to a sturdy tree branch at a height of approximately 5 feet above the ground, and was positioned at the following distances: approximately 50 feet from the centerline of a local-access segment of Sand Hill Road; 158 feet from the centerline of the west-bound lanes of the main Sand Hill Road; 310 feet from the centerline of the east-bound lanes of the main Sand Hill Road; and 780 feet from the centerline of nearby Interstate 280. 24-hour noise readings commenced at 5:02 PM on Monday, December 10th, 2012, at which time the air temperature was 58 degrees Fahrenheit and winds were calm.

Roadways and parking lots are the primary land uses in the immediate vicinity of long-term Site 3, and the nearest non-transportation, human-occupied structures are located 330, 430, and 500 feet from the site. Aside from the country club, nearby land uses are commercial and research and development offices. The nearest residential uses are approximately 750 feet from the site. The noise environment of long-term Site 3 is heavily dominated by traffic along I-280 and Sand Hill Road, especially traffic using Sand Hill road to access I-280. Traffic noise at this site was constant and sufficiently loud as to prevent the discernment of any other significant noise sources.

LT-3 Histrogram



Site: ST-1

Number of one-minute measurements 15

Average Leq: 67.31478

Minute	**L**eq
1	66.2
2	69.5
3	66.2
4	69.2
5	65.7
6	69
7	67.4
8	67
9	62.1
10	67.7
11	65.9
12	69.5
13	65.1
14	68.1
15	64.9

Site: ST-2
Number of one-minute measurements 15
Average Leq: 63.46009

Minute	**L**eq
1	59.2
2	64.3
3	58.2
4	58.8
5	60.9
6	62.9
7	62.1
8	59.9
9	65.8
10	69.7
11	61.8
12	60.8
13	58.3
14	67.8
15	60.5

Site: ST-3
Number of one-minute measurements 15
Average Leq: 56.47022

Minute	**L**eq	
1	56.7	
2	57.8	
3	57.4	
4	54.4	
5	57.1	
6	55.9	
7	56.2	
8	55.4	* Original minute 8 exlcuded due to uncharacteristic noice occurrence
9	57.7	
10	57.6	
11	55.1	
12	57	
13	56.2	
14	55	
15	55.7	

Site: ST-4
Number of one-minute measurements 15
Average Leq: 59.5463

Minute	**L**eq	
1	60.2	
2	57.5	
3	55.5	
4	58.9	
5	54.5	
6	56.7	
7	60.9	
8	57.9	
9	57.9	
10	57.7	*Original minute 10 excluded due to uncharacteristic noice occurrence
11	59.3	
12	62.9	
13	57.4	
14	61.4	
15	63.5	

Site: ST-5
Number of one-minute measurements 15
Average Leq: 55.86592

Minute	**L**eq
1	47.2
2	47.3
3	56
4	51.2
5	62.8
6	49.7
7	55
8	56.3
9	54.1
10	56.5
11	57.7
12	55.6
13	54.8
14	49.2
15	55.7

Site: ST-6
Number of one-minute measurements 15
Average Leq: 62.93902

Minute	**L**eq
1	60.5
2	62.3
3	67.5
4	60.3
5	61.1
6	62.2
7	66.3
8	62.9
9	64.4
10	61.1
11	60.6
12	62.6
13	60.8
14	60.7
15	61.6

Site: ST-7
Number of one-minute measurements 15
Average Leq: 69.05477

Minute	**L**eq
1	69.2
2	66.9
3	68.8
4	71.8
5	72.8
6	69.6
7	67
8	68.1
9	69.7
10	69.7
11	68.8
12	68.6
13	66.4
14	66.5
15	64.4

Site: ST-8
Number of one-minute measurements 15
Average Leq: 69.8392

Minute	**L**eq
1	70
2	71.1
3	71.3
4	66.3
5	71.7
6	71.8
7	68.6
8	68.6
9	68.4
10	70
11	68.9
12	69.4
13	66.2
14	70.3
15	70.5

Site: ST-9
Number of one-minute measurements 15
Average Leq: 60.85531

Minute	**L**eq
1	50.6
2	61.2
3	59.7
4	61.7
5	59.4
6	58.6
7	56
8	61.7
9	59.8
10	55.1
11	55.5
12	58.5
13	69
14	55.3
15	55.1

Site: ST-10
Number of one-minute measurements 15
Average Leq: 49.20649

Minute	**L**eq
1	45.1
2	45.9
3	47.3
4	43.4
5	45.8
6	51.7
7	56
8	44.5
9	46.7
10	44.5
11	45.6
12	47.8
13	54.2
14	45.5
15	43.1

Site: ST-11
Number of one-minute measurements 15
Average Leq: 66.7697

Minute	**L**eq
1	67.1
2	66.2
3	65.8
4	67.9
5	66.3
6	67.5
7	65.7
8	64.2
9	64.3
10	67.3
11	67.7
12	68
13	63.2
14	69.2
15	67.1

Site: ST-12

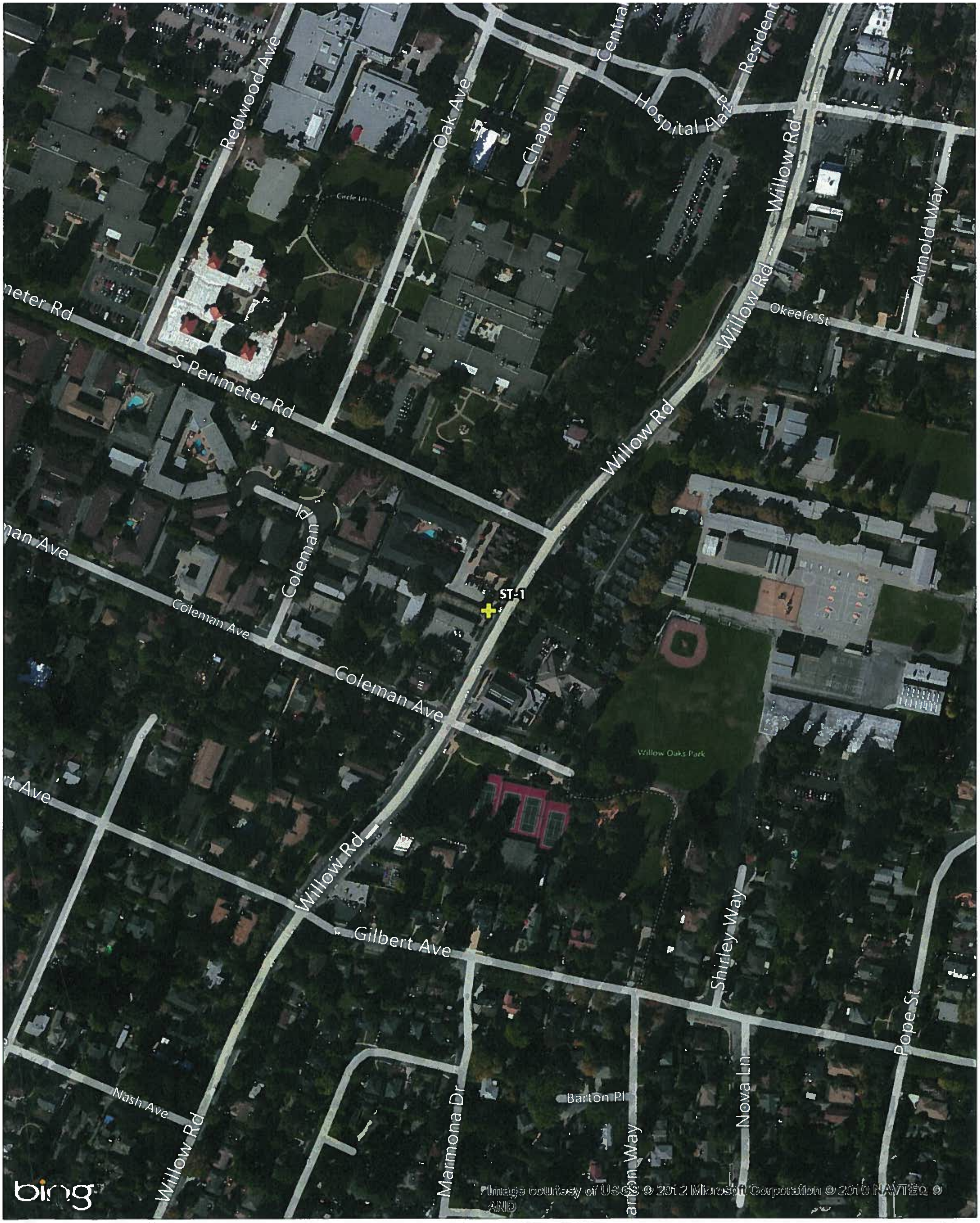
Number of one-minute measurements 15

Average Leq: 54.57726

Minute	**L**eq
1	54.3
2	59.2
3	58.1
4	54.3
5	54.6
6	56.9
7	50.9
8	57.2
9	52.6
10	52.5
11	49.1
12	50.5
13	46.7
14	46.8
15	53.3

Site: ST-13
Number of one-minute measurements 15
Average Leq: 57.44173

Minute	Leq
1	57.9
2	57.9
3	53
4	53
5	57.4
6	58.4
7	53.1
8	57.9
9	53.9
10	56.5
11	58
12	58.1
13	62.9
14	54.2
15	56.5



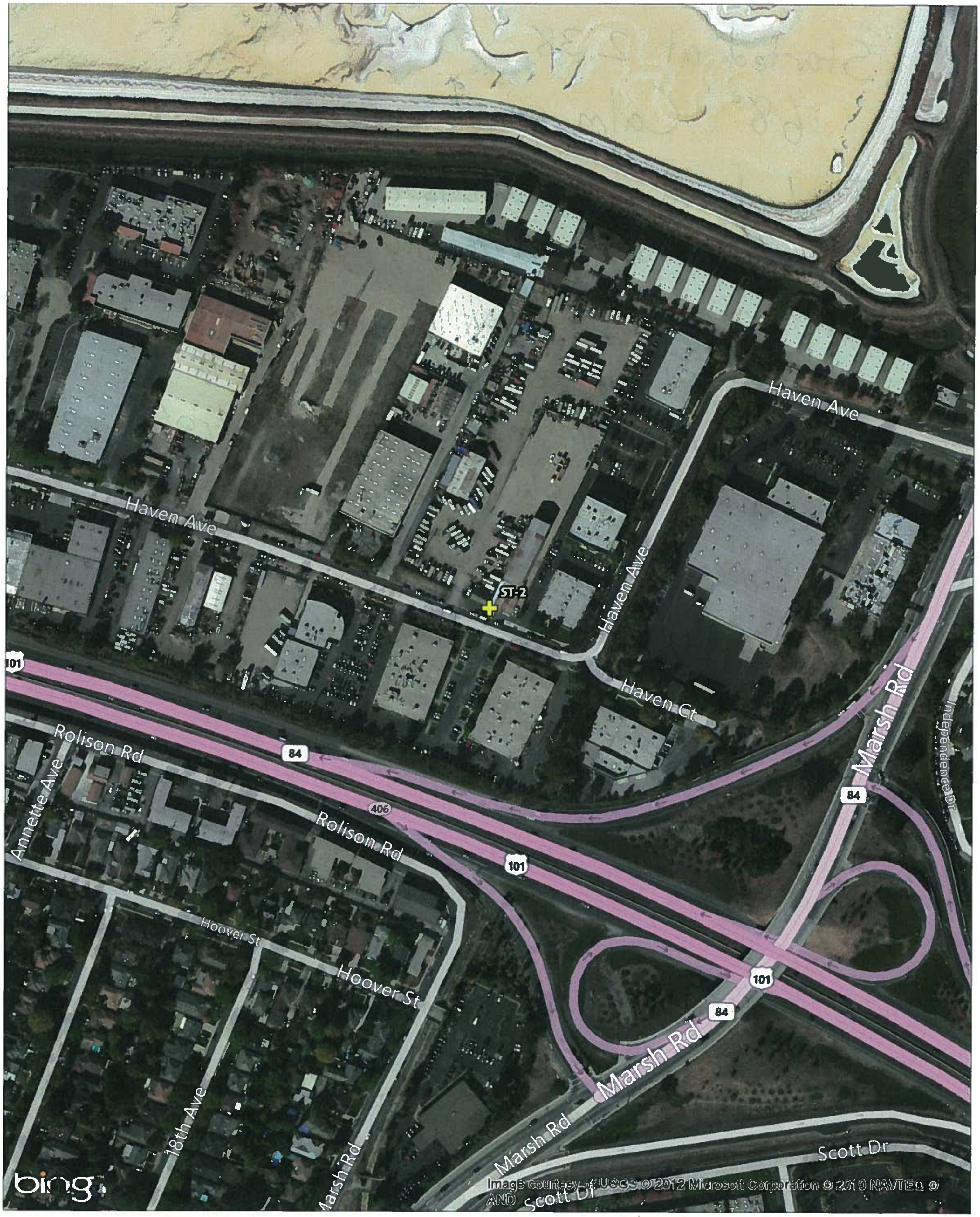
Schools ✚ Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

3:57 At vacant comm building at
557 willow road
45' from Centerline

Low-intensity commercial, service station,
Med-dens Apartments on two sides and catty corner
Noise dominated by traffic
on willow road
Some plane noise discernable
at times

58° Calm Wind

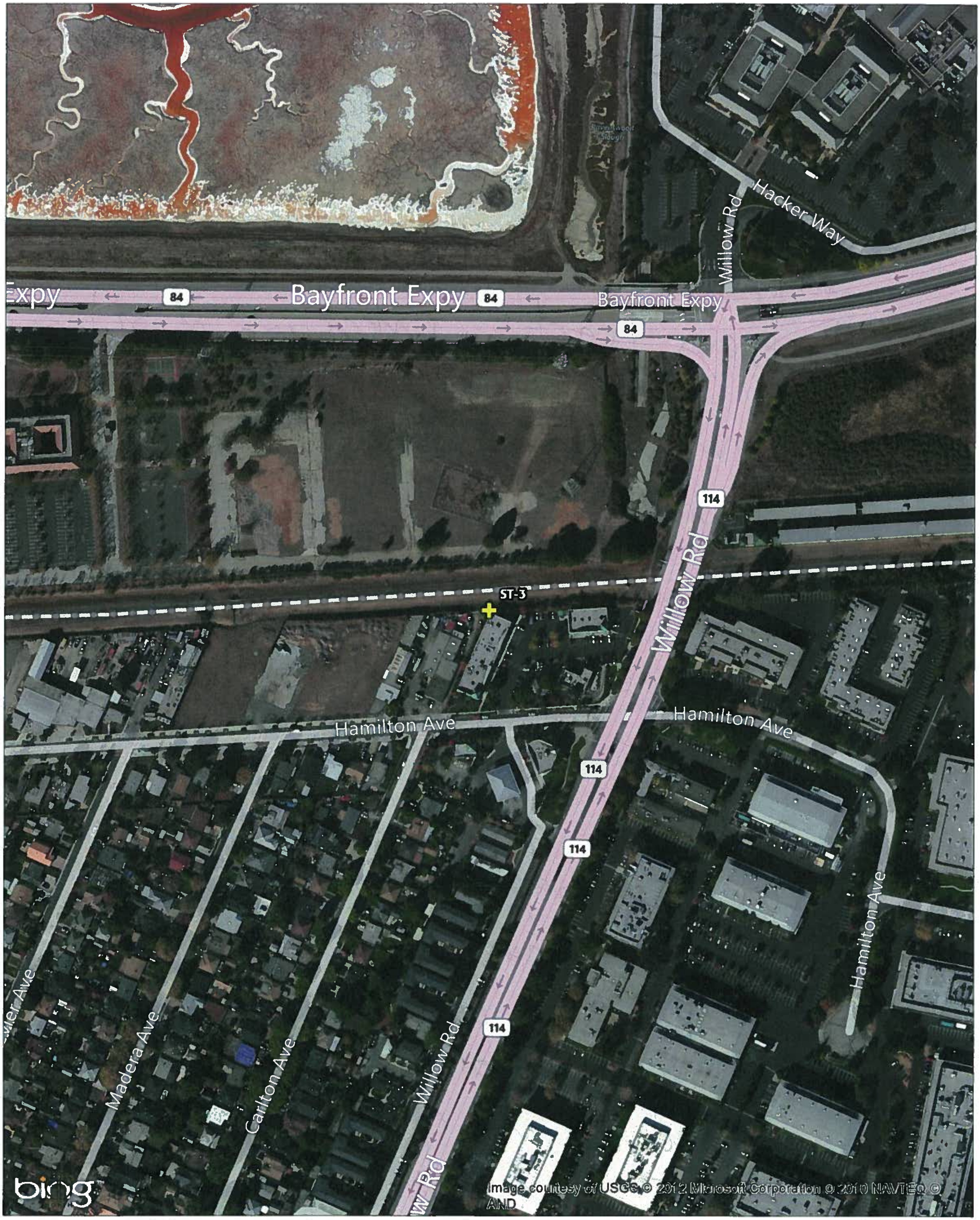


Schools
Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

Started at 2:38
68° Calm wind

Industrial area w assoc. office uses
Appears to be primarily warehouses
No nearby retail or res. uses noted
~~Dominant~~ Background noise is distant 101
but this is superseded by passing traffic on
haven ave, which includes cars and trucks
Speed limit 25-30mph
42 ft from Haven Ave C-line



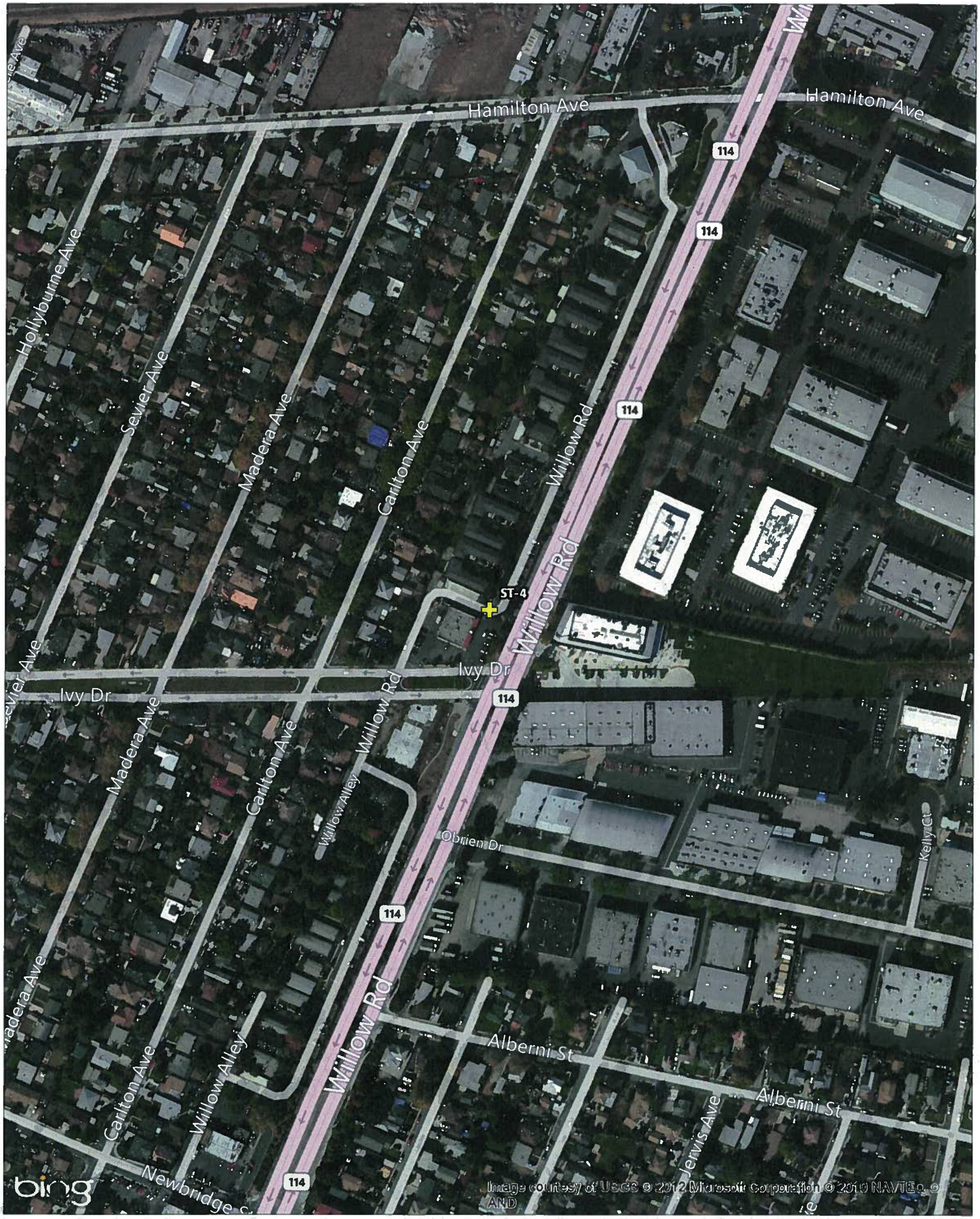
Schools Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

4:55 57 ft from Rail 315' from Willow
650' from Hwy 84

Sm. grassy shrubby area adjac. to sm. shopping center. Site immediately adj. to train tracks (measure dist)
Highway 84 lies beyond tracks
Nothing else in between
Surrounding immediate uses commerial with nearby ligh industrial and vacant land
noise env. dominated by traffic on Highway and lesser ~~etent~~ nearby roads
Also sounds of parking lot and human voices

look at min 4-5 consider excl.



Schools ✚ Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

4:29 ST-4

Tripod 60' from wall
102 ft from Willow c-line

Stone
4 ft

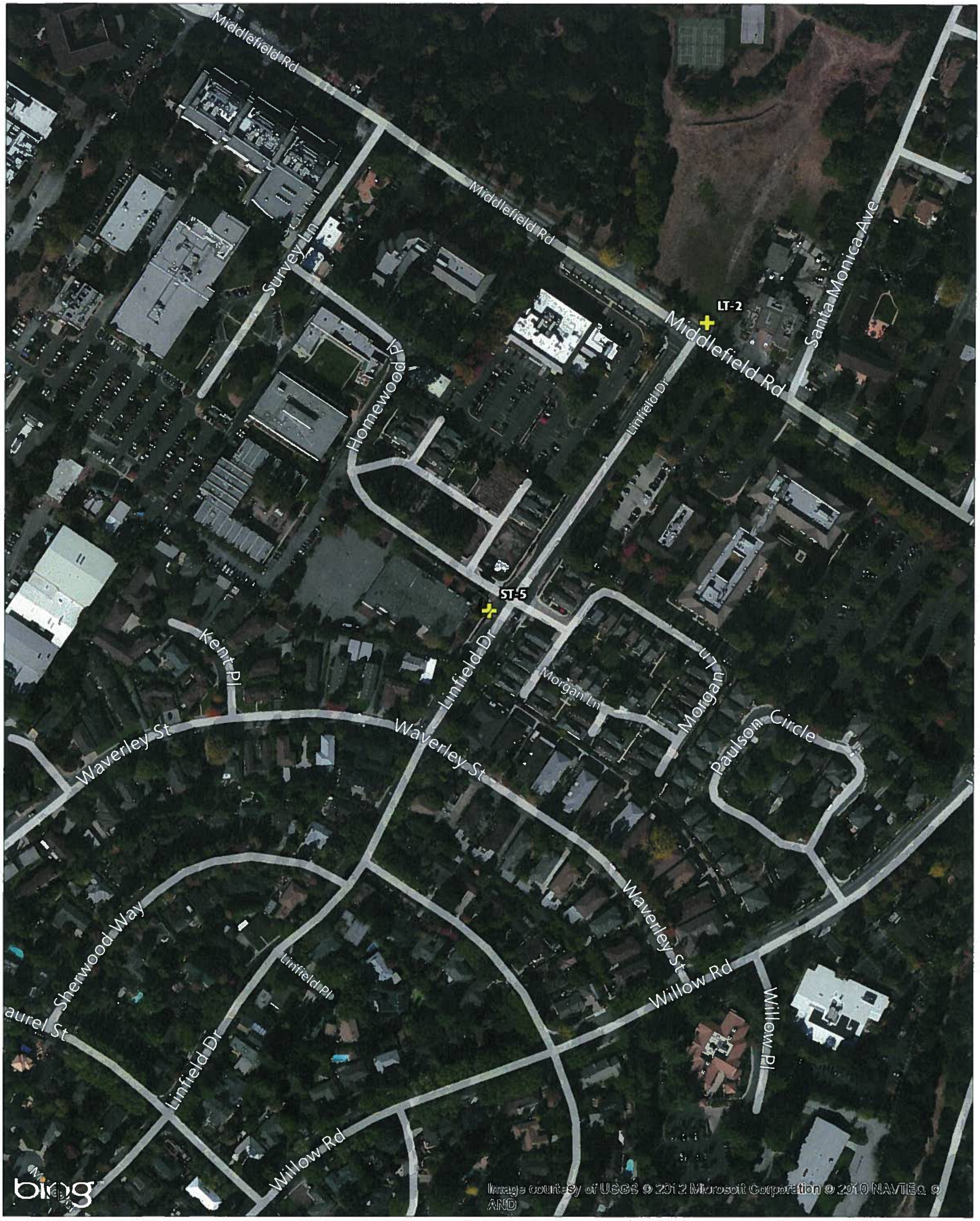
Med-density apartments behind sound wall allong Willow Rd. Office/Light Ind uses across street small market next door

Find address

Noise dominated by willow road traffic w/ addt'l noise from passing people + activity in parking area
also noise from freight deliveries across street

56° Calm Wind

Exclude Min 12 & 13



Schools
Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

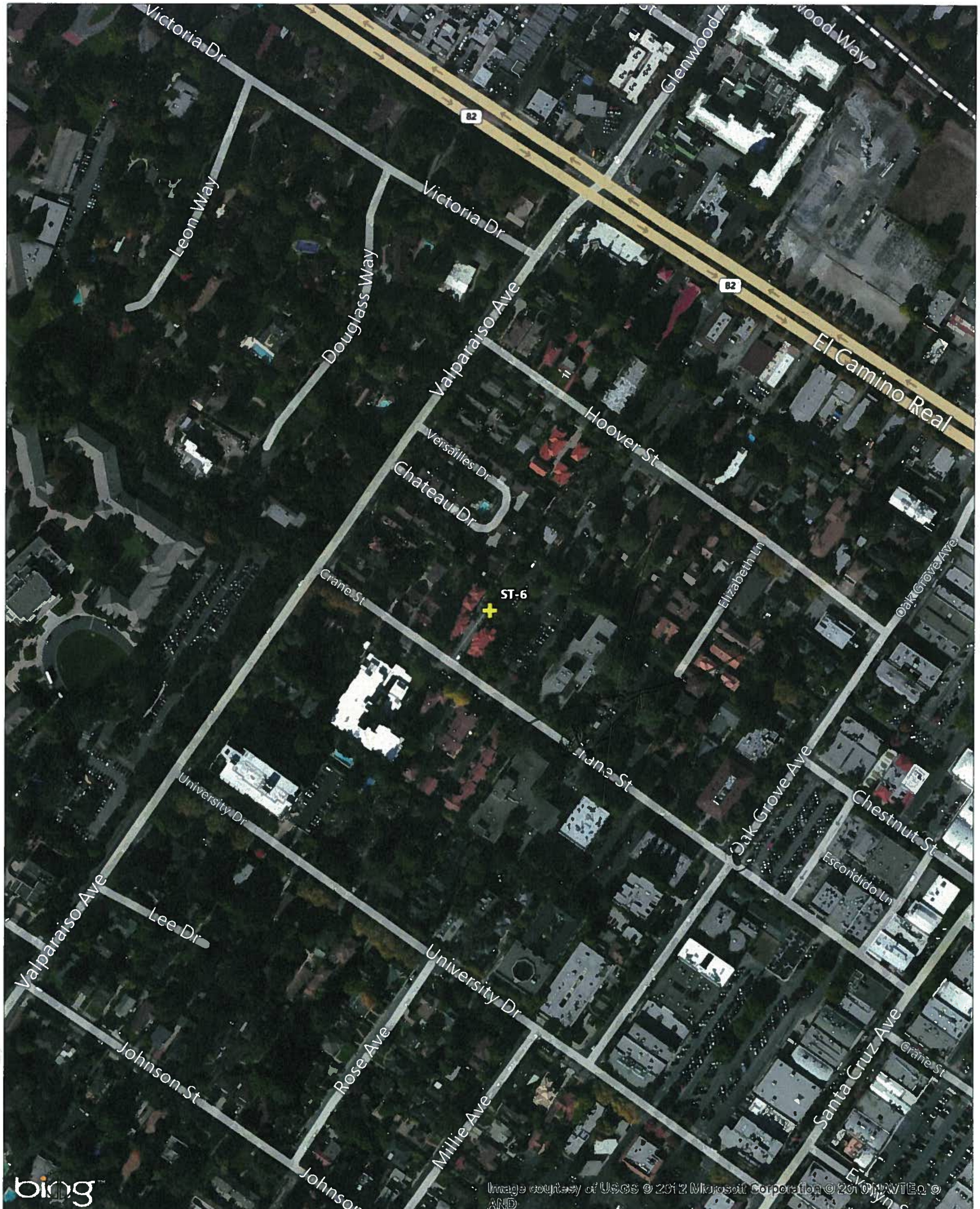
1 50 PM 59° <5 mph

Corner Linfield Homewood

New Urbanist Single-fam Homes
w/ vacant comm. office use
↳ Potential redevelopment

Noise env. Light passing traffic
mainly Linfield
Planes - one loud went over
Dist. traffic on Middlefield
Minor Neighborhood noises

40 ft from C-line of Homewood
62 ft from C-line Linfield
742' from Middlefield



Schools
Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

2:32 60° Calm winds

P. lot serving D-town M. Park

Placed on paved corner

Coom offices on three sides

~~other~~ primary site infeasible

alt site infeasible

↳ both had cost / landscaping / noise

~~Prim~~ Noise environment:

Passing traffic both streets

Passing people

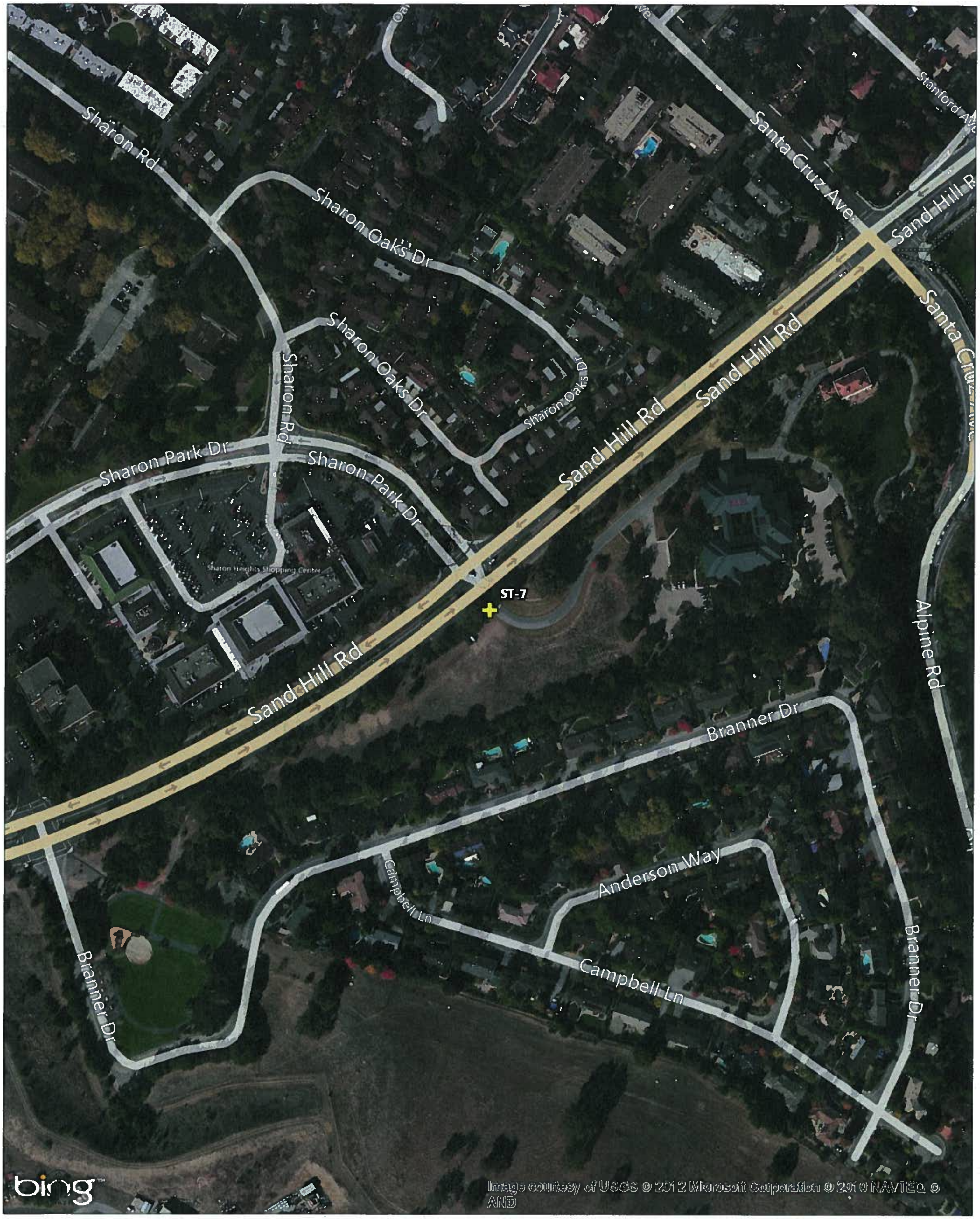
parking lot

distant trains

36' from Center of Crane St / Oak Grove Ave Intersect

20' from Crane C line

27' Oak Grove C-line



Schools
Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

11:12 58° Wind <5

Heavy Traffic Shopping Center Serv Stat

25 on Sharan 35 on Sand Hill

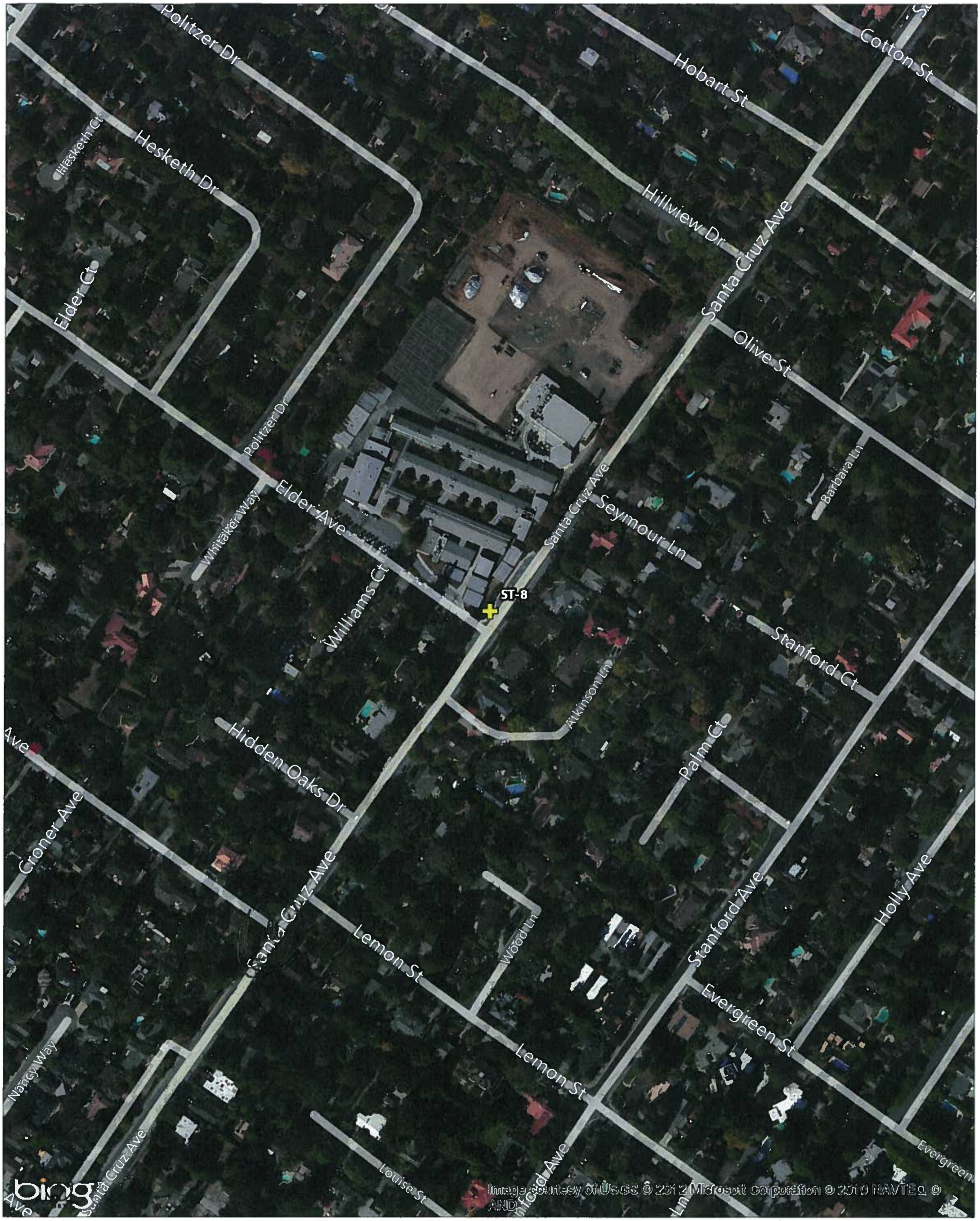
Dominated by passing traffic

Very busy int.

Site is on Sharan Park C-line.

100' from center of San Hill Road Intersection

Access issues and sound walls prevented use of any corner.



Schools
Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

11:48 Calm Wind 59°

SF res

Heavy Traffic on S Cruz

25 mph N. Lemon

Traffic 30-35 on S. Cruz

Noise Env. Frequent Traff on SC

Neighborhood noise

Had to move because of const at school

Then leaf blower

then house renovation

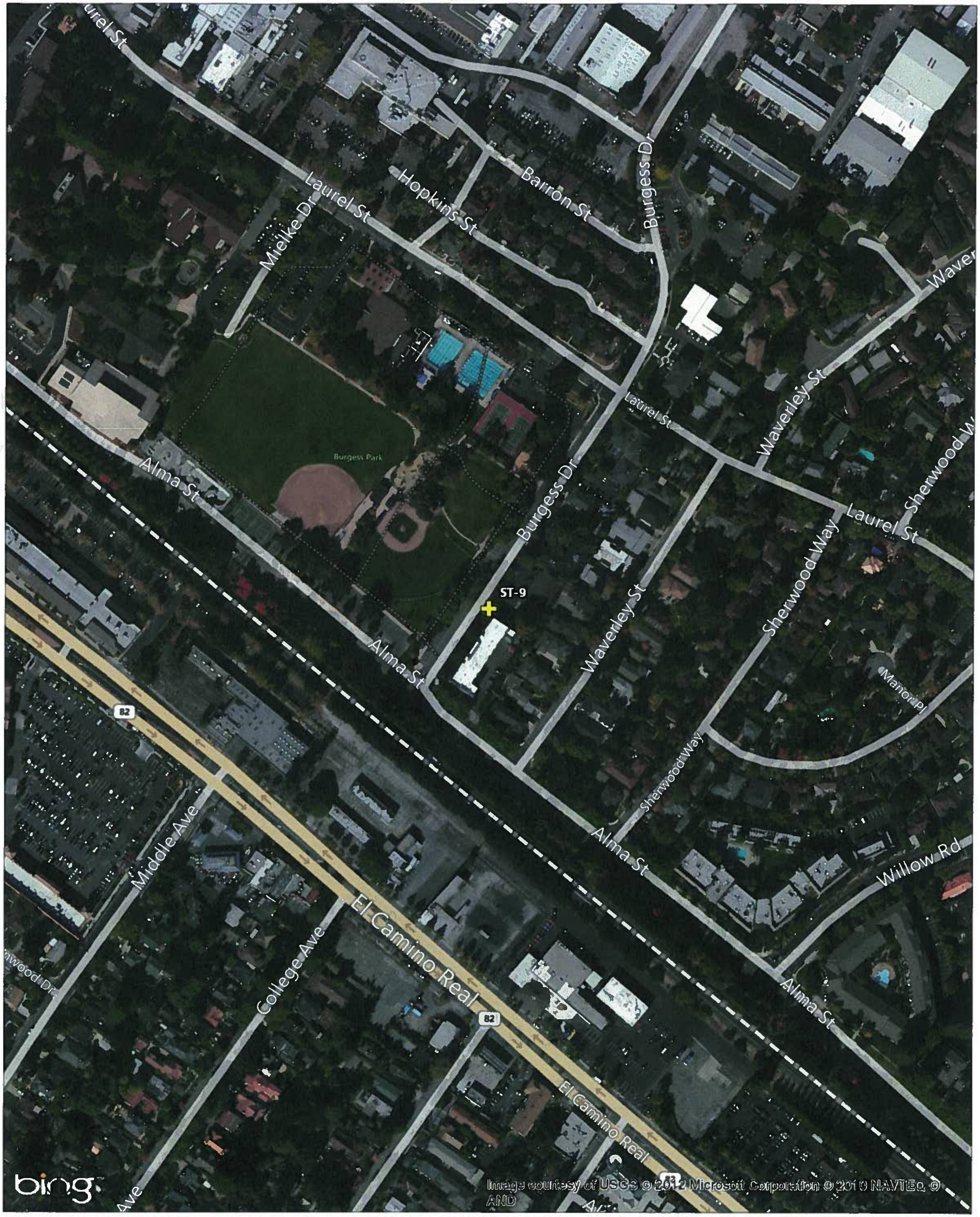
then another leaf blower.

This location is very close to school and replicates noise at intersection of similar busyness

40' from Santa Cruz Ave C-line

32' from N. Lemon Ave C-line

45' from intersection center



Schools Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

12:56 $\leq$5 mph 59°

Paved area near planted area at corner of civic lot.

Noise env. passing traffic mainly on Alma Some on burgess Some soud from rec activities at civic center → both minor

Some from passersby

some more distant traffic noise

near train tracks

Cal train right of way

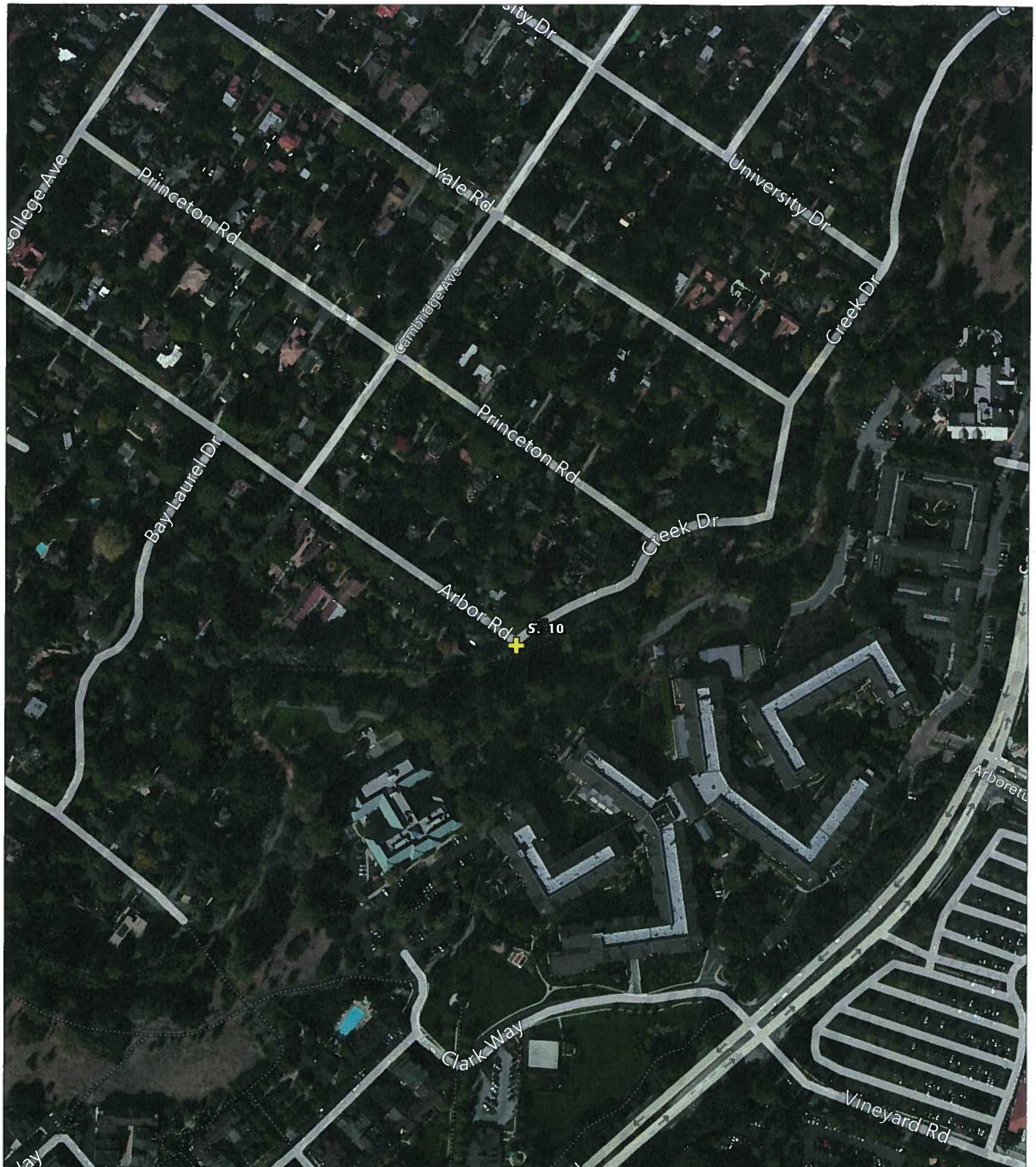
34' from Burgess C-line

52' from Alma

72' from Intersection

146' from CalTrain track

Train at ~~108~~ 108



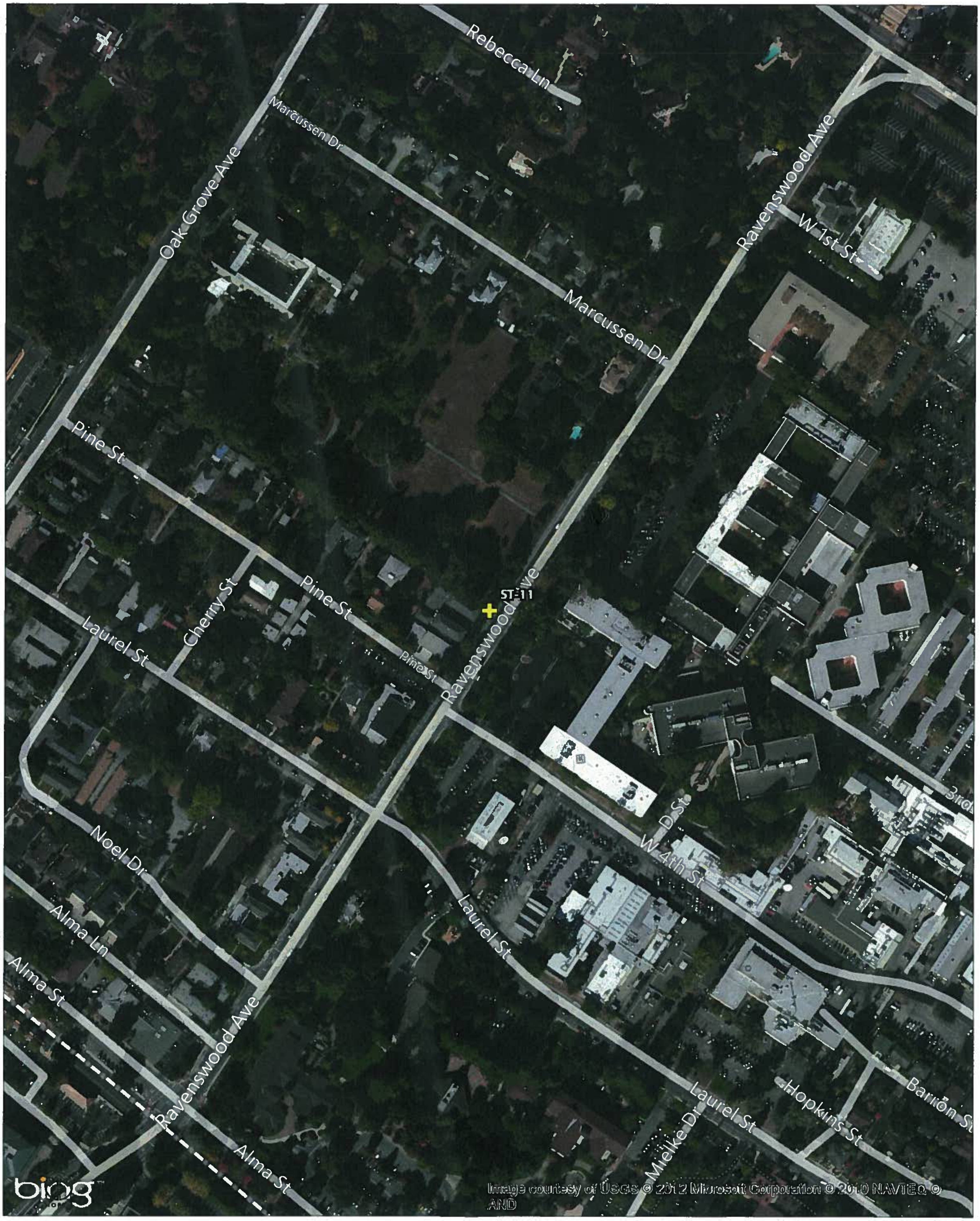
Schools Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

311 Calm wind 59°

1090 Creek Drive
Single fam across creek
from senior community
dominant noises:
distant traffic creek
very rare traffic
planes dist. train whistles trains
Noise from house activities
DRA

12 ft from Creek Dr C-line



Schools
Proposed noise monitoring locations

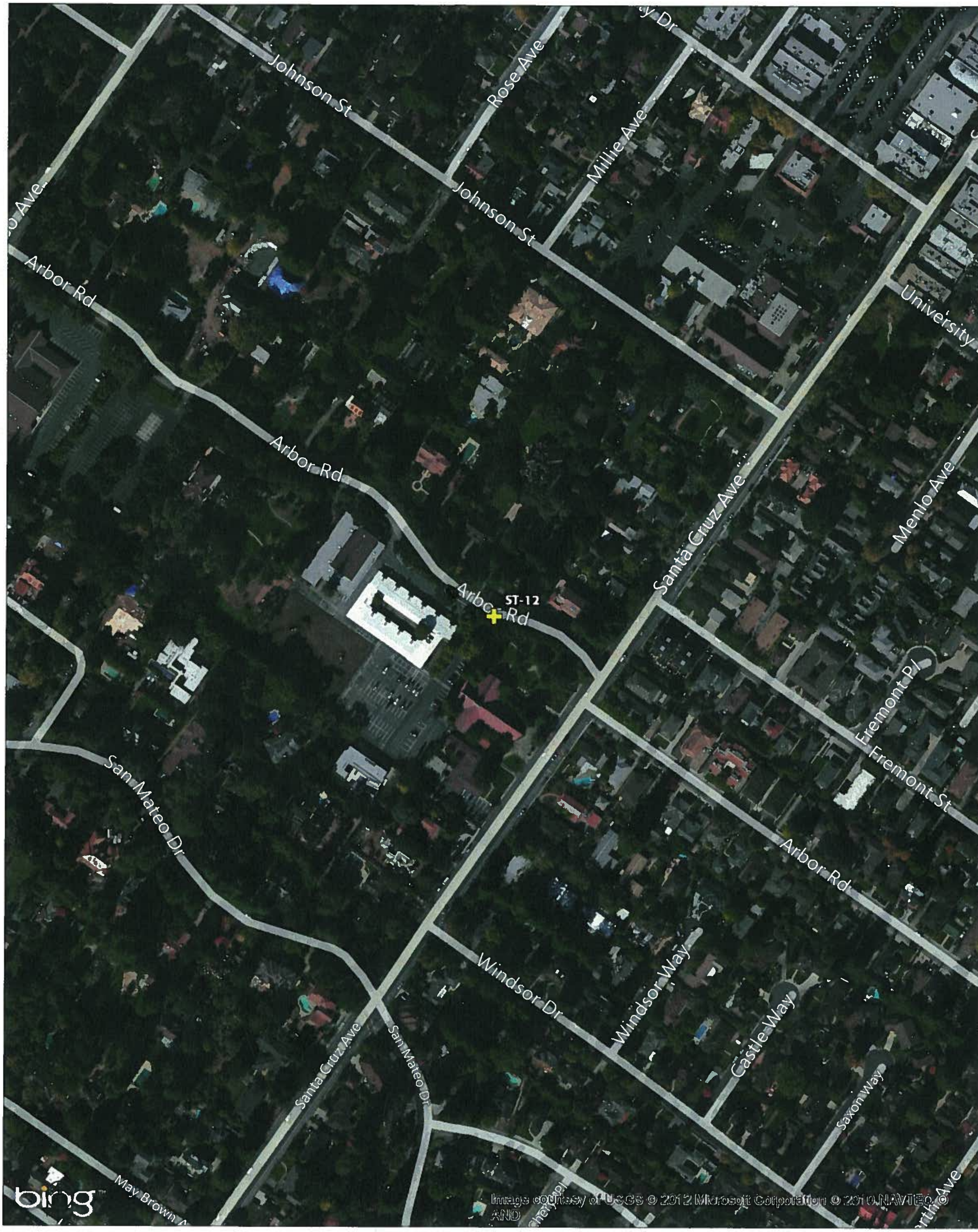
PROPOSED NOISE MONITORING LOCATIONS

1 22 Set up in ~~green~~ landscape
are between road and p. lot for
Stanford med center (?)
"SRI" internationa
333 Ravenswood

Wind < 5 mph 58°

Noise primarily passing traff R-wood
Single fam homes surrounding
monastery, which has ~~10~~ 12ft
sound wall — cinder block
Across street from institutional use

50' from Ravenswood Ave C-line



Schools ✚ Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

12:18 Calm Wind 59°

Near Telephone pole

Single-fam Church School

1140 Arbor

Sound; Children playing

occassional vehicel on Arbor

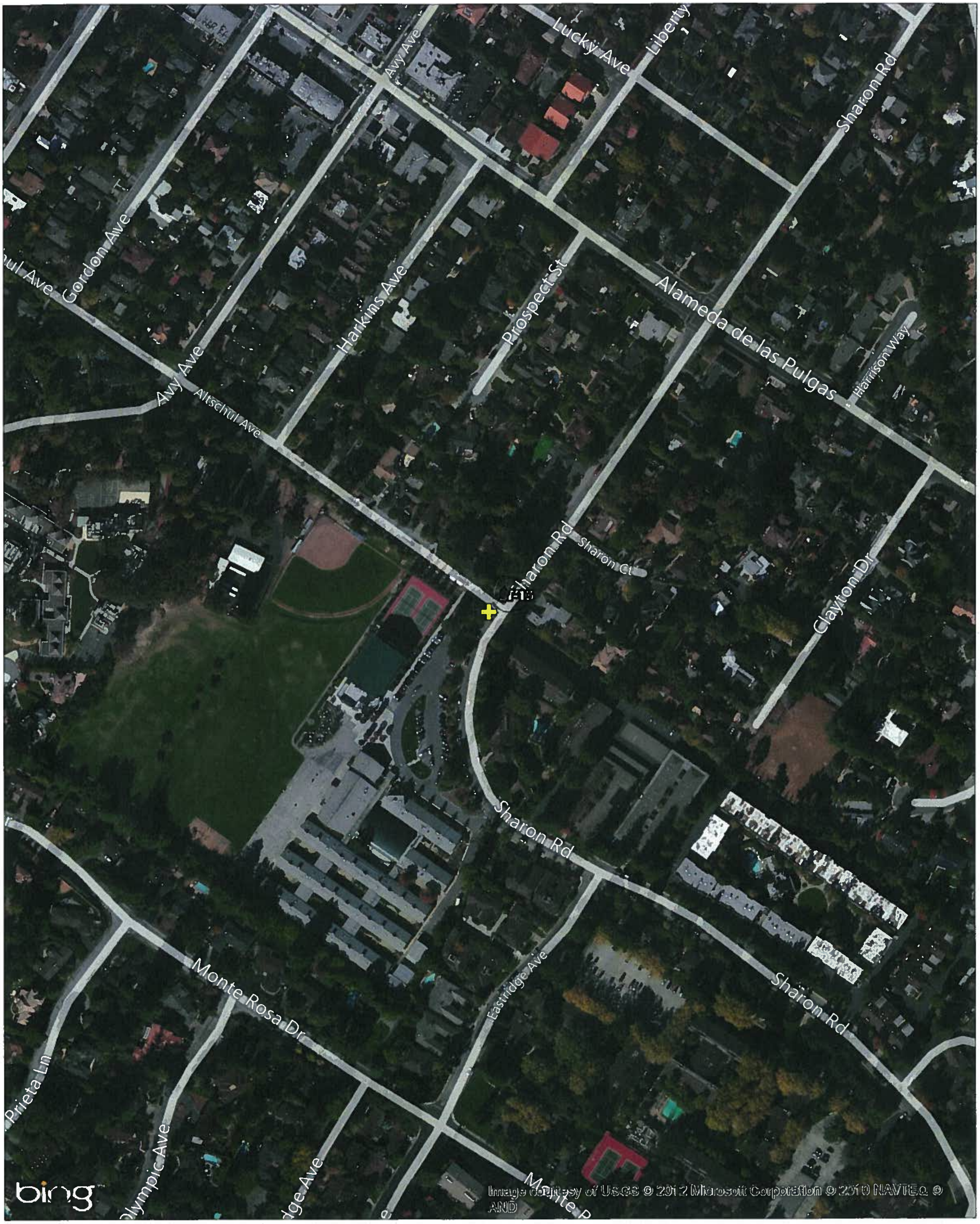
occ. vehicle from lot

* Dist from S. Cruz

Same traffic noise from SC

25 mph on Arbor 35 on S. Cruz

16' from Arbor Rd C-line



Schools   Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

10:20 AM

occ. Planes

Noise Env: Passing traffic distant children
noisy birds (crawl) distant children at play
Occasional Joggers Strollers

2199 sharon rd.

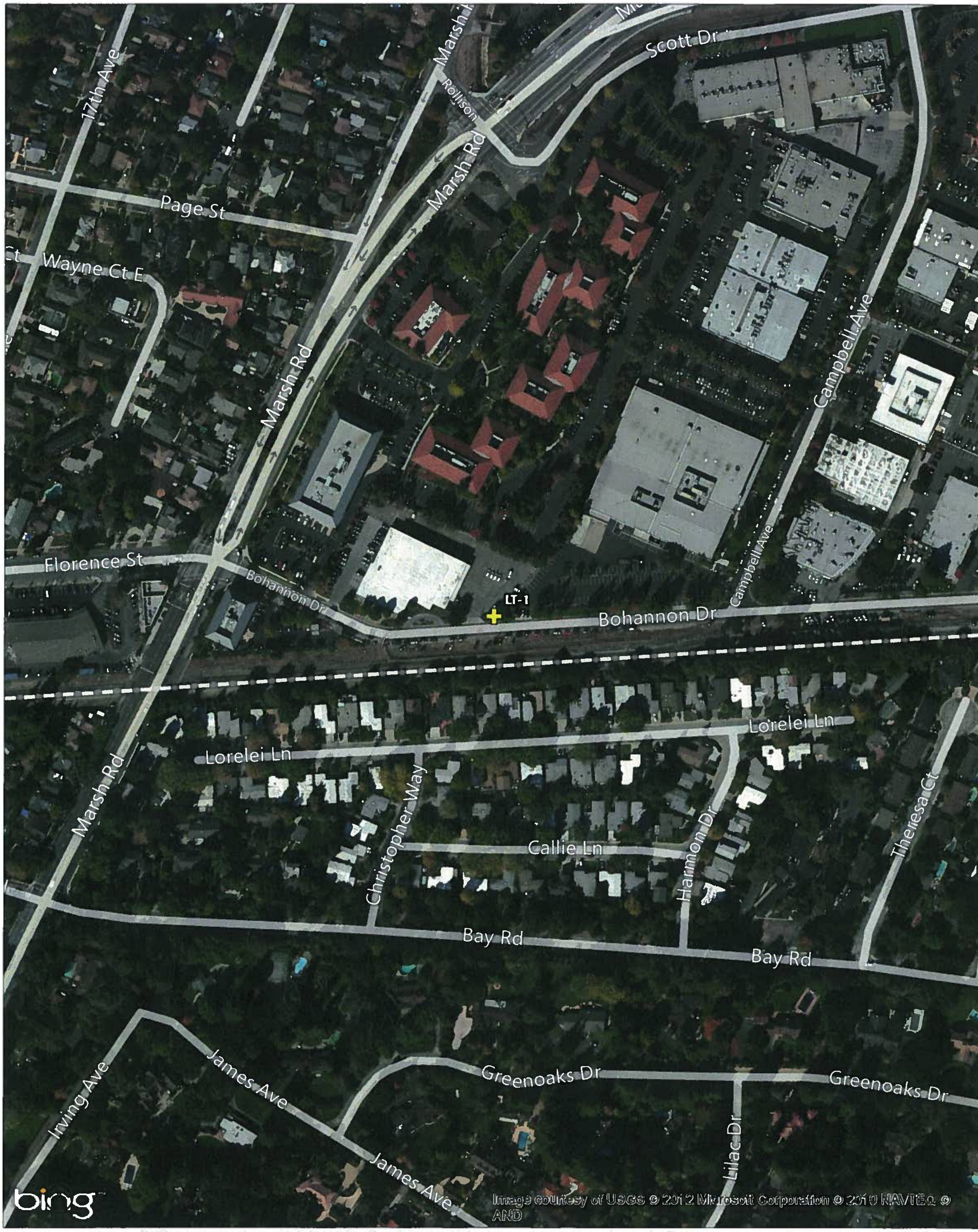
Speed Lim 25 mph

57° Wind <5mp

5' to 5 ft from shrubbery. No fence

32' from Altschul Ave C-line

24' from Sharon Rd. C-line



Schools ✚ Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

Start 2:20

Mix of office, light industrial

Light traffic on Bohannon

Some noise from operations of Post office, trucks loading etc

Mic at 5'6"

Site chosen: Less likely to be disturbed not on PO prop.

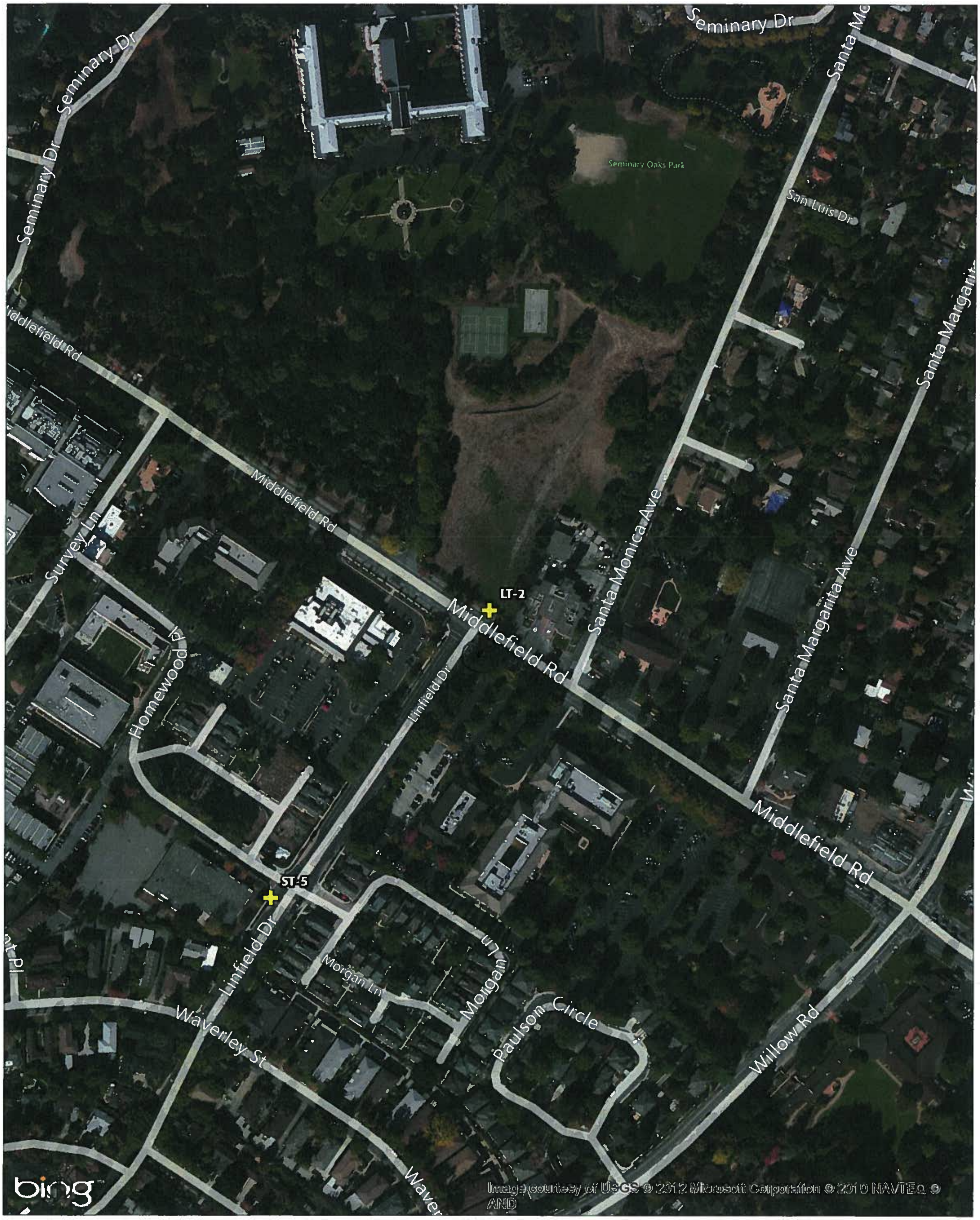
Far enough from / out of sight line from truck loading/unloading area

No obstructions

Temp 68 wind <5mph

Speed lim 30 on bohannon

20' from Bohannon C-line
64' from Center of railway



Schools Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

Started at 4:00

67° Winds Calm

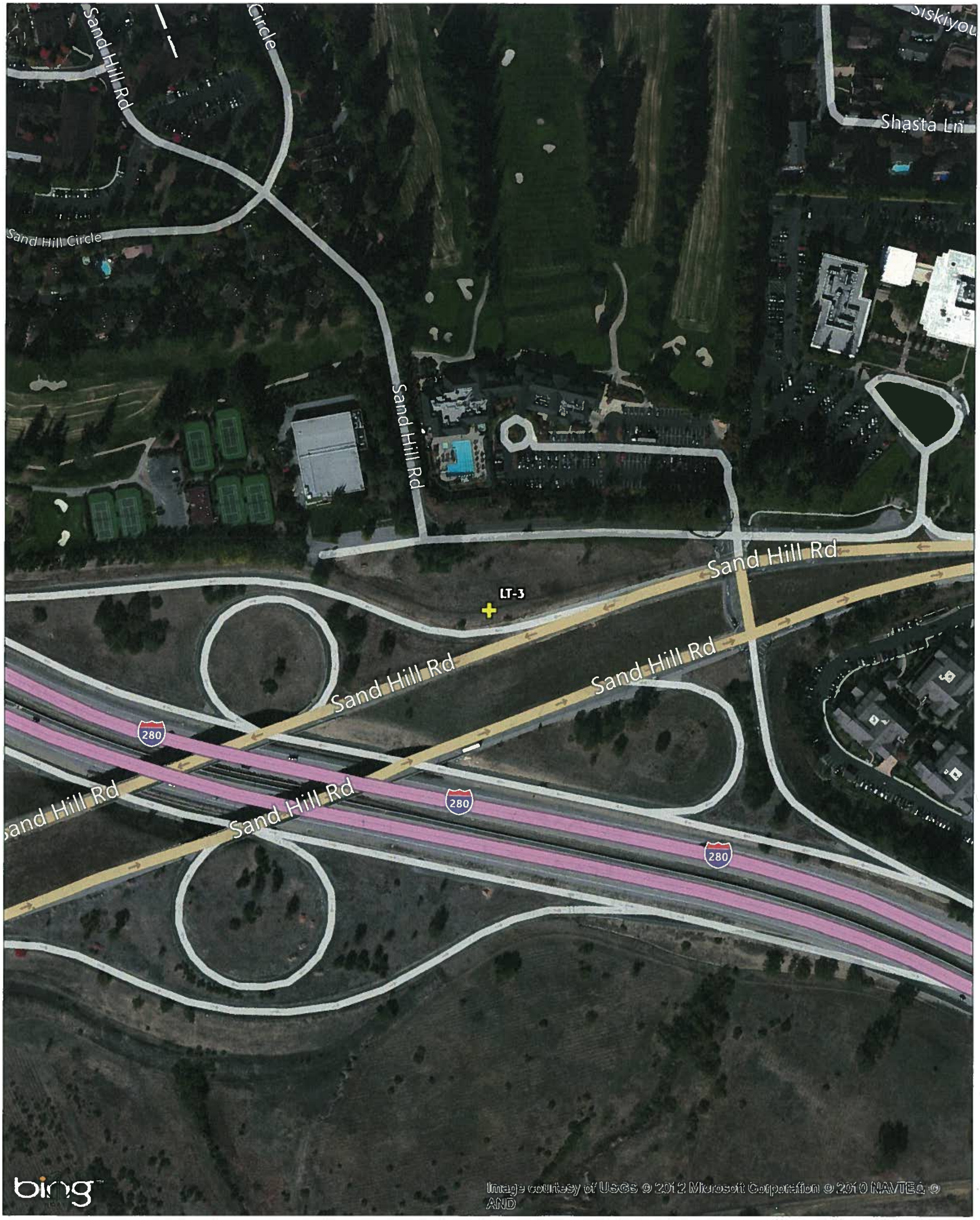
Office uses adjacent with firestation across street residential uses nearby

dominant noise was traffic on middlefield road some noise from vehicles on Linfield no other noise noted

Mic in tree approx 5'

~~40~~ 55' from C-line Middlefield

40' from Lifield C line



Schools
Proposed noise monitoring locations

PROPOSED NOISE MONITORING LOCATIONS

Start 5:02

58°

Wind calm

Adj. to Sand Hill Rd & 280 interchng

Nearby office uses

noise environment dominated by
traffic on Sand hill road & I-280

Othe noises cannot readily be discerned

Mic left 5' attached to tree
adjacent to roadway & near chainlink
fence

50' from C-line old Sand hill road
158' from C-line W-bound Sand hill Rd
310' from C-line E-bound "
780' from C-line highway 280

304 Constitution Dr.
Menlo Park, CA 94025
Tel (+1) 650-361-3022
Fax (+1) 650-361-3696
www.te.com

RECEIVED

FEB 01 2015

CITY OF MENLO PARK
BUILDING

January 30, 2015

Ms. Arlinda Heineck
City of Menlo Park
701 Laurel Street
Menlo Park, CA 94025

RE: TE Connectivity Annual Noise Monitoring and Abatement Report

Dear Ms. Heineck,

Enclosed please find the Annual Noise Monitoring and Abatement Report as specified in the Menlo Park Zoning Ordinance, Chapter 8.06.065, for the TE Connectivity (Tyco Electronics) facility located at 302-308 Constitution Drive. If you have any questions, please contact me at (650) 361-3022.

Sincerely,

Stephen Douglas
EHS Manager

304 Constitution Dr.
Menlo Park, CA 94025
Tel (+1) 650-361-3022
Fax (+1) 650-361-3696
www.te.com

TE Connectivity Annual Noise Monitoring and Abatement Report for CY 2014

January 30, 2015

TE Connectivity
302-308 Constitution Drive
Menlo Park, CA 94025

Following are the results of the Annual Noise Monitoring Program for TE Connectivity (TE) as set forth under the City of Menlo Park Noise Ordinance, Chapter 8.06.065 (c).

This report includes:

(1) A list of complaints received and follow up action taken by TE Connectivity, if applicable;
(2) Results of the annual noise monitoring assessment (See, Appendix A);
(3) Description of the monitoring and maintenance efforts; and
(4) Future plans to attempt to further reduce the noise generated from the operation of the facility.

1. Complaints Received:

No noise complaints were received in 2014.

2. Results of Annual Monitoring Program:

An Annual Ministerial Permit Noise Assessment was conducted on behalf of TE Connectivity by Wilson, Ihrig, and Associates, Inc. (acoustical consultants) and is attached to this submittal as Appendix A. Based upon the annual noise assessment conducted by Wilson, Ihrig & Associates, Inc. (WIA), TE is in compliance with its Ministerial Permit at Location 2 (offsite near Building 307) and Location 3 (offsite near Building 308). For Location 1 (offsite near Buildings 305A, B, and C), TE is in compliance with the Ministerial Permit during daytime hours, but may be in only partial compliance during nighttime hours (10 pm – 6 am). During the annual noise assessment conducted by WIA, TE took steps to reduce noise from the facility measured at Location 1 and was able to reduce noise levels by 2 dB. As indicated in the Annual Noise Assessment Report, the sound levels at the residential property line at Location 1 occasionally exceeded the 57 dBA nighttime limit by 1 or 2 dB. (1 dB has been widely assessed in studies as an imperceptible difference in volume and 2 dB has been assessed as barely perceptible.)

TE Connectivity is currently evaluating additional measures that can be taken to ensure compliance with the Ministerial Permit for Location 1. Equipment being evaluated for noise reducing measures include but are not limited to mist collectors on the roofs of

Building 305, exhaust fans from the electron beams in Building 305, and a cooling tower at Building 305A.

3. **Description of Monitoring and Maintenance efforts.**

In December 2014, TE Connectivity ceased operations of its compounding operations in Building 308. As a result, the baghouse and associated equipment are no longer in operation. In addition, TE installed sound absorber-barrier panels around various equipment on the roof and ground level of Buildings 305A and 305B. Equipment that was insulated for noise included blowers, fans, a compressor, and a cooling tower. As part of the Building 305A and 305B noise abatement project, TE spent $6,346 in materials and $8,218 in labor.

TE will continue to implement measures deemed effective and feasible to reduce noise.

4. **Future plans to attempt to further reduce the noise generated from the operation of the facility.**

TE is expecting to cease all production operations in Building 307 in February 2015. As a result, equipment associated with the beaming operations such as a cooling tower and exhaust fans will no longer be in use at Building 307.

In the second and/or third quarter of 2015, TE will be ceasing production operations and vacating Building 308. As a result, equipment used to support manufacturing such as a cooling tower will no longer be in operation at Building 308.

As stated previously, TE Connectivity is currently evaluating additional measures that can be taken to reduce noise and ensure compliance with the Ministerial Permit. TE will continue to monitor, perform preventative maintenance, and implement measures deemed effective and feasible to reduce noise. We are committed to compliance with all Menlo Park regulatory requirements and continuously improving our performance.

If you have questions, please contact me at (650) 361-3022.

Sincerely,

Stephen Douglas
EHS Manager

APPENDIX A
Annual Ministerial Noise Assessment Report

WILSON IHRIG & ASSOCIATES
ACOUSTICAL AND VIBRATION CONSULTANTS

CALIFORNIA NEW YORK WASHINGTON

6001 SHELLMOUND STREET
SUITE 400
EMERYVILLE, CA 94608
Tel: 510-658-6719
Fax: 510-652-4441
www.wiai.com

28 January 2015

Mr. Stephen Douglas
EHS Program Manager
TE Connectivity
304 Constitution Dr.
Menlo Park, CA 94025

Subject: TE Connectivity – Menlo Park
2015 Annual Ministerial Permit Noise Assessment Report

Dear Mr. Douglas:

This letter presents the results of noise measurements made by Wilson, Ihrig & Associates (WIA) at three locations near TE Connectivity (TEC) site in Menlo Park, California, in January 2015. The purpose of the measurements is to assess noise levels from the TEC facility in accordance with the Ministerial Permits section of the City of Menlo Park Municipal Code [§8.06.065(c)]. The Ministerial Permits section states that all sources of noise on the TEC campus except mobile sources must "not exceed sixty (60) dBA as measured at residential property lines between the hours of six (6) AM and ten (10) PM, or fifty-seven (57) dBA as measured at residential property lines between the hours of ten (10) PM and six (6) AM."

MEASUREMENT LOCATIONS

The measurements were made at the three locations shown in Figure 1. These are the same locations that were used last year for Ministerial Permit noise compliance testing. Location 1 was relocated in 2014 due to the construction of new facilities for the Beechwood School at the former Location 1. Photos of TEC taken from Locations 1, 2, and 3 are shown in Figures 2 through 4.

- Location 1 was directly against the chain-link fence at the Beechwood School expansion south of the Dumbarton Spur railroad tracks, approximately 250 feet from TEC Buildings 305A, B, and C. This year, there was a clear view of the all TEC buildings from Location 1.[†] The predominant TEC noise sources that affect Location 1 are located at Building 305B. All measurements at Location 1 were adjusted downward by 3.2 dB to represent the noise level at the nearest residential property lines. This correction

[†] In past years, the view has sometimes been obscured by high piles of track ballast and/or parked rail cars.

procedure was reviewed and approved by the City of Menlo Park prior to the measurements for the 2014 noise study.

- Location 2 was near the residential property line approximately 260 feet south of TEC Buildings 307-E and 308-H.

- Location 3 was near the residential property line approximately 250 feet south of Building 309-IT.

NOISE MEASUREMENT PROGRAM OVERVIEW

Our initial measurements were scheduled to be made on three consecutive week days followed by two consecutive weekend days, with four measurement periods per day as specified in the Menlo Park Municipal Code Chapter 8.06 Noise, Section 065: Ministerial Permits. Measurements were halted after the first six measurement sessions because it appeared that the nighttime noise limit was not being met. TEC installed vinyl, mass-loaded, Sound Absorber-Barrier Panels around blowers and additional rooftop equipment on the south side of Building 305B, and then testing resumed. The noise survey was paused again after the next four measurements so that additional noise abatement could be installed. The following was done at that time:

- Sound Absorber-Barrier Panels were placed around the top of a cooling tower and compressor on the south side of Building 305A at ground level;
- Sound Absorber-Barrier Panels were installed around two pieces of equipment on the roof of Building 305B;
- Sound Absorber-Barrier Panels were placed around an exhaust vent on the southern edge of the 305B roof;
- Sound Absorber-Barrier Panels were placed on rooftop equipment on Building 305A.

After this work was done, testing resumed. A total of 63 measurements, each 10 minutes long, were made on January 7 and 8, January 15 and 16, and January 24 to 26, inclusive. The measurements were made during four time periods each day: early morning (5 AM – 6 AM), mid-morning (9 AM – 10 AM), mid-afternoon (3 PM – 4 PM) and late evening (10 PM – 11 PM). Collectively, the early morning and late evening measurements represent the "nighttime" period, while the mid-morning and mid-afternoon measurements represent the "daytime" period.

Measurements were made with Norsonic Nor140 Precision Sound Level Meter. The equipment was calibrated using a NIST-traceable Brüel & Kjær Type 4230 microphone calibrator. "Slow meter response" was used as specified in the Menlo Park Municipal Code Noise Chapter 8.06 Section 020 (Definitions) which states that the response shall be "slow" unless the source is impulsive. Calibrated audio recordings were made for all 63 measurement sessions with the internal recording capability of the Nor140 meter. During all noise measurements, Wilson Ihrig personnel annotated field notes to separate TEC sources from non-TEC sources to the extent possible.

SUMMARY OF MINISTERIAL PERMIT NOISE LIMIT COMPLIANCE

Details of the measured noise levels and analysis are given below. In summary, the noise level measurements and analysis indicate that sounds from TE Connectivity subject to the Ministerial Permit noise limits comply with those limits at Locations 2 and 3. In many instances, compliance is unambiguous because no noise level over the limit was recorded. In a few instances, a determination of compliance requires interpretation of noise level readings over the limit in light of traffic and construction noise in the area.

The noise levels at Location 1 comply with the Ministerial Permit limits during the "daytime" period, defined as 6 AM until 10 PM.

The sounds from TE Connectivity during the "nighttime" period at Location 1 comply with the limits only part of the time. The sound levels at the residential property line occasionally exceed the 57 dBA limit by 1 or 2 dB. 1 dB is widely regarded as imperceptible and 2 dB is barely perceptible. While the limits technically apply at the property line, as a practical matter, the noise levels at the rear facades of the homes on Terminal Avenue are all below 57 dBA because of the attenuation afforded by the extra distance.

	Location 1	Location 2	Location 3
Nighttime	Partially Complies	Complies	Complies
Daytime	Complies	Complies	Complies

NOISE MEASUREMENT AND ANALYSIS DETAILS

The measured noise levels during the period January 7 and 8, 15 and 16, and 24 to 26 are presented in Table 1. For each location and each measurement period, the "combined steady" noise levels are given, transient TEC noise levels are given, and other non-TEC and mobile TEC noise levels are given.

The "combined steady" noise levels correspond to sound level meter readings when there were no clearly identifiable noise sources such as vehicles, airplanes, or transient TEC mechanical noises. As such, the "combined steady" noise level essentially includes only steady TEC mechanical noise and distant roadway noise. The latter is occasionally prevalent.

The TEC transient noises are discussed below under each location. The noise levels presented in Table 1 are the readings made at the time of the transient noises, so they may, and often do, include the influence of roadway noise.

TEC mobile noise sources were, for the most part, indistinguishable from the background noise level.

Non-TEC, discernible noise sources were cars, trucks, motorcycles, jets, propeller aircraft, dogs barking, roosters crowing, and construction activities near Locations 2 and 3. Jets and general aviation aircraft routinely create noise levels between 60 and 70 dBA at all locations. Aircraft noise is typically audible for about 1 minute, though the highest noise level is attained only for several seconds.

Location 1

Nighttime. There were three distinct "periods" at Location 1 this year. The first period spanned from the first measurement at 5:00 AM on Wednesday, 1/7/15, until the 5:00 AM measurement on Thursday, 1/8/15. During this time period, the steady nighttime noise levels at Location 1 ranged between 59 and 61 dBA. Traffic noise from U.S. 101 and the Bayshore Expressway was not as audible at this location as in previous years, during the 5:00 AM measurement sessions. The flow of the raw material pellets through the external ductwork was audible occasionally, as well as an "air release", but the predominant noise source was the steady state noise from TEC during all sessions in this period.

The second distinct period encompassed the measurement at 10:00 PM on Thursday, 1/15/15, through the 5:00 AM measurement on Friday, 1/16/15, after the initial noise abatement measures were implemented. During this period, the steady nighttime noise levels were 57 to 59 dBA, indicating that the noise abatement measured reduced noise by 2 dB. The "air release" sound as well as a high tone was present at the 10:00 PM measurement session, and again U.S. 101 and Bayshore Expressway traffic noise was not as noticeable as in previous years for either session in this period.

The third distinct period encompassed the measurements at 5:00 AM on Saturday, 1/24/15, through the 10:00 PM measurement on Monday, 1/26/15, after the second round of noise abatement measures were implemented. During this period, the steady nighttime noise levels were 56 to 60 dBA. Several field personnel noted that TEC noise had a "rattling" sound that was previously noted in 2013 and 2014. With the exception of Monday morning at 5:00 AM, U.S. 101 and Bayshore Expressway traffic noise was not as noticeable as in previous years for either session in this period. During the Monday 5:00 AM session, traffic noise was very prevalent. There were several distinct transient noises heard throughout this period, including the typical transient noises heard in past years plus a high pitched "buzzing" or saw sound which is new.

The highest steady nighttime noise level reported during the third period was 60 dBA. This does not necessarily mean that TEC is over the 57 dBA nighttime noise limit because noise from U.S. 101 and Bayshore Expressway contributes to the total noise level at this location, during the session in question. If the TEC noise level were 57 dBA, a highway noise level of 56 dBA would be sufficient to cause the combined level to be 60 dBA. Additionally, highway noise level of 48 dBA, combined with a TEC noise level of 57 dBA would result in combined level of 58 dBA.

The most common, nighttime transient noises observed at Location 1 were an "air release" sound, which comes from the Baghouse, a "knocking" sound, and the pellet flow. Although audible, these noises do not measurably increase the A-weighted noise reading. Other audible transients from the TEC campus were a "rattle" sound, a "banging" sound, and a high pitched "buzzing" sound. The rattle sound was concurrent with noise levels of 57 to 58 dBA. The "banging" sound was concurrent with noise levels of 58 to 59 dBA. The "buzzing" sound ranged from 58 to 60 dBA and was observed at the Sunday, 1/25/15, 10:00 PM and Monday, 1/26/15 5:00 AM and 10:00 PM sessions. This has not been heard in previous years.

Typically, human hearing in an outdoor environment cannot distinguish a 1 dB difference in noise levels and can just perceive a 3 dB difference in noise levels. Therefore, the steady nighttime noise levels of 58 dBA and 59 dBA which were observed after the implementation of noise abatement measures are, at most, just barely perceptibly above the 57 dBA nighttime noise limit.

The Ministerial Permit noise limits technically apply at the rear property line of the residences on Terminal Avenue. As a practical matter, the noise levels at the rear facades of the homes – all of which are set forward on the large lots – would be less because of the extra distance. The rear property lines are about 350 ft from TE whereas the home facades are about 450 ft away. At this greater distance, the noise levels should be 2 dB less than at the rear property line.

Daytime. As with the nighttime noise levels, the daytime noise levels were lower during the weekend measurement sessions. On the weekdays, the steady noise levels ranged between 56 and 60 dBA, whereas on the weekend it was 55 to 57 dBA.

The most common daytime transient TEC noises reported were the "air release" and pellet flow sounds. The air release and pellet flow noises did not measurably increase the total noise level. The high pitched "buzzing" sound was reported once during the daytime, on Monday, 1/26/15 in the 3:00 PM session, which resulted in a 61 dBA noise level. There were also a couple of measurement sessions in which no TEC transient noises were discernable.

Location 2

Nighttime. Combined, steady noise levels were 54 to 60 dBA during the early morning and late evening periods. One reading of 59 dBA and one of 60 dBA were obtained during two of eleven nighttime sessions, and both were heavily influenced by traffic noise. As such, the TEC noise level is indeterminate. Three steady sources were audible at this location: TEC, U.S. 101, and Bayshore Expressway. The temperature inversion condition can make roadway noise prominent at Location 2. During all nighttime sessions when traffic noise was not prevalent, noise levels were 57 dBA or less.

Air release noise is heard periodically at this location. Typically, the air release noise levels were 57 to 61 dBA at this location, measured when the noise level was otherwise in the mid 50's.

Daytime. Combined, steady noise levels were typically between 51 and 57 dBA during the mid-morning and afternoon periods. Roadway noise was less prevalent during these time periods; however, construction noise from the nearby Facebook construction site was occasionally audible at this location.

There were very few TEC transient noises observed during the daytime hours, however, there was an "impact" sound observed on Sunday, 1/25/15 which resulted in a noise level of 62 dBA. There were several measurement sessions in which no TEC transient noises were discernable.

Location 3

Nighttime. Combined, steady noise levels ranged between 54 and 58 dBA during the early morning and late evening periods. Roadway noise from Bayshore Expressway was audible at this location, and contributed to the combined, steady background noise level at times. The preponderance of noise level reading indicate that TEC noise levels are 57 dBA or less at this location.

Daytime. Combined, steady noise levels were typically between 53 and 59 dBA during the mid-morning and mid-afternoon periods. Construction noise from the nearby Facebook construction site was prevalent during all daytime sessions at this location.

There were no measurement sessions at this location in which TEC transient noises were heard.

* * *

Please do not hesitate to contact us if you have any questions about this monitoring report.

Very truly yours,

WILSON, IHRIG & ASSOCIATES, INC.

Leisa Nalls

Leisa Nalls
Senior Consultant

Derek L. Watry

Derek L. Watry
Principal

Table 1: Noise Survey Measurements Summary – dBA

		Location 1			Location 2			Location 3		
		Combined Steady	TEC ‡ Transient	Other	Combined Steady	TEC ‡ Transient	Other	Combined Steady	TEC ‡ Transient	Other
1/7/2015 Wednesday	5A - 6A	60	60	60.6	60*	--	61.3	55*	--	56 - 71
	9A - 10A	58	58 - 60	60.8	54 - 57**	--	56 - 63	56 - 58**	--	59 - 76
	3P - 4P	57 - 58	57 - 58	57 - 61	54 - 55	56	56 - 64	53 - 55**	--	54 - 63
	10P - 11P	59 - 60*	59 - 60	60 - 61	56	57	57 - 62	55 - 57	--	57 - 60
1/8/2014 Thursday	5A - 6A	59 - 61	59 - 61	60 - 64	56 - 57*	57 - 60	57 - 60	54 - 56	--	55 - 56
	9A - 10A	58 - 59	58 - 60	59 - 63	55 - 56	--	56 - 65	56**	--	58 - 65
1/15/2014 Thursday	3P - 4P	57 - 58	58.3	61 - 62	55 - 56**	--	57 - 66	55 - 56**	--	57 - 65
	10P - 11P	57 - 59	58 - 61	59 - 63	55 - 56	57 - 58*	58 - 68	54 - 56*	--	56 - 63
1/16/2014 Friday	5A - 6A	58 - 59	--	--	56 - 59*	60 - 61*	--	55 - 56*	--	57 – 61*
	9A - 10A	56 - 57	--	59 - 62	55	55*	57 - 61	55 - 56**	--	62 - 74
1/24/2014 Saturday	5A - 6A	56 - 57	57 - 58	58 - 59	55 - 56	56	57	54 - 57	--	56 - 69
	9A - 10A	56	56 - 57	57 - 65	52 - 54	--	57 - 67	52 - 54**	--	54 - 70
	3P - 4P	56	--	58 - 61	51 - 54	--	59 - 61	54 - 56	--	58 - 67
	10P - 11P	56 - 57	57 - 58	62	55	55 - 57	--	54 - 55	--	--
1/25/2014 Sunday	5A - 6A	56	57 - 58	--	54 - 55	--	--	55	--	--
	9A - 10A	55 - 57	56 - 58	56 - 64	53	62	57	52	--	54 - 55
	3P - 4P	56 - 57	56 - 57	56 - 59	52 - 54	54	56 - 77	52 - 54	--	53 - 65
	10P - 11P	56*	56 - 60*	58	55 - 56*	56 - 57	58	55 - 56*	--	57 - 61
1/26/2014 Monday	5A - 6A	58 - 60*	58 - 60*	61	56 - 57*	57 - 59*	60 - 61	56 - 58*	--	60 - 62
	9A - 10A	57	57 - 59	58 - 60	54 - 57	--	55 - 61	54 - 59*	--	58 - 69
	3P - 4P	58 - 60	58 - 61	59 - 60	53 - 57	--	55 - 62	54 - 56**	--	59 - 76
	10P - 11P	58	58 - 60	61	56 - 57	--	--	54 - 57	--	--

‡ "Transient" noise levels often include other noise sources such as U. S. 101 and Bayshore Expressway
* Traffic audible throughout
** Construction audible throughout

FIGURE 1 NOISE MEASUREMENT LOCATIONS AND TEC NOISE SOURCES

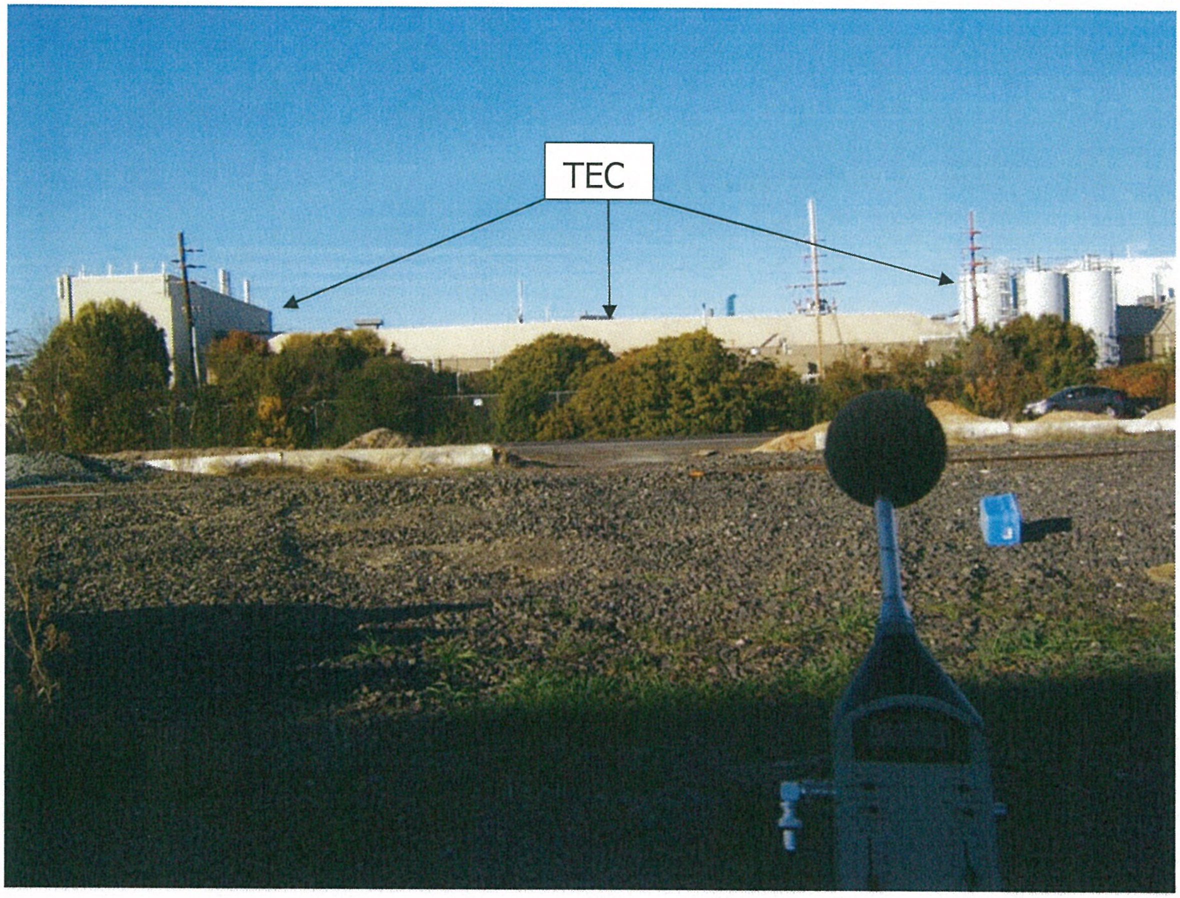


FIGURE 2 LOCATION 1 – LOOKING TOWARDS TEC

FIGURE 3 LOCATION 2 – LOOKING TOWARDS TEC

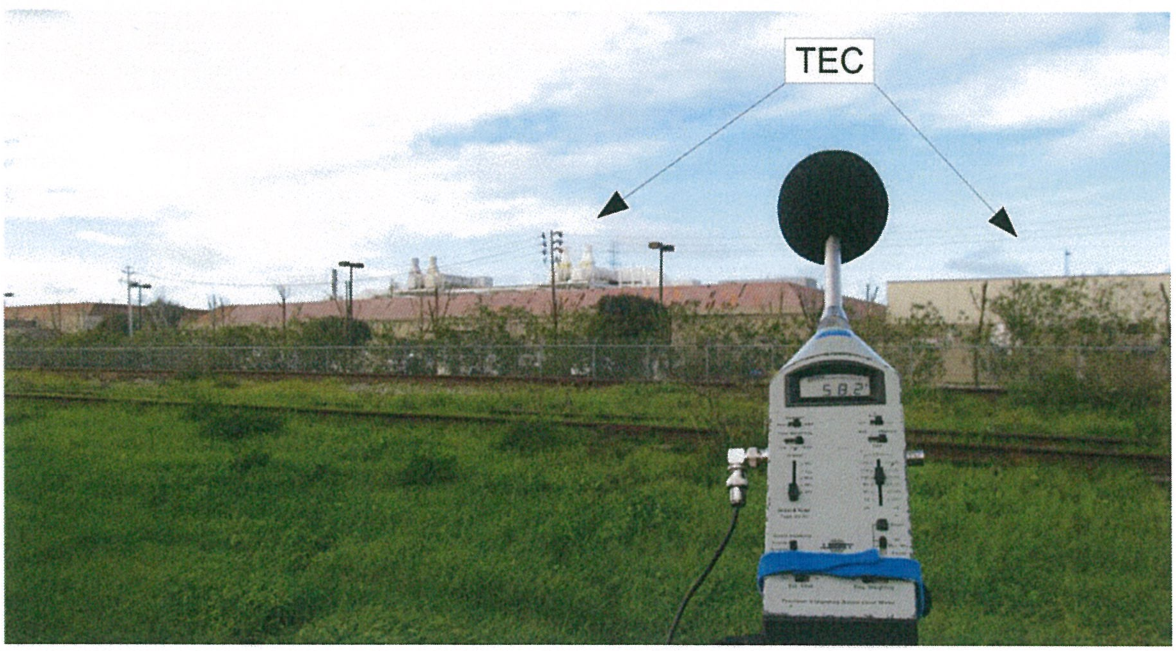


FIGURE 4 LOCATION 3 – LOOKING TOWARDS TEC

Appendix 3.6-2

Noise Measurements

LT-1 Data

Rec 1 to 98 Slow Response dBA weighting 2.0 dB resolution stats

Date hh:mm:ss	LeqPeriod	Leq	SEL	Lmax	Lmin	L1%	L5%	L10%	L50%	L90%	L95%	L99%	Lmedian	Lmean	StdDev	L2%	L8%	L25%
10/1/2015 10:56	1.0 hour	69.6	105.2	93.8	56.5	81	69	65	63	61	61	59	63	63	3.73	77	67	63
10/1/2015 11:56	1.0 hour	69.2	104.8	88.1	60.5	77	73	73	63	61	61	61	63	65.4	4.28	77	73	69
10/1/2015 12:56	1.0 hour	68.2	103.8	89	61.6	77	71	67	63	63	63	61	63	64.6	3.1	77	69	65
10/1/2015 13:56	1.0 hour	64.1	99.7	70.1	61.1	67	65	65	63	61	61	61	63	63.1	1.2	65	65	63
10/1/2015 14:56	1.0 hour	64.7	100.3	74.6	60.9	67	65	65	63	61	61	61	63	63.5	1.49	67	65	65
10/1/2015 15:56	1.0 hour	64.7	100.3	74.3	60.4	69	67	65	63	61	61	61	63	63.4	1.68	67	65	65
10/1/2015 16:56	1.0 hour	63.6	99.2	70.7	60.5	65	65	63	63	61	61	61	63	62.4	1.28	65	63	63
10/1/2015 17:56	1.0 hour	65.2	100.8	73.5	60.9	67	67	65	63	63	61	61	63	64	1.52	67	67	65
10/1/2015 18:56	1.0 hour	65.9	101.5	81.3	62.6	71	67	67	65	63	63	63	65	64.5	1.67	69	67	65
10/1/2015 19:56	1.0 hour	64.9	100.5	69.9	62.7	67	65	65	63	63	63	63	63	63.8	1.17	67	65	65
10/1/2015 20:56	1.0 hour	64.4	100	70.9	62.4	67	65	65	63	63	63	61	63	63.4	1	65	65	63
10/1/2015 21:56	1.0 hour	64.1	99.7	68.7	62.3	65	65	65	63	63	63	61	63	63.1	0.82	65	65	63
10/1/2015 22:56	1.0 hour	64	99.6	69	62.3	65	65	63	63	63	61	61	63	63.1	0.83	65	65	63
10/1/2015 23:56	1.0 hour	64.1	99.7	71.2	62.2	65	65	65	63	63	61	61	63	63.3	1.15	65	65	63
10/2/2015 0:56	1.0 hour	65	100.6	73.6	62.1	67	65	65	65	61	61	61	65	64	1.57	65	65	65
10/2/2015 1:56	1.0 hour	63	98.6	67.1	61.8	63	63	63	61	61	61	61	61	61.8	1	63	63	63
10/2/2015 2:56	1.0 hour	63.3	98.9	67.3	62.4	63	63	63	63	61	61	61	63	62.7	0.74	63	63	63
10/2/2015 3:56	1.0 hour	63.5	99.1	67.4	61.3	65	63	63	63	61	61	61	63	62.8	0.8	65	63	63
10/2/2015 4:56	1.0 hour	64.4	100	69.7	61.8	67	65	65	63	63	63	61	63	63.3	0.95	67	65	63
10/2/2015 5:56	1.0 hour	65.1	100.7	81.9	61.9	69	67	65	63	63	63	61	63	63.8	1.43	67	65	65
10/2/2015 6:56	1.0 hour	64.8	100.4	71.5	61	69	67	65	63	61	61	61	63	63.5	1.7	67	65	65
10/2/2015 7:56	1.0 hour	63.8	99.4	73.4	60.4	69	65	65	63	61	61	59	63	62.4	1.73	67	65	63
10/2/2015 8:56	1.0 hour	63.5	99.1	69.6	60.6	67	65	65	63	61	61	61	63	62.3	1.43	65	65	63
10/2/2015 9:56	1.0 hour	63.5	99.1	80.3	60.3	67	65	63	61	61	61	59	61	62.1	1.72	67	65	63
10/2/2015 10:56	1.0 hour	66.4	102	86.3	60.7	75	69	67	63	61	61	61	63	63.4	2.92	71	67	65
10/2/2015 11:56	1.0 hour	65.9	101.5	86.5	60.8	73	67	65	63	61	61	61	63	63.5	2.47	71	67	65
10/2/2015 12:56	1.0 hour	64.2	99.8	78.3	60.2	67	65	65	63	61	61	61	63	62.9	1.45	65	65	63
10/2/2015 13:56	1.0 hour	63.5	99.1	72.6	60.9	65	65	63	63	61	61	61	63	62.4	1.27	65	63	63
10/2/2015 14:56	1.0 hour	63.5	99.1	72.9	60.4	65	65	63	63	61	61	61	63	62.4	1.37	65	65	63
10/2/2015 15:56	1.0 hour	63.6	99.2	70.9	60.1	67	65	65	63	61	61	61	63	62.4	1.45	65	65	63
10/2/2015 16:56	1.0 hour	63.6	99.2	77.3	59.5	67	65	65	63	61	61	59	63	62.4	1.48	65	65	63
10/2/2015 17:56	1.0 hour	65.8	101.4	75.5	61.8	69	67	67	65	63	63	61	65	64.6	1.44	67	67	65
10/2/2015 18:56	1.0 hour	65.5	101.1	70.3	62.6	67	67	65	65	63	63	63	65	64.3	1.3	67	67	65
10/2/2015 19:56	1.0 hour	64.8	100.4	78.4	62	67	65	65	63	63	61	61	63	63.6	1.44	67	65	65
10/2/2015 20:56	1.0 hour	64.8	100.4	72.2	62.3	67	65	65	63	63	63	61	63	63.7	1.2	67	65	65
10/2/2015 21:56	1.0 hour	63.6	99.2	69.9	60.6	65	65	63	63	61	61	61	63	62.4	1.28	65	65	63
10/2/2015 22:56	1.0 hour	63	98.6	71.4	60.8	67	65	63	61	61	61	61	61	61.8	1.33	65	63	63
10/2/2015 23:56	1.0 hour	64.2	99.8	72.6	60.7	67	65	65	63	61	61	61	63	63	1.72	67	65	65
10/3/2015 0:56	1.0 hour	63.5	99.1	71.6	60.6	67	65	65	61	61	61	61	61	62.2	1.45	65	65	63
10/3/2015 1:56	1.0 hour	61.9	97.5	65.8	60.5	63	63	61	61	61	61	59	61	61.1	0.56	63	61	61
10/3/2015 2:56	1.0 hour	61.8	97.4	68.7	58.5	63	61	61	61	59	59	57	61	60.8	0.99	63	61	61
10/3/2015 3:56	1.0 hour	61.4	97	67.1	58.5	63	61	61	61	59	59	57	61	60.6	1.09	63	61	61
10/3/2015 4:56	1.0 hour	62.1	97.7	70	58.8	65	63	61	61	59	59	59	61	60.9	1.09	63	61	61
10/3/2015 5:56	1.0 hour	63	98.6	69.5	59.2	67	65	63	61	59	59	59	61	61.7	1.59	65	63	63
10/3/2015 6:56	1.0 hour	62.9	98.5	70.1	57.6	67	65	63	61	59	59	57	61	61.5	1.92	65	65	63
10/3/2015 7:56	1.0 hour	60.7	96.3	67.7	58.1	63	61	61	59	59	57	57	59	59.6	1.31	63	61	61
10/3/2015 8:56	1.0 hour	65.6	101.2	82.6	58.5	77	69	67	59	59	59	59	59	61.4	3.84	73	69	61
10/3/2015 9:56	1.0 hour	65.7	101.3	78.4	59.4	75	69	67	63	61	61	59	63	63.3	2.93	73	67	65
10/3/2015 10:56	1.0 hour	62.2	97.8	73.9	58.9	65	63	63	61	59	59	59	61	60.9	1.6	65	63	61
10/3/2015 11:56	1.0 hour	68.4	104	87	59.6	77	73	69	63	61	61	61	63	64.3	3.54	75	69	65
10/3/2015 12:56	1.0 hour	62.9	98.5	75.8	58.9	67	65	63	61	59	59	59	61	61.5	1.78	67	63	63
10/3/2015 13:56	1.0 hour	64.8	100.4	85	59.1	75	67	65	61	59	59	59	61	61.8	2.99	71	65	63
10/3/2015 14:56	1.0 hour	72	107.6	91	59.6	81	77	75	65	61	61	59	65	66.4	5.5	79	75	69
10/3/2015 15:56	1.0 hour	64.7	100.3	78.7	58.8	73	69	67	61	59	59	59	61	62	3.24	71	67	63
10/3/2015 16:56	1.0 hour	69.7	105.3	87.5	56.6	81	75	71	63	59	59	57	63	64.3	5.13	79	73	67
10/3/2015 17:56	1.0 hour	64.4	100	82.4	59.3	71	67	65	61	61	59	59	61	62.3	2.4	69	65	63
10/3/2015 18:56	1.0 hour	64	99.6	81.8	58.7	71	67	65	61	61	59	59	61	62.2	2.25	69	65	63
10/3/2015 19:56	1.0 hour	62.5	98.1	71.2	58.5	67	65	63	61	59	59	57	61	61.3	1.66	65	63	63
10/3/2015 20:56	1.0 hour	64.8	100.4	94.1	58.1	65	63	63	61	59	57	57	61	60.7	1.94	65	63	61
10/3/2015 21:56	1.0 hour	61.5	97.1	69.6	58	65	63	63	61	57	57	57	61	60.4	1.8	65	63	61
10/3/2015 22:56	1.0 hour	63.7	99.3	68	58.4	65	65	65	63	61	59	59	63	62.5	1.72	65	65	63
10/3/2015 23:56	1.0 hour	62.9	98.5	73.6	58.5	67	65	63	61	59	59	59	61	61.4	1.86	65	63	63
10/4/2015 0:56	1.0 hour	61.4	97	73.1	57.8	67	63	61	61	57	57	57	61	60.1	1.93	63	61	61
10/4/2015 1:56	1.0 hour	60.5	96.1	67.8	57.2	63	61	61	59	57	57	57	59	59.4	1.84	63	61	61
10/4/2015 2:56	1.0 hour	60.5	96.1	67.9	58.1	63	61	61	59	57	57	57	59	59.6	1.58	61	61	61
10/4/2015 3:56	1.0 hour	60.4	96	69.2	57.4	63	61	61	59	57	57	57	59	59.3	1.79	61	61	61
10/4/2015 4:56	1.0 hour	60.8	96.4	68	57.5	63	61	61	59	57	57	57	59	59.7	1.46	63	61	61
10/4/2015 5:56	1.0 hour	61.7	97.3	71.3	58.4	65	63	63	61	59	59	59	61	60.4	1.5	65	63	61
10/4/2015 6:56	1.0 hour	62	97.6	79	57.8	65	63	63	61	57	57	57	61	60.3	2.04	65	63	61
10/4/2015 7:56	1.0 hour	59.5	95.1	69	55.7	63	61	61	59	55	55	55	59	58.2	1.85	63	61	59
10/4/2015 8:56	1.0 hour	60.4	96	74.9	55.4	63	63	61	59	57	55	55	59	59.1	1.84	63	61	59
10/4/2015 9:56	1.0 hour	61.9	97.5	70.2	58	65	63	63	61	59	57	57	61	60.6	1.75	65	63	61
10/4/2015 10:56	1.0 hour	61.9	97.5	74	58.1	65	63	63	61	59	57	57	61	60.6	1.82	65	63	61
10/4/2015 11:56	1.0 hour	60.9	96.5	69.2	57.9	65	63	61	59	59	57	57	59	59.7	1.54	63	61	61
10/4/2015 12:56	1.0 hour	61.1	96.7	71.7	58.1	65	63	61	59	59	57	57	59	59.8	1.59	63	63	61
10/4/2015 13:56	1.0 hour	62.1	97.7	71.2	58.3	65	63	63	61	59	59	59	61	60.9	1.64	65	63	61
10/4/2015 14:56	1.0 hour	61.7	97.3	75.1	58.1	65	63	63	61	59	59	59	61	60.4	1.59	63	63	61
10/4/2015 15:56	1.0 hour	61.7	97.3	71.4	58	65	63	63	59	59	59	57	59	60.3	1.73	65	63	61
10/4/2015 16:56	1.0 hour	61.8	97.4	76.3	58	65	63	63	61	59	59	57	61	60.4	1.69	65	63	61
10/4/2015 17:56	1.0 hour	63.3	98.9	73	60.3	67	65	63	61	61	61	59	61	62.1	1.45	65	65	63
10/4/2015 18:56	1.0 hour	63.1	98.7	77.7	60.4	65	65	63	61	61	61	59	61	61.9	1.43	65	63	63
10/4/2015 19:56	1.0 hour	63	98.6	69.4	60.4	65	65	63	61	61	61	59	61	61.8	1.37	65	63	63
10/4/2015 20:56	1.0 hour	62.6	98.2	69.3	60.1	65	65	63	61	59	59	59	61	61.5	1.55	65	63	63
10/4/2015 21:56	1.0 hour	64.9	100.5	71.8	61.5	67	65	65	63	63	61	61	63	63.8	1.32	67	65	65
10/4/2015 22:56	1.0 hour	63.4	99	77.3	61.6	65	63	63	63	61	61	61	63	62.3	1.21	65	63	63
10/4/2015 23:56	1.0 hour	63.3	98.9	68.9	62.1	65	63	63	63	61	61	61	63	62.5	0.97	63	63	63
10/5/2015 0:56	1.0 hour	63	98.6	67.7	62	63	63	63	61	61	61	61	61	61.8	1.01	63	63	63
10/5/2015 1:56	1.0 hour	62.9	98.5	66	61.6	63	63	63	61	61	61	61	61	61.8	1.01	63	63	63
10/5/2015 2:56	1.0 hour	62.6	98.2	67.7	61.5	65	63	61	61	61	61	61	61	61.2	0.67	63	61	61
10/5/2015 3:56	1.0 hour	63.5	99.1	69.3	61.9	65	63	63	63	61	61	61	63	62.4	1.15	65	63	63
10/5/2015 4:56	1.0 hour	64.8	100.4	70.7	63.2	67	65	65	63	63	63	63	63	63.6	1.09	67	65	63

10/5/2015 5:56	1.0 hour	65.8	101.4	72.5	63.5	67	67	65	65	63	63	63	65	64.8	1.14	67	67	65
10/5/2015 6:56	1.0 hour	65.7	101.3	72.7	61.3	69	67	67	65	63	61	61	65	64.4	1.72	67	67	65
10/5/2015 7:56	1.0 hour	63.4	99	73.1	60.1	67	65	65	61	61	59	59	61	62.1	1.73	67	65	63
10/5/2015 8:56	1.0 hour	63.5	99.1	71.6	60.4	67	65	65	63	61	61	59	63	62.3	1.5	65	65	63
10/5/2015 9:56	1.0 hour	64.3	99.9	71.2	60.7	67	65	65	63	61	61	61	63	63.1	1.28	65	65	63
10/5/2015 10:56	1.0 hour	64	99.6	77.5	60.6	69	65	65	63	61	61	61	63	62.5	1.81	67	65	63
10/5/2015 11:56	16.4 min	68	97.9	89.7	59.2	79	67	65	63	61	61	61	63	63.4	2.9	71	65	63

LT-2 Data

Rec 2 to 99 Slow Response dBA weighting 2.0 dB resolution stats

Date hh:mm:ss	LeqPeriod	Leq	SEL	Lmax	Lmin	L1%	L5%	L10%	L50%	L90%	L95%	L99%	Lmedian	Lmean	StdDev	L2%	L8%	L25%
10/1/2015 11:24	1.0 hour	65.3	100.9	90.2	42	77	67	63	49	45	43	43	49	51.4	7.89	73	65	55
10/1/2015 12:24	1.0 hour	56.8	92.4	80.1	44.7	67	61	57	49	47	45	45	49	50.2	4.94	63	59	51
10/1/2015 13:24	1.0 hour	54.4	90	71.2	45.2	63	59	57	49	47	45	45	49	50.4	4.1	61	57	53
10/1/2015 14:24	1.0 hour	55	90.6	69.9	44.7	63	59	57	51	47	47	45	51	52	3.71	61	57	53
10/1/2015 15:24	1.0 hour	56.7	92.3	69.9	47.7	65	61	59	53	51	49	49	53	53.7	3.61	63	61	55
10/1/2015 16:24	1.0 hour	56.4	92	79.5	47.6	65	61	59	51	49	49	47	51	52.2	4.07	65	59	53
10/1/2015 17:24	1.0 hour	54.1	89.7	71.4	46.1	63	59	57	49	47	47	45	49	50.5	3.87	61	57	51
10/1/2015 18:24	1.0 hour	55.8	91.4	71.6	47.5	65	61	57	51	49	49	47	51	52.7	3.54	63	59	53
10/1/2015 19:24	1.0 hour	56.9	92.5	71	49.2	65	61	59	53	51	49	49	53	53.6	3.66	65	59	55
10/1/2015 20:24	1.0 hour	56.4	92	71.2	48.2	63	61	59	51	49	49	47	51	53.3	3.9	63	59	57
10/1/2015 21:24	1.0 hour	53.9	89.5	67.7	46.5	63	59	55	49	47	47	47	49	51	3.38	61	57	51
10/1/2015 22:24	1.0 hour	51.9	87.5	63.6	47.7	59	53	53	49	49	47	47	49	50.3	2.03	57	53	51
10/1/2015 23:24	1.0 hour	50.3	85.9	67.4	44.7	59	51	49	47	45	45	45	47	47.5	2.65	55	51	49
10/2/2015 0:24	1.0 hour	50.3	85.9	71	43.1	59	49	47	45	43	43	43	45	45.8	2.88	55	47	47
10/2/2015 1:24	1.0 hour	51.3	86.9	73.5	42.5	63	47	47	45	43	43	41	45	44.6	3.07	53	47	45
10/2/2015 2:24	1.0 hour	45.8	81.4	52.4	42	49	47	47	45	43	43	41	45	44.5	1.73	49	47	45
10/2/2015 3:24	1.0 hour	50	85.6	59.6	46.3	55	51	51	49	47	47	47	49	48.6	1.75	53	51	49
10/2/2015 4:24	1.0 hour	53	88.6	62.8	48.5	57	55	53	51	49	49	49	51	51.6	1.91	55	53	53
10/2/2015 5:24	1.0 hour	54.3	89.9	66.9	50	57	55	55	53	51	51	49	53	53.1	1.43	55	55	53
10/2/2015 6:24	1.0 hour	57.7	93.3	73.8	50.4	67	61	59	53	51	51	51	53	54.4	3.36	65	59	55
10/2/2015 7:24	1.0 hour	59.2	94.8	80.3	48	67	63	61	53	49	49	47	53	54.7	4.31	65	61	57
10/2/2015 8:24	1.0 hour	60.9	96.5	71.4	43.2	67	67	65	53	47	45	43	53	54.7	7.28	67	65	61
10/2/2015 9:24	1.0 hour	53.6	89.2	69.8	43.2	63	59	57	47	45	45	43	47	49.3	4.65	61	57	51
10/2/2015 10:24	1.0 hour	63.1	98.7	92.6	43.2	75	61	57	47	43	43	43	47	49.1	6.35	67	59	51
10/2/2015 11:24	1.0 hour	66.1	101.7	91.1	43.1	79	65	59	49	45	45	43	49	50.4	7.12	77	59	53
10/2/2015 12:24	1.0 hour	54.7	90.3	78.4	43.9	65	59	55	47	45	45	43	47	48.5	4.72	61	57	49
10/2/2015 13:24	1.0 hour	54.1	89.7	67.7	44.3	63	59	57	49	45	45	45	49	50.1	4.59	61	59	53
10/2/2015 14:24	1.0 hour	54.8	90.4	69.8	45.7	65	59	57	51	47	47	45	51	51.6	3.73	63	57	53
10/2/2015 15:24	1.0 hour	55.5	91.1	69.7	46.9	63	61	59	51	49	49	47	51	52.5	3.64	61	59	53
10/2/2015 16:24	1.0 hour	55.7	91.3	73.7	48.5	65	59	57	51	49	49	49	51	52.5	3.33	63	59	53
10/2/2015 17:24	1.0 hour	56.5	92.1	74.5	47.6	65	61	59	53	49	49	47	53	53	3.8	63	59	55
10/2/2015 18:24	1.0 hour	56.7	92.3	67.3	51.7	63	59	57	55	53	53	51	55	55	2.23	61	57	57
10/2/2015 19:24	1.0 hour	57.5	93.1	71.9	46.9	65	61	61	53	49	47	47	53	54.1	4.45	63	61	57
10/2/2015 20:24	1.0 hour	55.2	90.8	68.6	45.9	65	61	57	49	47	47	45	49	51.1	4.28	63	59	53
10/2/2015 21:24	1.0 hour	51.4	87	66	44.6	61	55	53	49	45	45	45	49	48.8	3.04	57	53	49
10/2/2015 22:24	1.0 hour	51.9	87.5	68.6	44.1	63	57	51	47	45	45	43	47	47.7	3.74	61	53	49
10/2/2015 23:24	1.0 hour	51.4	87	68.4	45	63	53	49	47	45	45	45	47	47.9	2.98	59	51	49
10/3/2015 0:24	1.0 hour	53.9	89.5	71.8	45.2	67	53	49	47	47	47	45	47	48.3	3.56	65	51	49
10/3/2015 1:24	1.0 hour	48.6	84.2	61.7	44.6	53	49	49	47	45	45	45	47	47.1	1.75	51	49	47
10/3/2015 2:24	1.0 hour	48.2	83.8	60	44.2	53	51	49	47	45	45	43	47	46.8	1.94	51	49	47
10/3/2015 3:24	1.0 hour	46.4	82	52.6	44.1	49	47	47	45	45	43	43	45	45.4	1.23	49	47	45
10/3/2015 4:24	1.0 hour	50.1	85.7	67.5	44.5	55	51	51	47	45	45	45	47	47.7	2.52	55	51	49
10/3/2015 5:24	1.0 hour	52.7	88.3	62.8	47.8	59	55	53	51	49	49	47	51	51.1	2.17	57	53	53
10/3/2015 6:24	1.0 hour	55.8	91.4	68.2	49	63	59	57	53	51	51	49	53	53.8	2.63	61	57	55
10/3/2015 7:24	1.0 hour	55.3	90.9	68.1	47.1	61	57	57	53	49	49	47	53	53.2	2.92	61	57	55
10/3/2015 8:24	1.0 hour	53	88.6	71	42.9	61	59	55	47	43	43	43	47	48.9	4.81	59	57	53
10/3/2015 9:24	1.0 hour	54.6	90.2	70.4	42.8	65	59	57	49	45	43	43	49	49.9	4.67	63	57	51
10/3/2015 10:24	1.0 hour	55	90.6	74.5	42.4	65	61	55	47	45	43	43	47	48.7	5.21	63	57	51
10/3/2015 11:24	1.0 hour	53.6	89.2	67.9	43.5	63	59	57	47	45	43	43	47	49.2	4.77	61	57	51
10/3/2015 12:24	1.0 hour	53.3	88.9	70.7	43.5	63	57	55	47	45	45	43	47	48.8	4.39	61	55	51
10/3/2015 13:24	1.0 hour	54.2	89.8	69.8	42.8	65	59	57	49	45	45	43	49	50.1	4.29	63	57	51
10/3/2015 14:24	1.0 hour	57.7	93.3	74.5	44.1	65	63	61	53	49	47	45	53	54.2	4.4	65	61	57
10/3/2015 15:24	1.0 hour	56.9	92.5	68.5	51.6	63	61	59	55	53	53	51	55	55	2.47	63	59	55
10/3/2015 16:24	1.0 hour	56.9	92.5	69.8	49.5	63	61	59	55	51	51	49	55	54.7	3.07	63	59	57
10/3/2015 17:24	1.0 hour	57	92.6	73.8	52.1	61	59	57	55	53	53	53	55	55.5	1.97	61	59	57
10/3/2015 18:24	1.0 hour	56.6	92.2	74	51.3	65	59	57	53	51	51	51	53	54.1	2.72	65	57	55
10/3/2015 19:24	1.0 hour	56.1	91.7	71.1	50	65	61	55	53	51	51	51	53	53.4	2.86	63	57	53
10/3/2015 20:24	1.0 hour	50.4	86	66.7	42.1	59	53	51	47	43	43	41	47	47	3.77	57	53	49
10/3/2015 21:24	1.0 hour	51.7	87.3	67.4	44.6	63	55	51	47	45	45	45	47	47.6	3.65	61	53	47
10/3/2015 22:24	1.0 hour	49.7	85.3	69.5	45.4	57	51	49	47	45	45	45	47	47.7	2.17	55	51	49
10/3/2015 23:24	1.0 hour	53.5	89.1	74.7	45.7	65	53	51	47	47	45	45	47	48.3	3.25	61	51	49
10/4/2015 0:24	1.0 hour	48.8	84.4	62.4	44.5	53	49	49	47	45	45	45	47	47.5	1.7	51	49	49
10/4/2015 1:24	1.0 hour	52.8	88.4	75.7	43.1	65	47	47	45	43	43	43	45	45.3	3.21	51	47	45
10/4/2015 2:24	1.0 hour	46.6	82.2	64.5	42.3	55	49	47	43	43	43	41	43	44.4	2.46	53	47	45
10/4/2015 3:24	1.0 hour	46.1	81.7	58	42.1	51	47	47	45	43	43	41	45	44.7	1.98	49	47	45
10/4/2015 4:24	1.0 hour	57.3	92.9	69.7	43.2	63	61	61	53	45	43	43	53	52.3	6.58	63	61	59
10/4/2015 5:24	1.0 hour	49.6	85.2	62.7	45.1	57	51	49	47	45	45	45	47	47.8	2.11	55	51	49
10/4/2015 6:24	1.0 hour	52.6	88.2	65.9	47.2	61	55	53	49	47	47	47	49	50.5	2.68	57	55	51
10/4/2015 7:24	1.0 hour	56.4	92	76.2	43.8	65	59	57	51	47	45	43	51	51.6	4.5	63	59	53
10/4/2015 8:24	1.0 hour	55	90.6	73.6	43.1	65	61	57	47	43	43	43	47	48.6	5.63	63	59	51
10/4/2015 9:24	1.0 hour	54.8	90.4	69.9	42	65	61	57	47	43	43	41	47	48.9	5.89	63	59	53
10/4/2015 10:24	1.0 hour	63.9	99.5	78.1	41.9	75	73	67	49	43	43	41	49	52.1	8.96	73	69	57
10/4/2015 11:24	1.0 hour	69.9	105.5	77.9	43.1	75	75	73	61	47	45	43	61	61.7	10.07	75	73	71
10/4/2015 12:24	1.0 hour	65.9	101.5	76.5	42.7	73	71	69	59	47	45	43	59	58.7	8.9	73	69	67
10/4/2015 13:24	1.0 hour	58.6	94.2	71.8	44	69	65	63	49	45	45	43	49	52	6.26	67	63	55
10/4/2015 14:24	1.0 hour	55.2	90.8	70.4	46	63	59	57	51	49	47	47	51	52.1	3.56	61	57	53
10/4/2015 15:24	1.0 hour	55.3	90.9	72.4	45.3	65	61	57	51	47	47	45	51	51.3	4.13	63	57	53
10/4/2015 16:24	1.0 hour	55.9	91.5	73.4	45.9	65	61	57	51	49	47	47	51	52.3	3.88	63	59	53
10/4/2015 17:24	1.0 hour	58.3	93.9	71.9	46.7	67	65	61	51	49	49	47	51	53.6	4.97	67	63	57
10/4/2015 18:24	1.0 hour	70.7	106.3	80	47.4	77	75	73	67	51	49	47	67	63.3	9.53	75	75	73
10/4/2015 19:24	1.0 hour	70.4	106	88.4	47.3	77	77	75	59	53	51	49	59	62.1	8.42	77	75	69
10/4/2015 20:24	1.0 hour	58.3	93.9	75.8	46.5	69	63	61	51	47	47	47	51	51.9	5.32	67	61	53
10/4/2015 21:24	1.0 hour	52.9	88.5	67.4	42.5	63	57	55	47	43	43	43	47	48.3	4.46	63	55	49
10/4/2015 22:24	1.0 hour	51.6	87.2	68.1	44.7	63	55	51	47	45	45	45	47	47.9	3.21	61	51	49
10/4/2015 23:24	1.0 hour	49.8	85.4	67.7	43.6	61	53	49	45	43	43	43	45	46.1	3.25	57	49	47
10/5/2015 0:24	1.0 hour	50	85.6	68.7	43.8	61	49	47	45	45	43	43	45	46	2.7	55	47	47
10/5/2015 1:24	1.0 hour	46.8	82.4	63.3	42.5	51	49	47	45	43	43	43	45	45.3	1.83	49	47	47
10/5/2015 2:24	1.0 hour	46.8	82.4	66.6	42.4	53	47	47	45	43	43	43	45	44.7	2.08	49	47	45
10/5/2015 3:24	1.0 hour	47.8	83.4	63.7	42.6	55	49	47	45	43	43	43	45	45.7	2.11	51	47	47
10/5/2015 4:24	1.0 hour	51	86.6	66.6	45.4	57	53	51	49	47	45	45	49	48.9	2.66	55	53	51
10/5/2015 5:24	1.0 hour	53.1	88.7	65.8	48.1	59	55	53	51	49	49	47	51	51.5	2.11	57	55	53

10/5/2015 6:24	1.0 hour	56.6	92.2	67.5	49.7	63	59	57	55	53	53	51	55	55	2.12	61	57	55
10/5/2015 7:24	1.0 hour	55.3	90.9	68.9	45.1	63	59	57	53	47	47	45	53	52.2	3.94	61	57	55
10/5/2015 8:24	1.0 hour	53.3	88.9	69.8	42.7	63	59	55	47	43	43	43	47	48.2	4.75	63	57	49
10/5/2015 9:24	1.0 hour	55.4	91	69.7	43.1	65	61	59	47	45	43	43	47	49.6	5.66	63	59	53
10/5/2015 10:24	1.0 hour	54.3	89.9	76.2	42.7	65	59	55	47	43	43	43	47	48	5.02	63	57	49
10/5/2015 11:24	1.0 hour	56.2	91.8	74	43.7	67	63	59	47	45	45	43	47	50	5.62	65	61	53
10/5/2015 12:24	1.9 min	72.8	93.3	87.2	45.8	85	79	75	59	45	45	45	59	59.9	11.13	83	75	69

ST-1 Data

Record #	Record Type	Date	Time	LAeq	LASmax	LASmin	Ovrld.	OBA Ovrld.	Marker
1	Calibration Change	2015/10/01	13:11:46	0.0	0.0	0.0	No	No	
2	Run	2015/10/01	13:12:32	0.0	0.0	0.0	No	No	
3		2015/10/01	13:12:32	63.7	67.2	54.6	No	No	
4	Pause	2015/10/01	13:13:15	0.0	0.0	0.0	No	No	
5	Resume	2015/10/01	13:13:40	0.0	0.0	0.0	No	No	
6		2015/10/01	13:13:40	57.8	64.9	49.2	No	No	
7		2015/10/01	13:14:40	57.8	62.8	51.9	No	No	
8		2015/10/01	13:15:40	62.1	66.6	58.3	No	No	
9	Pause	2015/10/01	13:16:31	0.0	0.0	0.0	No	No	
10	Resume	2015/10/01	13:16:44	0.0	0.0	0.0	No	No	
11		2015/10/01	13:16:44	61.1	68.4	51.6	No	No	
12		2015/10/01	13:17:44	59.6	64.7	51.6	No	No	
13		2015/10/01	13:18:44	59.9	65.8	53.6	No	No	
14		2015/10/01	13:19:44	61.9	67.3	54.0	No	No	
15		2015/10/01	13:20:44	60.2	65.5	54.4	No	No	
16		2015/10/01	13:21:44	61.8	66.2	51.6	No	No	
17		2015/10/01	13:22:44	62.9	69.5	52.0	No	No	
18		2015/10/01	13:23:44	62.0	67.1	51.9	No	No	
19		2015/10/01	13:24:44	60.3	65.6	49.4	No	No	
20		2015/10/01	13:25:44	56.7	60.8	50.6	No	No	
21		2015/10/01	13:26:44	59.3	63.9	51.0	No	No	
22		2015/10/01	13:27:44	60.8	66.1	50.3	No	No	
23		2015/10/01	13:28:44	59.2	63.2	53.7	No	No	
24		2015/10/01	13:29:44	60.9	67.4	53.0	No	No	
25		2015/10/01	13:30:44	59.9	67.4	49.8	No	No	
26		2015/10/01	13:31:44	59.5	64.8	54.0	No	No	
27	Pause	2015/10/01	13:32:33	0.0	0.0	0.0	No	No	
28		2015/10/01	13:31:44	59.5	64.8	54.0	No	No	
29	Stop	2015/10/01	13:32:51	0.0	0.0	0.0	No	No	

ST-2 Data

Record #	Record Type	Date	Time	LAeq	LASmax	LASmin	Ovrld.	OBA Ovrld.	Marker
1	Run	2015/10/01	12:13:05	0.0	0.0	0.0	No	No	
2		2015/10/01	12:13:05	53.3	57.2	49.6	No	No	
3	Pause	2015/10/01	12:13:12	0.0	0.0	0.0	No	No	
4	Resume	2015/10/01	12:13:13	0.0	0.0	0.0	No	No	
5		2015/10/01	12:13:13	49.5	60.1	45.4	No	No	
6		2015/10/01	12:14:13	58.5	63.8	46.0	No	No	
7		2015/10/01	12:15:13	48.5	52.9	45.7	No	No	
8		2015/10/01	12:16:13	48.6	54.4	44.4	No	No	
9		2015/10/01	12:17:13	45.0	51.2	43.2	No	No	
10		2015/10/01	12:18:13	50.2	55.8	45.6	No	No	
11		2015/10/01	12:19:13	47.2	53.5	43.7	No	No	
12		2015/10/01	12:20:13	61.6	68.6	44.9	No	No	
13		2015/10/01	12:21:13	52.5	61.0	46.4	No	No	
14		2015/10/01	12:22:13	62.8	74.9	46.3	No	No	
15		2015/10/01	12:23:13	58.3	66.9	47.2	No	No	
16		2015/10/01	12:24:13	46.6	50.7	43.5	No	No	
17		2015/10/01	12:25:13	62.1	69.5	49.0	No	No	
18		2015/10/01	12:26:13	59.8	69.1	47.0	No	No	
19		2015/10/01	12:27:13	48.1	52.6	44.1	No	No	
20		2015/10/01	12:28:13	50.0	54.8	44.4	No	No	
21		2015/10/01	12:29:13	46.8	50.6	44.0	No	No	
22		2015/10/01	12:30:13	48.7	55.3	44.8	No	No	
23	Stop	2015/10/01	12:31:06	0.0	0.0	0.0	No	No	

ST-3 Data

Record #	Record Type	Date	Time	LAeq	LASmax	LASmin	Ovrld.	OBA Ovrld.	Marker
1	Run	2015/10/01	14:22:43	0.0	0.0	0.0	No	No	
2		2015/10/01	14:22:43	67.5	74.9	48.2	No	No	
3		2015/10/01	14:23:43	65.6	74.0	44.7	No	No	
4		2015/10/01	14:24:43	67.8	74.2	45.5	No	No	
5		2015/10/01	14:25:43	65.7	73.3	48.3	No	No	
6		2015/10/01	14:26:43	61.8	69.8	47.5	No	No	
7		2015/10/01	14:27:43	66.5	77.6	45.9	No	No	
8		2015/10/01	14:28:43	69.1	80.2	45.6	No	No	
9		2015/10/01	14:29:43	67.2	75.1	50.2	No	No	
10		2015/10/01	14:30:43	63.3	71.9	47.5	No	No	
11		2015/10/01	14:31:43	68.1	74.8	52.7	No	No	
12		2015/10/01	14:32:43	62.9	70.9	52.2	No	No	
13		2015/10/01	14:33:43	66.3	75.5	46.2	No	No	
14		2015/10/01	14:34:43	65.9	77.2	46.8	No	No	
15		2015/10/01	14:35:43	68.4	77.2	49.8	No	No	
16		2015/10/01	14:36:43	61.7	73.5	46.8	No	No	
17		2015/10/01	14:37:43	71.5	74.3	66.6	No	No	
18	Stop	2015/10/01	14:37:49	0.0	0.0	0.0	No	No	

ST-4 Data

Record #	**Record Type**	**Date**	**Time**	**LAeq**	**LASmax**	**LASmin**	**Ovrld.**	**OBA Ovrld.**	**Marker**
1	Calibration Change	2015/10/01	13:42:22	0.0	0.0	0.0	No	No	
2	Run	2015/10/01	13:42:57	0.0	0.0	0.0	No	No	
3		2015/10/01	13:42:57	62.3	69.1	47.6	No	No	
4		2015/10/01	13:43:57	65.2	70.3	49.8	No	No	
5		2015/10/01	13:44:57	64.7	68.3	53.4	No	No	
6		2015/10/01	13:45:57	63.9	68.0	49.2	No	No	
7		2015/10/01	13:46:57	59.3	67.2	46.7	No	No	
8		2015/10/01	13:47:57	62.2	66.7	51.2	No	No	
9		2015/10/01	13:48:57	62.3	67.8	49.0	No	No	
10		2015/10/01	13:49:57	63.3	70.1	51.5	No	No	
11		2015/10/01	13:50:57	62.4	66.6	55.2	No	No	
12		2015/10/01	13:51:57	58.1	66.9	46.4	No	No	
13		2015/10/01	13:52:57	63.6	68.3	55.7	No	No	
14		2015/10/01	13:53:57	64.0	69.3	57.6	No	No	
15		2015/10/01	13:54:57	58.3	62.9	50.5	No	No	
16		2015/10/01	13:55:57	64.7	71.9	47.7	No	No	
17		2015/10/01	13:56:57	65.4	70.2	56.7	No	No	
18		2015/10/01	13:57:57	63.7	69.8	52.8	No	No	
19		2015/10/01	13:58:57	63.0	69.3	53.9	No	No	
20		2015/10/01	13:59:57	62.0	67.3	49.9	No	No	
21		2015/10/01	14:00:57	63.6	67.8	49.2	No	No	
22		2015/10/01	14:01:57	65.1	69.0	55.1	No	No	
23		2015/10/01	14:02:57	61.1	66.2	52.2	No	No	
24	Stop	2015/10/01	14:03:17	0.0	0.0	0.0	No	No	

Appendix 3.6-3

Average Daily Trip Volumes

Segment	Street	Segment between		Jurisdiction	Classification	Existing	Forecast Background	Background + Facebook	Facebook Volumes	Significant Impact?	Current General Plan	Current GP + Facebook	Facebook Volumes	Significant Impact?	Forecast New GP	New GP - Current GP
1	Alameda De Las Pulgas	*Avy Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Minor Arterial*	12,449	12,943	13,153	210	NO	14,970	14,710	-260	NO	14,807	-163
2	Alameda De Las Pulgas	*Valparaiso Ave.*	*Avy Ave.*	*County*	*Minor Arterial*	15,329	15,902	16,128	226	NO	18,304	18,245	-59	NO	18,130	-174
3	Alameda De Las Pulgas	*City Limit*	*Valparaiso Ave.*	*County*	*Minor Arterial*	16,141	16,849	17,091	242	NO	19,322	19,327	5	NO	19,276	-46
4	Alma St.	*Ravenswood Ave.*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	1,640	1,665	1,667	2	NO	1,864	1,905	41	NO	1,822	-42
5	Alma St.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Collector*	3,240	4,793	4,716	-77	NO	4,888	4,907	19	NO	5,069	181
6	Alpine Rd.	*City Limit*	*Junipero Serra Blvd.*	*Menlo Park*	*Minor Arterial*	23,305	24,264	24,450	186	**YES**	25,858	26,325	467	**YES**	26,171	313
7	Avy Ave.	*City Limit*	*Alameda de las Pulgas*	*Atherton*	*Collector*	4,606	4,555	4,568	13	NO	4,697	4,700	3	NO	4,704	7
8	Avy Ave.	*Alameda de las Pulgas*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	5,935	5,929	5,964	35	NO	6,175	6,431	256	NO	6,195	20
9	Bay Rd.	*Greenwood Dr.*	*Marsh Rd.*	*Menlo Park*	*Collector*	5,548	7,051	7,363	312	NO	10,140	10,190	50	NO	10,190	50
10	Bay Rd.	*Ringwood Ave.*	*Greenwood Dr.*	*Menlo Park*	*Collector*	5,658	7,092	7,354	262	NO	10,008	10,097	89	**YES**	10,112	104
11	Bay Rd.	*Willow Rd.*	*Ringwood Ave.*	*Menlo Park*	*Collector*	7,581	9,165	9,053	-112	NO	9,757	9,576	-181	NO	9,667	-90
12	Bohannon Dr.	*Campbell Ave.*	*Marsh Rd.*	*Menlo Park*	*Collector*	3,908	3,908	3,908	0	NO	3,908	3,908	0	NO	3,908	0
13	Chilco St.	*Constitution Dr.*	*Bayfront Expwy.*	*Menlo Park*	*Collector*	6,999	5,205	17,440	12,235	**YES**	6,172	17,379	11,207	**YES**	9,317	3,145
14	Chrysler Dr.	*Constitution Dr.*	*Bayfront Expwy.*	*Menlo Park*	*Collector*	4,068	4,068	4,068	0	NO	4,068	4,068	0	NO	4,068	0
15	Constitution Dr.	*Chilco St.*	*Chrysler Dr.*	*Menlo Park*	*Collector*	2,359	2,787	5,770	2,983	**YES**	3,163	6,681	3,518	**YES**	5,304	2,141
16	Crane St.	*Oak Grove Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	2,662	3,001	2,998	-3	NO	3,250	3,284	34	NO	3,271	21
17	Crane St.	*Santa Cruz Ave.*	*Menlo Ave.*	*Menlo Park*	*Collector*	2,418	2,424	2,424	0	NO	2,451	2,465	14	NO	2,454	3
18	Encinal Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	5,597	5,697	5,736	39	NO	6,111	6,049	-62	NO	6,416	305
19	Encinal Ave.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	4,949	5,615	5,663	48	NO	5,995	5,841	-154	NO	6,275	280
20	Glenwood Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	5,979	5,829	6,010	181	NO	6,288	6,406	118	NO	6,518	230
21	Hamilton Ave.	*Willow Rd.*	*Chilco St.*	*Menlo Park*	*Collector*	2,773	2,456	3,399	943	**YES**	3,063	3,480	417	NO	3,468	405
22	Haven Ave.	*Bayfront Expwy./Marsh Rd.*	*City Limit*	*Menlo Park*	*Collector*	7,397	12,763	13,067	304	**YES**	15,443	15,123	-320	NO	17,487	2,044
23	Junipero Serra Blvd.	*City Limit*	*Alpine Rd.*	*Menlo Park*	*Primary Arterial*	16,010	16,154	16,301	147	NO	18,119	18,525	406	**YES**	18,374	255
24	Laurel St.	*Oak Grove Ave.*	*Glenwood Ave.*	*Menlo Park*	*Collector*	4,055	4,843	4,978	135	NO	5,397	5,516	119	NO	5,566	169
25	Laurel St.	*Ravenswood Ave.*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	4,408	4,614	4,740	126	NO	5,979	6,189	210	NO	5,799	-180
26	Laurel St.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Collector*	4,471	4,859	4,938	79	NO	5,805	5,586	-219	NO	5,643	-162
27	Marsh Rd.	*City Limit*	*Bay Rd.*	*Menlo Park*	*Minor Arterial*	22,845	24,728	25,193	465	**YES**	25,825	25,175	-650	NO	26,084	259
28	Marsh Rd.	*Bay Rd.*	*Bohannon Dr.*	*Menlo Park*	*Primary Arterial*	25,828	29,175	29,834	659	**YES**	33,550	33,036	-514	NO	33,926	376
29	Marsh Rd.	*Bohannon Dr.*	*Scott Dr.*	*Menlo Park*	*Primary Arterial*	32,408	38,713	38,767	54	NO	45,082	42,393	-2,689	NO	43,413	-1,669
30	Menlo Ave.	*University Ave.*	*Crane St.*	*Menlo Park*	*Collector*	7,360	7,516	7,460	-56	NO	7,695	7,613	-82	NO	7,580	-115
31	Menlo Ave.	*Crane St.*	*El Camino Real*	*Menlo Park*	*Collector*	8,647	8,638	8,565	-73	NO	8,725	8,646	-79	NO	8,611	-114
32	Middle Ave.	*Olive St.*	*University Dr.*	*Menlo Park*	*Collector*	7,249	7,456	7,411	-45	NO	7,706	7,720	14	NO	7,698	-8
33	Middle Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Collector*	8,916	8,903	8,812	-91	NO	9,443	9,392	-51	NO	9,330	-113
34	Middlefield Rd.	*Ravenswood Ave.*	*Oak Grove Ave.*	*Atherton*	*Minor Arterial*	14,757	14,681	14,983	302	NO	16,766	16,349	-417	NO	16,630	-136
35	Middlefield Rd.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Minor Arterial*	19,684	20,502	20,672	170	**YES**	21,612	21,921	309	**YES**	21,794	182
36	Middlefield Rd.	*City Limit*	*Willow Rd.*	*Menlo Park*	*Minor Arterial*	18,416	18,460	18,584	124	**YES**	22,461	21,811	-650	NO	22,310	-151
37	Newbridge St.	*Willow Rd.*	*Chilco St.*	*Menlo Park*	*Collector*	7,065	9,419	11,562	2,143	**YES**	8,303	12,163	3,860	**YES**	7,995	-308
38	Oak Grove Ave.	*University Dr.*	*Crane St.*	*Menlo Park*	*Collector*	6,351	6,612	6,680	68	NO	7,611	7,673	62	NO	7,428	-183
39	Oak Grove Ave.	*Crane St.*	*El Camino Real*	*Menlo Park*	*Collector*	7,697	8,559	8,502	-57	NO	10,544	10,938	394	**YES**	10,540	-4
40	Oak Grove Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	9,570	10,573	10,668	95	**YES**	11,813	11,755	-58	NO	11,486	-327
41	Oak Grove Ave.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	8,651	8,719	8,740	21	NO	8,825	8,713	-112	NO	8,803	-22

Segment	Street	Segment between		Jurisdiction	Classification	Existing	Forecast Background	Background + Facebook	Facebook Volumes	Significant Impact?	Current General Plan	Forecast GP + Facebook	Facebook Volumes	Significant Impact?	Forecast New GP	New GP - Current GP
42	O'Brien Dr.	*Kavanaugh Dr.*	*Willow Rd.*	*Menlo Park*	*Collector*	6,374	5,741	5,750	9	NO	7,457	7,881	424	NO	13,754	6,297
43	O'Brien Dr.	*University Ave.*	*Kavanaugh Dr.*	*Menlo Park*	*Collector*	3,279	2,904	3,154	250	NO	3,367	3,603	236	NO	5,613	2,246
44	Ravenswood Ave.	*El Camino Real*	*Alma St.*	*Menlo Park*	*Minor Arterial*	23,981	24,612	24,582	-30	NO	26,390	25,693	-697	NO	25,914	-476
45	Ravenswood Ave.	*Alma St.*	*Laurel St.*	*Menlo Park*	*Minor Arterial*	18,762	18,051	18,086	35	NO	19,898	19,225	-673	NO	19,155	-743
46	Ravenswood Ave.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Minor Arterial*	16,553	15,923	15,928	5	NO	18,156	17,738	-418	NO	17,384	-772
47	Ringwood Ave.	*Middlefield Rd.*	*Bay Rd.*	*County*	*Collector*	7,302	7,804	7,756	-48	NO	9,362	9,503	141	**YES**	8,662	-700
48	Sand Hill Rd.	*I-280*	*Sharon Park Dr.*	*Menlo Park*	*Primary Arterial*	28,048	27,979	28,010	31	NO	29,725	30,116	391	**YES**	29,902	177
49	Sand Hill Rd.	*Santa Cruz Ave.*	*Sharon Park Dr.*	*Menlo Park*	*Primary Arterial*	30,785	30,963	31,095	132	**YES**	33,278	33,867	589	**YES**	33,574	296
50	Sand Hill Rd.	*Santa Cruz Ave.*	*City Limit*	*Menlo Park*	*Minor Arterial*	32,742	33,210	33,433	223	**YES**	35,019	35,012	-7	NO	35,165	146
51	Santa Cruz Ave.	*Junipero Serra Blvd.*	*Sand Hill Rd.*	*Menlo Park*	*Minor Arterial*	26,484	27,528	27,792	264	**YES**	30,214	30,856	642	**YES**	30,814	600
52	Santa Cruz Ave.	*Sand Hill Rd.*	*Alameda de las Pulgas*	*County*	*Minor Arterial*	23,227	24,494	24,757	263	**YES**	27,167	26,731	-436	NO	26,850	-317
53	Santa Cruz Ave.	*Alameda de las Pulgas*	*Avy Ave./Orange Ave.*	*Menlo Park*	*Minor Arterial*	10,897	11,587	11,643	56	NO	12,069	11,951	-118	NO	11,861	-208
54	Santa Cruz Ave.	*Avy Ave./Orange Ave.*	*Olive St.*	*Menlo Park*	*Minor Arterial*	14,524	15,250	15,330	80	NO	16,099	16,155	56	NO	15,992	-107
55	Santa Cruz Ave.	*Olive St.*	*University Dr.*	*Menlo Park*	*Minor Arterial*	15,314	16,001	16,099	98	NO	16,573	16,518	-55	NO	16,285	-288
56	Santa Cruz Ave.	*University Dr.*	*Crane St.*	*Menlo Park*	*Minor Arterial*	7,614	8,001	8,135	134	NO	8,276	8,327	51	NO	8,197	-79
57	Santa Cruz Ave.	*Crane St.*	*El Camino Real*	*Menlo Park*	*Minor Arterial*	7,373	7,162	7,287	125	NO	6,878	6,862	-16	NO	6,717	-161
58	Scott Dr.	*Marsh Rd.*	*Campbell Ave.*	*Menlo Park*	*Collector*	4,815	4,815	4,815	0	NO	4,815	4,815	0	NO	4,815	0
59	Sharon Park Dr.	*Sand Hill Rd.*	*Sharon Rd.*	*Menlo Park*	*Collector*	9,970	10,048	10,037	-11	NO	10,385	10,607	222	**YES**	10,473	88
60	Sharon Rd.	*Sharon Park Dr.*	*Alameda de las Pulgas*	*Menlo Park*	*Collector*	3,781	3,774	3,773	-1	NO	3,803	4,009	206	NO	3,891	88
61	University Dr.	*Middle Ave.*	*Menlo Ave.*	*Menlo Park*	*Collector*	5,840	5,491	5,528	37	NO	5,721	5,785	64	NO	5,715	-6
62	University Dr.	*Menlo Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	9,310	9,155	9,155	0	NO	9,402	9,335	-67	NO	9,222	-180
63	University Dr.	*Santa Cruz Ave.*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	7,158	7,208	7,209	1	NO	7,366	7,392	26	NO	7,381	15
64	University Dr.	*Oak Grove Ave.*	*Valparaiso Ave.*	*Menlo Park*	*Collector*	5,111	5,434	5,514	80	NO	6,582	6,675	93	NO	6,415	-167
65	Valparaiso Ave.	*Alameda de las Pulgas*	*Cotton St.*	*Menlo Park*	*Minor Arterial*	12,052	12,245	12,285	40	NO	12,378	12,440	62	NO	12,543	165
66	Valparaiso Ave.	*Cotton St.*	*University Ave.*	*Menlo Park*	*Minor Arterial*	14,436	14,646	14,691	45	NO	14,816	14,848	32	NO	14,973	157
67	Valparaiso Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Minor Arterial*	13,011	13,381	13,445	64	NO	13,856	14,085	229	NO	14,058	202
68	Willow Rd.	*Alma St.*	*Laurel St.*	*Menlo Park*	*Collector*	3,362	4,830	4,757	-73	NO	4,892	5,010	118	NO	5,178	286
69	Willow Rd.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	5,247	6,783	6,760	-23	NO	7,581	7,623	42	NO	7,824	243
70	Willow Rd.	*Middlefield Rd.*	*Gilbert Ave.*	*Menlo Park*	*Collector*	24,332	23,472	22,955	-517	NO	25,033	23,607	-1,426	NO	24,462	-571
71	Chilco St.	*Hamilton Ave.*	*Terminal Ave.*	*Menlo Park*	*Collector*	4,776	6,321	10,233	3,912	**YES**	7,291	10,986	3,695	**YES**	8,280	989
72	Chilco St.	*Ivy Dr.*	*Hamilton Ave.*	*Menlo Park*	*Collector*	2,654	4,443	7,585	3,142	**YES**	4,765	8,277	3,512	**YES**	5,994	1,229
73	Chilco St.	*Newbridge St.*	*Ivy Dr.*	*Menlo Park*	*Collector*	2,114	3,855	6,417	2,562	**YES**	4,031	7,213	3,182	**YES**	4,026	-5
74	Hamilton Ave.	*Willow Rd.*	*Hamilton Ct.*	*Menlo Park*	*Collector*	2,643	2,643	2,643	0	NO	2,643	2,643	0	NO	2,643	0
75	Willow Rd.	*Gilbert Ave.*	*Coleman Ave.*	*Menlo Park*	*Minor Arterial*	24,353	24,362	23,904	-458	NO	25,745	24,515	-1,230	NO	25,924	179
76	Willow Rd.	*Coleman Ave.*	*Durham St.*	*Menlo Park*	*Minor Arterial*	41,188	41,138	40,801	-337	NO	42,449	41,294	-1,155	NO	42,639	190
77	Willow Rd.	*Durham St.*	*Bay Rd.*	*Menlo Park*	*Minor Arterial*	34,147	35,537	35,184	-353	NO	37,199	35,852	-1,347	NO	37,724	525
78	Chilco St.	*Terminal Ave.*	*Constitution Dr.*	*Menlo Park*	*Collector*	5,103	6,643	10,527	3,884	**YES**	7,610	11,250	3,640	**YES**	8,492	882
79	Chrysler Dr.	*Constitution Dr.*	*Independence Dr.*	*Menlo Park*	*Collector*	3,269	3,269	3,269	0	NO	3,269	3,269	0	NO	3,269	0
80	Chrysler Dr.	*Independence Dr.*	*Commonwealth Dr.*	*Menlo Park*	*Collector*	1,110	1,110	1,110	0	NO	1,110	1,110	0	NO	1,110	0
81	Adams Dr.	*University Dr.*	*Adams Ct.*	*Menlo Park*	*Local*	1,263	1,669	1,940	271	**YES**	3,155	3,488	333	**YES**	7,762	4,607
82	Olive St.	*Santa Cruz Ave.*	*Middle Ave.*	*Menlo Park*	*Local*	2,449	2,468	2,476	8	NO	2,552	2,562	10	NO	2,557	5

Segment	Street	Segment between		Jurisdiction	Classification	Existing	Forecast Background	Background + Facebook	Facebook Volumes	Significant Impact?	Current General Plan	Forecast GP + Facebook	Facebook Volumes	Significant Impact?	Forecast New GP	New GP - Current GP
83	Olive St.	*Middle Ave.*	*Oak Ave.*	*Menlo Park*	*Local*	3,051	3,090	3,087	-3	NO	3,222	3,280	58	**YES**	3,272	50
84	Cambridge Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Local*	1,603	1,551	1,595	44	**YES**	1,546	1,566	20	NO	1,551	5
85	Linfield Dr.	*Middlefield Rd.*	*Waverley St.*	*Menlo Park*	*Local*	1,760	1,625	1,586	-39	NO	1,633	1,772	139	**YES**	1,794	161
86	Waverley St.	*Laurel St.*	*Linfield Dr.*	*Menlo Park*	*Local*	1,652	1,844	1,863	19	NO	1,925	1,858	-67	NO	1,895	-30
87	Ivy Dr.	*Chilco St.*	*Willow Rd.*	*Menlo Park*	*Local*	3,200	3,266	3,922	656	**YES**	3,439	3,905	466	**YES**	4,977	1,538

	B	C	D	E	F	G	M
1	***Segment***	***Street***	***Segment between***		***Jurisdiction***	***Classification***	***FB 2040 (Prop GP)***
2	1	Alameda De Las Pulgas	*Avy Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Minor Arterial*	-163
3	2	Alameda De Las Pulgas	*Valparaiso Ave.*	*Avy Ave.*	*San Mateo County*	*Minor Arterial*	-59
4	3	Alameda De Las Pulgas	*City Limits*	*Valparaiso Ave.*	*San Mateo County*	*Minor Arterial*	5
5	4	Alma St.	*Ravenswood Ave*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	41
6	5	Alma St.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Collector*	19
7	6	Alpine Rd.	*City Limits*	*Junipero Serra Blvd.*	*Menlo Park*	*Minor Arterial*	416
8	7	Avy Ave.	*City Limit*	*Alameda de las Pulgas*	*Atherton*	*Collector*	3
9	8	Avy Ave.	*Alameda de las Pulgas*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	138
10	9	Bay Rd.	*Greenwood Dr.*	*Marsh Rd.*	*Menlo Park*	*Collector*	50
11	10	Bay Rd.	*Ringwood Ave.*	*Greenwood Dr.*	*Menlo Park*	*Collector*	89
12	11	Bay Rd.	*Willow Rd.*	*Ringwood Ave.*	*Menlo Park*	*Collector*	-136
13	12	Bohannon Dr.	*Campbell Ave.*	*Marsh Rd.*	*Menlo Park*	*Collector*	0
14	13	Chilco St	*Constitution Dr.*	*Bayfront Expwy.*	*Menlo Park*	*Collector*	7,176
15	14	Chrysler Dr.	*Constitution Dr.*	*Bayfront Expwy.*	*Menlo Park*	*Collector*	1,415
16	15	Constitution Dr.	*Chilco St.*	*Chrysler Dr.*	*Menlo Park*	*Collector*	2,830
17	16	Crane St.	*Oak Grove Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	34
18	17	Crane St.	*Santa Cruz Ave.*	*Menlo Ave.*	*Menlo Park*	*Collector*	14
19	18	Encinal Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	-62
20	19	Encinal Ave.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	-154
21	20	Glenwood Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	118
22	21	Hamilton Ave.	*Willow Rd.*	*Chilco St.*	*Menlo Park*	*Collector*	417
23	22	Haven Ave.	*Bayfront Expwy./Marsh Ro*	*City Limit*	*Menlo Park*	*Collector*	271
24	23	Junipero Serra Blvd.	*City Limit*	*Alpine Rd.*	*Menlo Park*	*Primary Arterial*	331
25	24	Laurel St.	*Oak Grove Ave.*	*Glenwood Ave.*	*Menlo Park*	*Collector*	144
26	25	Laurel St.	*Ravenswood Ave.*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	210
27	26	Laurel St.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Collector*	-191
28	27	Marsh Rd.	*City Limit*	*Bay Rd.*	*Menlo Park*	*Minor Arterial*	-196
29	28	Marsh Rd.	*Bay Rd.*	*Bohannon Dr.*	*Menlo Park*	*Primary Arterial*	-69
30	29	Marsh Rd.	*Bohannon Dr.*	*Scott Dr.*	*Menlo Park*	*Primary Arterial*	-2,179
31	30	Menlo Ave.	*University Ave.*	*Crane St.*	*Menlo Park*	*Collector*	-99
32	31	Menlo Ave.	*Crane St.*	*El Camino Real*	*Menlo Park*	*Collector*	-97

	B	C	D	E	F	G	M
33	32	Middle Ave.	Olive St.	University Dr.	Menlo Park	Collector	3
34	33	Middle Ave.	University Dr.	El Camino Real	Menlo Park	Collector	-82
35	34	Middlefield Rd.	Ravenswood Ave.	Oak Grove Ave.	Atherton	Minor Arterial	-277
36	35	Middlefield Rd.	Willow Rd.	Ravenswood Ave.	Menlo Park	Minor Arterial	246
37	36	Middlefield Rd.	City Limits	Willow Rd.	Menlo Park	Minor Arterial	-401
38	37	Newbridge St.	Willow Rd.	Chilco St.	Menlo Park	Collector	1,776
39	38	Oak Grove Ave.	University Dr.	Crane St.	Menlo Park	Collector	-61
40	39	Oak Grove Ave.	Crane St.	El Camino Real	Menlo Park	Collector	195
41	40	Oak Grove Ave.	El Camino Real	Laurel St.	Menlo Park	Collector	-193
42	41	Oak Grove Ave.	Laurel St.	Middlefield Rd.	Menlo Park	Collector	-67
43	42	O'Brien Dr.	Kavanaugh Dr.	Willow Rd.	Menlo Park	Collector	424
44	43	O'Brien Dr.	University Ave.	Kavanaugh Dr.	Menlo Park	Collector	236
45	44	Ravenswood Ave.	El Camino Real	Alma St.	Menlo Park	Minor Arterial	-587
46	45	Ravenswood Ave.	Alma St.	Laurel St.	Menlo Park	Minor Arterial	-697
47	46	Ravenswood Ave.	Laurel St.	Middlefield Rd.	Menlo Park	Minor Arterial	-595
48	47	Ringwood Ave.	Middlefield Rd.	Bay Rd.	San Mateo County	Collector	-280
49	48	Sand Hill Rd.	I-280	Sharon Park Dr.	Menlo Park	Primary Arterial	284
50	49	Sand Hill Rd.	Santa Cruz Ave.	Sharon Park Dr.	Menlo Park	Primary Arterial	443
51	50	Sand Hill Rd.	Santa Cruz Ave.	City Limits	Menlo Park	Minor Arterial	70
52	51	Santa Cruz Ave.	Junipero Serra Blvd	Sand Hill Rd.	Menlo Park	Minor Arterial	621
53	52	Santa Cruz Ave.	Sand Hill Rd.	Alameda de las Pulgas	San Mateo County	Minor Arterial	-377
54	53	Santa Cruz Ave.	Alameda de las Pulgas	Avy Ave./Orange Ave.	Menlo Park	Minor Arterial	-163
55	54	Santa Cruz Ave.	Avy Ave./Orange Ave	Olive St.	Menlo Park	Minor Arterial	-26
56	55	Santa Cruz Ave.	Olive St.	University Dr.	Menlo Park	Minor Arterial	-172
57	56	Santa Cruz Ave.	University Dr.	Crane St.	Menlo Park	Minor Arterial	-14
58	57	Santa Cruz Ave.	Crane St.	El Camino Real	Menlo Park	Minor Arterial	-89
59	58	Scott Dr.	Marsh Rd.	Campbell Ave.	Menlo Park	Collector	0
60	59	Sharon Park Dr.	Sand Hill Rd.	Sharon Rd.	Menlo Park	Collector	155
61	60	Sharon Rd.	Sharon Park Dr.	Alameda de las Pulgas	Menlo Park	Collector	147
62	61	University Dr.	Middle Ave.	Menlo Ave.	Menlo Park	Collector	29
63	62	University Dr.	Menlo Ave.	Santa Cruz Ave.	Menlo Park	Collector	-124
64	63	University Dr.	Santa Cruz Ave.	Oak Grove Ave.	Menlo Park	Collector	21

	B	C	D	E	F	G	M
65	64	University Dr.	*Oak Grove Ave.*	*Valparaiso Ave.*	*Menlo Park*	*Collector*	-37
66	65	Valparaiso Ave.	*Alameda de las Pulgas*	*Cotton St.*	*Menlo Park*	*Minor Arterial*	114
67	66	Valparaiso Ave.	*Cotton St.*	*University Ave.*	*Menlo Park*	*Minor Arterial*	95
68	67	Valparaiso Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Minor Arterial*	216
69	68	Willow Rd.	*Alma St.*	*Laurel St.*	*Menlo Park*	*Collector*	202
70	69	Willow Rd.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	143
71	70	Willow Rd.	*Middlefield Rd.*	*Gilbert Ave.*	*Menlo Park*	*Collector*	-999
72	71	Chilco St.	*Hamilton Ave.*	*Terminal Ave.*	*Menlo Park*	*Collector*	3,019
73	72	Chilco St.	*Ivy Dr.*	*Hamilton Ave.*	*Menlo Park*	*Collector*	2,941
74	73	Chilco St.	*Newbridge St.*	*Ivy Dr.*	*Menlo Park*	*Collector*	2,385
75	74	Hamilton Ave.	*Willow Rd.*	*Hamilton Ct.*	*Menlo Park*	*Collector*	0
76	75	Willow Rd.	*Gilbert Ave.*	*Coleman Ave.*	*Menlo Park*	*Minor Arterial*	-526
77	76	Willow Rd.	*Coleman Ave.*	*Durham St.*	*Menlo Park*	*Minor Arterial*	-483
78	77	Willow Rd.	*Durham St.*	*Bay Rd.*	*Menlo Park*	*Minor Arterial*	-411
79	78	Chilco St.	*Terminal Ave.*	*Constitution Dr.*	*Menlo Park*	*Collector*	3,640
80	79	Chrysler Dr.	*Constitution Dr.*	*Independence Dr.*	*Menlo Park*	*Collector*	0
81	80	Chrysler Dr.	*Independence Dr.*	*Commonwealth Dr.*	*Menlo Park*	*Collector*	0
82	81	Adams Dr.	*University Dr.*	*Adams Ct.*	*Menlo Park*	*Local*	333
83	82	Olive St.	*Santa Cruz Ave.*	*Middle Ave.*	*Menlo Park*	*Local*	10
84	83	Olive St.	*Middle Ave.*	*Oak Ave.*	*Menlo Park*	*Local*	58
85	84	Cambridge Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Local*	20
86	85	Linfield Dr.	*Middlefield Rd.*	*Waverley St.*	*Menlo Park*	*Local*	139
87	86	Waverley St.	*Laurel St.*	*Linfield Dr.*	*Menlo Park*	*Local*	-49
88	87	Ivy Drive	*Chilco St.*	*Willow Rd.*		*Local*	1,032

Appendix 3.6-4

Modeling Results Summary

Modeling for Segments in Project Area or with Project-added traffic greater than 10% of existing traffic volumes:

Existing, Existing Plus Project, Forecast General Plan without Project, and Forecast Genral Plan with Project scenarios

*Initial modeling conducted with a reference distance of 50 feet

				Existing				Existing + Project				Forecast General Plan (2040) without Project				Forecast General Plan with Project (2040)				
Segment	Street		Distance feet, min. 33 max. 1000	Existing ADT	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)	Existing plus Project ADT	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)	Current General Plan (2040) ADT	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)	Current GP + Facebook (2040) ADT	dB Ldn	dB CNEL	dBA Leq1h (loudest hour)	
9	Bay Rd.	*Greenwood Dr. to Marsh Rd.*	50	5,548	59.7	60.3	58.8	5,860	59.9	60.5	59.1	10,140	62.3	62.9	61.4	10,190	62.3	62.9	61.5	
10	Bay Rd.	*Ringwood Ave. to Greenwood Dr.*	50	5,658	59.8	60.4	58.9	5,920	60.0	60.6	59.1	10,023	62.2	62.8	61.4	10,112	62.3	62.9	61.4	
13	Chilco St.	*Constitution Dr. to Bayfront Expwy.*	50	6,999	63.9	64.5	63.1	19,234	68.3	68.9	67.5	2,141	58.9	59.5	58.0	9,317	65.2	65.8	64.3	
15	Constitution Dr.	*Chilco St. to Chrysler Dr.*	50	2,359	57.8	58.3	56.8	5,342	61.2	61.8	60.3	2,475	58.0	58.5	57.0	5,304	61.2	61.8	60.3	
21	Hamilton Ave.	*Willow Rd. to Chilco St.*	50	2,773	56.8	57.4	55.9	3,716	58.0	58.6	57.1	3,051	57.2	57.8	56.3	3,468	57.7	58.3	56.8	
37	Newbridge St.	*Willow Rd. to Chilco St.*	50	7,065	59.2	59.7	58.3	9,208	60.3	60.9	59.4	6,219	58.6	59.2	57.7	7,995	59.7	60.3	58.8	
42	O'Brien Dr.	*Kavanaugh Dr. to Willow Rd.*	50	6,374	60.3	60.9	59.4	6,383	60.3	60.9	59.4	13,330	63.5	64.1	62.6	13,754	63.6	64.2	62.8	
43	O'Brien Dr.	*University Ave. to Kavanaugh Dr.*	50	3,279	57.5	58.1	56.6	3,529	57.8	58.4	56.9	5,377	59.6	60.2	58.7	5,613	59.8	60.4	58.9	
71	Chilco St.	*Hamilton Ave. to Terminal Ave.*	50	4,776	57.5	58.1	56.6	8,688	60.0	60.6	59.2	5,262	57.9	58.5	57.0	8,280	59.8	60.4	59.0	
72	Chilco St.	*Ivy Dr. to Hamilton Ave.*	50	2,654	55.1	55.7	54.1	5,796	58.3	58.9	57.4	3,053	55.7	56.2	54.7	5,994	58.5	59.0	57.6	
73	Chilco St.	*Newbridge St. to Ivy Dr.*	50	2,114	54.2	54.7	53.1	4,676	57.4	58.0	56.5	1,641	53.2	53.7	52.0	4,026	56.8	57.4	55.9	
78	Chilco St.	*Terminal Ave. to Constitution Dr.*	50	5,103	62.6	63.2	61.7	8,987	65.0	65.6	64.2	4,852	62.4	63.0	61.5	8,492	64.8	65.4	63.9	
81	Adams Dr.	*University Dr. to Adams Ct.*	50	1,263	52.2	52.7	50.9	1,534	52.9	53.5	51.8	7,429	59.4	60.0	58.5	7,762	59.6	60.1	58.7	
87	Ivy Dr.	*Chilco St. to Willow Rd.*	50	3,200	55.9	56.4	54.9	3,856	56.6	57.2	55.7	3,946	56.7	57.3	55.8	4,977	57.7	58.3	56.8	
14	Chrysler Dr.	*Constitution Dr. to Bayfront Expwy.*	50	4,068	60.0	60.6	59.2					2,653	58.3	58.8	57.3	4,068	60.0	60.6	59.2	Note: only analyze for cumulative
22	Haven Ave.	*Bayfront Expwy./Marsh Rd. to City Limit*	50	7,397	60.9	61.5	60.1					17,216	64.6	65.2	63.7	17,487	64.6	65.2	63.8	Note: only analyze for cumulative
12	Bohannon Dr.	*Campbell Ave. to Marsh Rd.*	50	3,908	59.9	60.5	59.0	3,908	59.9	60.5	59.0									note - no project traffic
58	Scott Dr.	*Marsh Rd. to Campbell Ave.*	50	4,815	59.1	59.7	58.2	4,815	59.1	59.7	58.2									note - no project traffic
74	Hamilton Ave.	*Willow Rd. to Hamilton Ct.*	50	2,643	55.1	55.7	54.1	2,643	55.1	55.7	54.1									note - no project traffic
79	Chrysler Dr.	*Constitution Dr. to Independence Dr.*	50	3,269	59.1	59.7	58.2	3,269	59.1	59.7	58.2									note - no project traffic
80	Chrysler Dr.	*Independence Dr. to Commonwealth Dr.*	50	1,110	54.7	55.3	53.6	1,110	54.7	55.3	53.6									note - no project traffic

Direct Project Impact Summary Data

*Initial modeling conducted with a reference distance of 50 feet

Segment	Street		Existing Existing dB Ldn	Existing Existing + Project dB Ldn	Existing Delta dB	Existing Project result in > 60 Ldn where < 60 without P?	Existing Incease by more than 3 above 60?	
13	Chilco St.	*Constitution Dr. to Bayfront Expwy.*	63.9	68.3	4.4	N	Y	*Proceed to actual distance modeling
15	Constitution Dr.	*Chilco St. to Chrysler Dr.*	57.8	61.2	3.4	Y	Y	*Proceed to actual distance modeling
71	Chilco St.	*Hamilton Ave. to Terminal Ave.*	57.5	60.0	2.5	Y	Y	*Proceed to actual distance modeling
37	Newbridge St.	*Willow Rd. to Chilco St.*	59.2	60.3	1.1	N	N	No Impact (E + P does not exceed 60, with rounding)
9	Bay Rd.	*Greenwood Dr. to Marsh Rd.*	59.7	59.9	0.2	N	N	No Impact
10	Bay Rd.	*Ringwood Ave. to Greenwood Dr.*	59.8	60.0	0.2	N	N	No Impact
21	Hamilton Ave.	*Willow Rd. to Chilco St.*	56.8	58.0	1.2	N	N	No Impact
42	O'Brien Dr.	*Kavanaugh Dr. to Willow Rd.*	60.3	60.3	0.0	N	N	No Impact
43	O'Brien Dr.	*University Ave. to Kavanaugh Dr.*	57.5	57.8	0.3	N	N	No Impact
72	Chilco St.	*Ivy Dr. to Hamilton Ave.*	55.1	58.3	3.2	N	N	No Impact (E + P Does not exceed 60)
73	Chilco St.	*Newbridge St. to Ivy Dr.*	54.2	57.4	3.2	N	N	No Impact (E + P Does not exceed 60)
78	Chilco St.	*Terminal Ave. to Constitution Dr.*	62.6	65.0	2.4	N	N	No Impact
81	Adams Dr.	*University Dr. to Adams Ct.*	52.2	52.9	0.7	N	N	No Impact
87	Ivy Dr.	*Chilco St. to Willow Rd.*	55.9	56.6	0.8	N	N	No Impact
12	Bohannon Dr.	*Campbell Ave. to Marsh Rd.*	59.9	59.9	0.0	N	N	note - no project traffic
58	Scott Dr.	*Marsh Rd. to Campbell Ave.*	59.1	59.1	0.0	N	N	note - no project traffic
74	Hamilton Ave.	*Willow Rd. to Hamilton Ct.*	55.1	55.1	0.0	N	N	note - no project traffic
79	Chrysler Dr.	*Constitution Dr. to Independence Dr.*	59.1	59.1	0.0	N	N	note - no project traffic
80	Chrysler Dr.	*Independence Dr. to Commonwealth Dr.*	54.7	54.7	0.0	N	N	note - no project traffic
14	Chrysler Dr.	*Constitution Dr. to Bayfront Expwy.*						Note: only analyze for cumulative
22	Haven Ave.	*Bayfront Expwy./Marsh Rd. to City Limit*						Note: only analyze for cumulative

Direct Impact Assessment - Noise Levels at 50-foot reference distance and Actual Distances for Potentially Impacted Roadway Segments

Segment #	Street	Segment	Type of Receptor? On- or off-site impact?	Actual Distance to Receptor	Existing	Existing + Project	Delta		Existing	Existing + Project	Delta	Impacts?
					dB Ldn at 50 feet	dB Ldn at 50 feet	dB	X = distance to receptor (feet)	dB Ldn at actual distance	dB Ldn at actual distance	dB	
13	Chilco St.	*Constitution Dr. to Bayfront Expwy.*	*On-site Hotel & Commercial*	*Commercial = 100 feet Hotel = Over 100 feet (Modeled at 100 feet)*	*64.0*	*68.0*	*4.0*	125	60.0	64.0	4.0	*No - Hotel acceptable with 65 Ldn, Commercial acceptable with 70 Ldn*
15	Constitution Dr.	*Chilco St. to Chrysler Dr.*	*Commercial*	*40 feet*	*58.0*	*61.0*	*3.0*	40	59.0	63.0	4.0	*No - Commercial acceptable with 70 Ldn*
71	Chilco St.	*Hamilton Ave. to Terminal Ave.*	*Residential*	*35 feet*	*58.0*	*60.0*	*2.0*	35	59.0	62.0	3.0	*Yes - impact to residence*

Cumulative Project Impact Summary Data

*Initial modeling conducted with a reference distance of 50 feet

					Cumulative - Compare existing and Year 2040 Including Project						Year 2040						
		Street	Segment	Impact distance	Existing	Forecast GP including Project	Delta	Project result in > 60 Ldn where < 60 without P?	Incease by more than 3 above 60?	Cumulative Impact?	Forecast GP without Project	Forecast GP with Project	Delta	Project result in > 60 Ldn where < 60 without P?	Incease by more than 1 above 60?	Cumulative Contribution	
orig or	Segment				dB Ldn	dB Ldn	dB				dB Ldn	dB Ldn	dB				
4	15	Constitution Dr.	*Chilco St. to Chrysler Dr.*	*50 feet*	58.0	61.0	3.0	Y	Y	**Yes**	58.0	61.0	3.0	Y	Y	**Yes**	
9	71	Chilco St.	*Hamilton Ave. to Terminal Ave.*	*50 feet*	58.0	60.0	2.0	Y	N	**Yes**	58.0	60.0	2.0	Y	Y	**Yes**	
8	43	O'Brien Dr.	*University Ave. to Kavanaugh Dr.*	*50 feet*	58.0	60.0	2.0	Y	N	**Yes**	60.0	60.0	0.0	N	N	No	
13	81	Adams Dr.	*University Dr. to Adams Ct.*	*50 feet*	52.0	60.0	8.0	Y	N	**Yes**	59.0	60.0	1.0	Y	Y	No	Below 70 threshold.
7	42	O'Brien Dr.	*Kavanaugh Dr. to Willow Rd.*	*50 feet*	60.0	64.0	4.0	N	Y	**Yes**	63.0	64.0	1.0	N	Y	No	Below 70 threshold.
16	22	Haven Ave.	*Bayfront Expwy./Marsh Rd. to City Limit*	*50 feet*	61.0	65.0	4.0	N	Y	**Yes**	65.0	65.0	0.0	N	N	No	Below 70 threshold.
[redacted]																	
6	37	Newbridge St.	*Willow Rd. to Chilco St.*	*50 feet*	59.0	60.0	1.0	Y	N	No	59.0	60.0	1.0	Y	Y	No	*Doesn't bring noise to above 60
1	9	Bay Rd.	*Greenwood Dr. to Marsh Rd.*		60.0	62.0	2.0	N	N	No	62.0	62.0	0.0	N	N	No	
2	10	Bay Rd.	*Ringwood Ave. to Greenwood Dr.*		60.0	62.0	2.0	N	N	No	62.0	62.0	0.0	N	N	No	
3	13	Chilco St.	*Constitution Dr. to Bayfront Expwy.*	*Commercial = 100 feet (not in excess of thresholds) Hotel = Over 100 feet*	64.0	65.0	1.0	N	N	No	59.0	65.0	6.0	Y	Y	No	No Cumulative impact, so no cumulative contribution
15	14	Chrysler Dr.	*Constitution Dr. to Bayfront Expwy.*		60.0	60.0	0.0	N	N	No	58.0	60.0	2.0	Y	Y	No	No Cumulative impact, so no cumulative contribution
5	21	Hamilton Ave.	*Willow Rd. to Chilco St.*		57.0	58.0	1.0	N	N	No	57.0	58.0	1.0	N	N	No	
10	72	Chilco St.	*Ivy Dr. to Hamilton Ave.*		55.0	58.0	3.0	N	N	No	56.0	58.0	2.0	N	N	No	
11	73	Chilco St.	*Newbridge St. to Ivy Dr.*		54.0	57.0	3.0	N	N	No	53.0	57.0	4.0	N	N	No	
12	78	Chilco St.	*Terminal Ave. to Constitution Dr.*		63.0	65.0	2.0	N	N	No	62.0	65.0	3.0	N	Y	No	No Cumulative impact, so no cumulative contribution
14	87	Ivy Dr.	*Chilco St. to Willow Rd.*		56.0	58.0	2.0	N	N	No	57.0	58.0	1.0	N	N	No	

Cumulative Impact Assessment - Noise Levels at Actual Distances for Potentially Impacted Roadway Segments

orig or	Segment	Street		Actual Distance?	Existing	Forecast GP including Project	Delta	Project result in > 60 Ldn where < 60 without P?	Incease by more than 3 above 60?	Cumulative Impact?	Forecast GP without Project	Forecast GP with Project	Delta	Project result in > 60 Ldn where < 60 without P?	Incease by more than 1 above 60?	Cumulative Contribution	
					Cumulative - Compare existing and Year 2040 Including Project						Year 2040						
					dB Ldn	dB Ldn	dB				dB Ldn	dB Ldn	dB				
4	15	Constitution Dr.	*Chilco St. to Chrysler Dr.*	*40 feet*	59.0	62.1	3.1	Y	Y	Y	58.9	62.1	3.2	Y	Y	Yes	Segments with Cumulative Impacts
9	71	Chilco St.	*Hamilton Ave. to Terminal Ave.*	*35 feet*	59.0	61.2	2.2	Y	N	Y	59.3	61.2	1.9	N	Y	Yes	
8	43	O'Brien Dr.	*University Ave. to Kavanaugh Dr.*	*30 feet*	59.0	61.3	2.3	Y	N	Y	61.1	61.3	0.2			No	
	Segments w pos impacts (if not commercial)																
13	81	Adams Dr.	*University Dr. to Adams Ct.*	*45 feet to commercial/office*	52.0	60.0	8.0	Y	N	Yes	59.0	60.0	1.0	Y	Y	No	Below 70 threshold.
7	42	O'Brien Dr.	*Kavanaugh Dr. to Willow Rd.*	*45 feet to commercial/office*	60.0	64.0	4.0	N	Y	Yes	63.0	64.0	1.0	N	Y	No	Below 70 threshold.
16	22	Haven Ave.	*Bayfront Expwy./Marsh Rd. to City Limit*	*50 feet to commercial/office*	61.0	65.0	4.0	N	Y	Yes	65.0	65.0	0.0	N	N	No	Below 70 threshold
	Segments with No Cumulative Impacts																
6	37	Newbridge St.	*Willow Rd. to Chilco St.*	*30 feet*	61.0	61.2	0.2	N	N	No	60.2	61.2	1.1	N	Y	Yes	
1	9	Bay Rd.	*Greenwood Dr. to Marsh Rd.*		60.0	62.0	2.0	N	N	No	62.0	62.0	0.0	N	N	No	No Cumulative impact, so no cumulative contribution
2	10	Bay Rd.	*Ringwood Ave. to Greenwood Dr.*		60.0	62.0	2.0	N	N	No	62.0	62.0	0.0	N	N	No	
3	13	Chilco St.	*Constitution Dr. to Bayfront Expwy.*	*Commercial = 100 feet (not in excess of thresholds) Hotel = Over 100 feet*	64.0	65.0	1.0	N	N	No	59.0	65.0	6.0	Y	Y	No	
15	14	Chrysler Dr.	*Constitution Dr. to Bayfront Expwy.*		60.0	60.0	0.0	N	N	No	58.0	60.0	2.0	Y	Y	No	
5	21	Hamilton Ave.	*Willow Rd. to Chilco St.*		57.0	58.0	1.0	N	N	No	57.0	58.0	1.0	N	N	No	
10	72	Chilco St.	*Ivy Dr. to Hamilton Ave.*		55.0	58.0	3.0	N	N	No	56.0	58.0	2.0	N	N	No	
11	73	Chilco St.	*Newbridge St. to Ivy Dr.*		54.0	57.0	3.0	N	N	No	53.0	57.0	4.0	N	N	No	
12	78	Chilco St.	*Terminal Ave. to Constitution Dr.*		63.0	65.0	2.0	N	N	No	62.0	65.0	3.0	N	Y	No	
14	87	Ivy Dr.	*Chilco St. to Willow Rd.*		56.0	58.0	2.0	N	N	No	57.0	58.0	1.0	N	N	No	

Menlo Park GP

EXISTING

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	Alameda De Las Pulgas	Avy to Santa Cruz	12,449	30	36	Soft	4U	**0%**
2	Alameda De Las Pulgas	Valparaiso to Avy	15,329	30	24	Soft	2D	**0%**
3	Alameda De Las Pulgas	City Limit Valparaiso	16,141	30	24	Soft	2D	**0%**
4	Alma St.	Ravenswood to Oak Grove	1,640	25	12	Soft	2U	**0%**
5	Alma St.	Willow to Ravenswood	3,240	25	12	Soft	2U	**0%**
6	Alpine Rd.	City Limit to Junipero Serra	23,305	40	12	Soft	2U	**0%**
7	Avy Ave.	City Limit to Alameda de las Pulgas	4,606	25	12	Soft	2U	**0%**
8	Avy Ave.	Alameda de las Pulgas to Santa Cruz	5,935	25	12	Soft	2U	**0%**
9	Bay Rd.	Greenwood to Marsh	5,548	30	12	Soft	2U	**0%**
10	Bay Rd.	Ringwood to Greenwood	5,658	30	12	Soft	2U	**0%**
11	Bay Rd.	Willow to Ringwood	7,581	30	12	Soft	2U	**0%**
12	Bohannon Dr.	Campbell to Marsh	3,908	30	12	Soft	2U	**0%**
13	Chilco St.	Constitution to Bayfront	6,999	40	24	Soft	2D	**0%**
14	Chrysler Dr.	Constitution to Bayfront	4,068	30	12	Soft	2U	**0%**
15	Constitution Dr.	Chilco to Chrysler	2,359	30	12	Soft	2U	**0%**
16	Crane St.	Oak Grove to Santa Cruz	2,662	25	12	Soft	2U	**0%**
17	Crane St.	Santa Cruz to Menlo	2,418	25	12	Soft	2U	**0%**
18	Encinal Ave.	El Camino Real to Laurel	5,597	25	12	Soft	2U	**0%**
19	Encinal Ave.	Laurel to Middlefield	4,949	25	12	Soft	2U	**0%**
20	Glenwood Ave.	El Camino Real to Laurel	5,979	25	12	Soft	2U	**0%**
21	Hamilton Ave.	Willow to Chilco	2,773	30	12	Soft	2U	**0%**
22	Haven Ave.	Bayfront to City Limit	7,397	25	12	Soft	2U	**0%**
23	Junipero Serra Blvd.	City Limit to Alpine	16,010	35	36	Soft	4U	**0%**
24	Laurel St.	Oak Grove to Glenwood	4,055	25	12	Soft	2U	**0%**
25	Laurel St.	Ravenswood to Oak Grove	4,408	25	12	Soft	2U	**0%**
26	Laurel St.	Willow to Ravenswood	4,471	25	12	Soft	2U	**0%**
27	Marsh Rd.	City Limit to Bay	22,845	35	12	Soft	2U	**0%**
28	Marsh Rd.	Bay to Bohannon	25,828	35	48	Soft	4D	**0%**
29	Marsh Rd.	Bohannon to Scott	32,408	35	48	Soft	4D	**0%**
30	Menlo Ave.	University to Crane	7,360	25	12	Soft	2U	**0%**

ANALYST
NJF

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

73.6	75.55%
13.6	13.96%
10.22	10.49%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.42%	DAY	75.5%
% MT	1.84%	EVENING	14.0%
% HT	0.74%	NIGHT	10.5%

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mitigating Traf

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM tc	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Menlo Park GP
EXISTING CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

#	ROADWAY	SEGMENT	TRAFIC VOLUMES	LEVEL AT 50 FT.	DISTACE TO NOISE CONTOUR (FT.) 70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alameda De Las Pulgas	Avy to Santa Cruz	12,449	65.2	24	52	111
2	Alameda De Las Pulgas	Valparaiso to Avy	15,329	65.8	26	57	123
3	Alameda De Las Pulgas	City Limit Valparaiso	16,141	66.1	27	59	127
4	Alma St.	Ravenswood to Oak Grove	1,640	54.2	4	10	21
5	Alma St.	Willow to Ravenswood	3,240	57.2	7	15	32
6	Alpine Rd.	City Limit to Junipero Serra	23,305	70.5	54	116	250
7	Avy Ave.	City Limit to Alameda de las Pulgas	4,606	58.7	9	19	41
8	Avy Ave.	Alameda de las Pulgas to Santa Cruz	5,935	59.8	10	23	49
9	Bay Rd.	Greenwood to Marsh	5,548	61.3	13	28	61
10	Bay Rd.	Ringwood to Greenwood	5,658	61.4	13	29	62
11	Bay Rd.	Willow to Ringwood	7,581	62.6	16	35	75
12	Bohannon Dr.	Campbell to Marsh	3,908	59.8	10	22	48
13	Chilco St.	Constitution to Bayfront	6,999	65.4	25	53	115
14	Chrysler Dr.	Constitution to Bayfront	4,068	59.9	11	23	50
15	Constitution Dr.	Chilco to Chrysler	2,359	57.6	7	16	34
16	Crane St.	Oak Grove to Santa Cruz	2,662	56.3	6	13	28
17	Crane St.	Santa Cruz to Menlo	2,418	55.9	6	12	27
18	Encinal Ave.	El Camino Real to Laurel	5,597	59.6	10	22	47
19	Encinal Ave.	Laurel to Middlefield	4,949	59.0	9	20	43
20	Glenwood Ave.	El Camino Real to Laurel	5,979	59.9	11	23	49
21	Hamilton Ave.	Willow to Chilco	2,773	58.3	8	18	38
22	Haven Ave.	Bayfront to City Limit	7,397	60.8	12	26	56
23	Junipero Serra Blvd.	City Limit to Alpine	16,010	67.9	36	78	167
24	Laurel St.	Oak Grove to Glenwood	4,055	58.2	8	18	38
25	Laurel St.	Ravenswood to Oak Grove	4,408	58.5	9	19	40
26	Laurel St.	Willow to Ravenswood	4,471	58.6	9	19	40
27	Marsh Rd.	City Limit to Bay	22,845	69.0	43	92	199
28	Marsh Rd.	Bay to Bohannon	25,828	70.3	53	113	244
29	Marsh Rd.	Bohannon to Scott	32,408	71.3	61	132	284
30	Menlo Ave.	University to Crane	7,360	60.8	12	26	56

Scenario: EXISTING
Roadway: Alameda De Las Pulgas
Segment: Avy to Santa Cruz

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	12,449
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	36
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	764	14	6	564	11	4	141	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-1.2	-18.5	-22.4	-2.6	-19.8	-23.8	-8.6	-25.8	-29.8
Distance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	61.6	55.0	56.7	60.3	53.7	55.4	54.3	47.6	49.3
VEHICULAR NOISE	DAY=	63.5	Leq	EVENING=	62.2	Leq	NIGHT=	56.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):				**Ldn=**	**64.6**
				CNEL=	**65.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**22**	**47**	**101**	
	CNEL:	**24**	**52**	**111**	

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Alameda De Las Pulgas	Analyst:	NJF
Segment:	Valparaiso to Avy	Date:	25-May-16

ROADWAY INPUTS	
ADT	15,329
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	940	18	7	695	13	5	174	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.3	-17.6	-21.5	-1.7	-18.9	-22.9	-7.7	-24.9	-28.9
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.3	55.6	57.3	60.9	54.3	56.0	54.9	48.3	50.0
VEHICULAR NOISE	DAY=	64.1	Leq	EVENING=	62.8	Leq	NIGHT=	56.8	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.2**
					CNEL=	**65.8**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**24**	**52**	**111**
			CNEL:	**26**	**57**	**123**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Alameda De Las Pulgas	Analyst:	NJF
Segment:	City Limit Valparaiso	Date:	25-May-16

ROADWAY INPUTS	
ADT	16,141
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	990	19	8	732	14	6	183	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.1	-17.4	-21.3	-1.4	-18.7	-22.6	-7.4	-24.7	-28.6
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.5	55.8	57.5	61.2	54.5	56.2	55.2	48.5	50.2
VEHICULAR NOISE	DAY=	64.3	Leq	EVENING=	63.0	Leq	NIGHT=	57.0	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.4**
					CNEL=	**66.1**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**25**	**54**	**115**
			CNEL:	**27**	**59**	**127**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Alma St.	Analyst:	NJF
Segment:	Ravenswood to Oak Grove	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,640
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	101	2	1	74	1	1	19	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-9.3	-26.5	-30.5	-10.6	-27.8	-31.8	-16.6	-33.8	-37.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	50.1	44.5	46.7	48.8	43.2	45.4	42.8	37.2	39.4
VEHICULAR NOISE	DAY=	52.5	Leq	EVENING=	51.2	Leq	NIGHT=	45.2	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**53.6**	
				CNEL=	**54.2**	
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**4**	**9**	**19**
			CNEL:	**4**	**10**	**21**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Alma St.	Analyst:	NJF
Segment:	Willow to Ravenswood	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,240
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	199	4	2	147	3	1	37	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-6.3	-23.5	-27.5	-7.6	-24.9	-28.8	-13.6	-30.9	-34.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.1	47.5	49.7	51.8	46.2	48.4	45.8	40.2	42.4
VEHICULAR NOISE	DAY=	55.5	Leq	EVENING=	54.2	Leq	NIGHT=	48.1	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**56.6**
					CNEL=	**57.2**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**6**	**14**	**30**
			CNEL:	**7**	**15**	**32**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Alpine Rd.	Analyst:	NJF
Segment:	City Limit to Junipero Serra	Date:	25-May-16

ROADWAY INPUTS	
ADT	23,305
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1429	27	11	1056	20	8	265	5	2
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	0.2	-17.0	-21.0	-1.1	-18.3	-22.3	-7.1	-24.3	-28.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	67.5	59.2	60.1	66.2	57.9	58.8	60.2	51.9	52.8
VEHICULAR NOISE	DAY=	68.8	Leq	EVENING=	67.5	Leq	NIGHT=	61.4	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.9**
					CNEL=	**70.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**49**	**105**	**227**
			CNEL:	**54**	**116**	**250**

Scenario: EXISTING
Roadway: Avy Ave.
Segment: City Limit to Alameda de las Pulgas

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	4,606
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	283	5	2	209	4	2	52	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.8	-22.0	-26.0	-6.1	-23.3	-27.3	-12.1	-29.3	-33.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.6	49.0	51.2	53.3	47.7	49.9	47.3	41.7	43.9
VEHICULAR NOISE	DAY=	57.0	Leq	EVENING=	55.7	Leq	NIGHT=	49.7	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.1**
					CNEL=	**58.7**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**8**	**17**	**37**
			CNEL:	**9**	**19**	**41**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Avy Ave.	Analyst:	NJF
Segment:	Alameda de las Pulgas to Santa Cruz	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,935
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	364	7	3	269	5	2	67	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.7	-20.9	-24.9	-5.0	-22.2	-26.2	-11.0	-28.2	-32.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.7	50.1	52.3	54.4	48.8	51.0	48.4	42.8	45.0
VEHICULAR NOISE	DAY=	58.1	Leq	EVENING=	56.8	Leq	NIGHT=	50.8	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.2**
					CNEL=	**59.8**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**10**	**21**	**44**
			CNEL:	**10**	**23**	**49**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Bay Rd.	Analyst:	NJF
Segment:	Greenwood to Marsh	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,548
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	340	6	3	252	5	2	63	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-4.8	-22.0	-26.0	-6.1	-23.3	-27.3	-12.1	-29.3	-33.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.7	51.1	52.8	56.4	49.7	51.4	50.4	43.7	45.4
VEHICULAR NOISE	DAY=	59.6	Leq	EVENING=	58.3	Leq	NIGHT=	52.2	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.7**
					CNEL=	**61.3**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**12**	**26**	**55**
			CNEL:	**13**	**28**	**61**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Bay Rd.	Analyst:	NJF
Segment:	Ringwood to Greenwood	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,658
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	347	7	3	256	5	2	64	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-4.7	-21.9	-25.9	-6.0	-23.2	-27.2	-12.0	-29.2	-33.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.8	51.1	52.8	56.5	49.8	51.5	50.5	43.8	45.5
VEHICULAR NOISE	DAY=	59.6	Leq	EVENING=	58.3	Leq	NIGHT=	52.3	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.7**
					CNEL=	**61.4**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**12**	**26**	**56**
			CNEL:	**13**	**29**	**62**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Bay Rd.	Analyst:	NJF
Segment:	Willow to Ringwood	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,581
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	465	9	4	344	6	3	86	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.4	-20.6	-24.6	-4.7	-22.0	-25.9	-10.7	-28.0	-31.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	59.1	52.4	54.1	57.7	51.1	52.8	51.7	45.1	46.8
VEHICULAR NOISE	DAY=	60.9	Leq	EVENING=	59.6	Leq	NIGHT=	53.6	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.0**
			CNEL=	**62.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**15**	**32**	**68**
	CNEL:	**16**	**35**	**75**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Bohannon Dr.	Analyst:	NJF
Segment:	Campbell to Marsh	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,908
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	240	5	2	177	3	1	44	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-6.3	-23.5	-27.5	-7.6	-24.8	-28.8	-13.6	-30.8	-34.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.2	49.5	51.2	54.9	48.2	49.9	48.8	42.2	43.9
VEHICULAR NOISE	DAY=	58.0	Leq	EVENING=	56.7	Leq	NIGHT=	50.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.1**
			CNEL=	**59.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**44**
	CNEL:	**10**	**22**	**48**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: EXISTING
Roadway: Chilco St.
Segment: Constitution to Bayfront

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	6,999
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	429	8	3	317	6	2	79	2	1
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	-5.0	-22.2	-26.2	-6.3	-23.6	-27.5	-12.3	-29.6	-33.5
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.4	54.2	55.1	61.1	52.9	53.7	55.1	46.8	47.7
VEHICULAR NOISE	DAY=	63.7	Leq	EVENING=	62.4	Leq	NIGHT=	56.4	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 64.8**
CNEL= 65.4

NOISE CONTOUR:		70 dBA	65 dBA	60 dBA
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**22**	**48**	**104**
	CNEL:	**25**	**53**	**115**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: EXISTING
Roadway: Chrysler Dr.
Segment: Constitution to Bayfront

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	4,068
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	250	5	2	184	3	1	46	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-6.1	-23.3	-27.3	-7.4	-24.7	-28.6	-13.4	-30.7	-34.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.3	49.7	51.4	55.0	48.4	50.1	49.0	42.4	44.1
VEHICULAR NOISE	DAY=	58.2	Leq	EVENING=	56.9	Leq	NIGHT=	50.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):				**Ldn=**	**59.3**
				CNEL=	**59.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**21**	**45**	
	CNEL:	**11**	**23**	**50**	

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Constitution Dr.	Analyst:	NJF
Segment:	Chilco to Chrysler	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,359
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	145	3	1	107	2	1	27	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-8.5	-25.7	-29.7	-9.8	-27.0	-31.0	-15.8	-33.0	-37.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.0	47.3	49.0	52.7	46.0	47.7	46.7	40.0	41.7
VEHICULAR NOISE	DAY=	55.8	Leq	EVENING=	54.5	Leq	NIGHT=	48.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**56.9**
			CNEL=	**57.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**15**	**31**
	CNEL:	**7**	**16**	**34**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Crane St.	Analyst:	NJF
Segment:	Oak Grove to Santa Cruz	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,662
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	163	3	1	121	2	1	30	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-7.2	-24.4	-28.4	-8.5	-25.7	-29.7	-14.5	-31.7	-35.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	52.2	46.6	48.8	50.9	45.3	47.5	44.9	39.3	41.5
VEHICULAR NOISE	DAY=	54.6	Leq	EVENING=	53.3	Leq	NIGHT=	47.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**55.7**
			CNEL=	**56.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**12**	**26**
	CNEL:	**6**	**13**	**28**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Crane St.	Analyst:	NJF
Segment:	Santa Cruz to Menlo	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,418
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	148	3	1	110	2	1	27	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-7.6	-24.8	-28.8	-8.9	-26.1	-30.1	-14.9	-32.1	-36.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	51.8	46.2	48.4	50.5	44.9	47.1	44.5	38.9	41.1
VEHICULAR NOISE	DAY=	54.2	Leq	EVENING=	52.9	Leq	NIGHT=	46.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**55.3**
			CNEL=	**55.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**5**	**11**	**24**
	CNEL:	**6**	**12**	**27**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Encinal Ave.	Analyst:	NJF
Segment:	El Camino Real to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,597
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	343	6	3	254	5	2	64	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.9	-21.2	-25.1	-5.2	-22.5	-26.4	-11.3	-28.5	-32.4
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.5	49.9	52.1	54.1	48.5	50.7	48.1	42.5	44.7
VEHICULAR NOISE	DAY=	57.8	Leq	EVENING=	56.5	Leq	NIGHT=	50.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.9**
			CNEL=	**59.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**42**
	CNEL:	**10**	**22**	**47**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Encinal Ave.	Analyst:	NJF
Segment:	Laurel to Middlefield	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,949
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	304	6	2	224	4	2	56	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.5	-21.7	-25.7	-5.8	-23.0	-27.0	-11.8	-29.0	-33.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.9	49.3	51.5	53.6	48.0	50.2	47.6	42.0	44.2
VEHICULAR NOISE	DAY=	57.3	Leq	EVENING=	56.0	Leq	NIGHT=	50.0	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.4**
			CNEL=	**59.0**

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**18**	**39**
	CNEL:	**9**	**20**	**43**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Glenwood Ave.	Analyst:	NJF
Segment:	El Camino Real to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,979
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	367	7	3	271	5	2	68	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.6	-20.9	-24.8	-5.0	-22.2	-26.1	-11.0	-28.2	-32.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.7	50.1	52.3	54.4	48.8	51.0	48.4	42.8	45.0
VEHICULAR NOISE	DAY=	58.1	Leq	EVENING=	56.8	Leq	NIGHT=	50.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.2**
			CNEL=	**59.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**21**	**44**
	CNEL:	**11**	**23**	**49**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Hamilton Ave.	Analyst:	NJF
Segment:	Willow to Chilco	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,773
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	170	3	1	126	2	1	31	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-7.8	-25.0	-29.0	-9.1	-26.3	-30.3	-15.1	-32.3	-36.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.7	48.0	49.7	53.4	46.7	48.4	47.4	40.7	42.4
VEHICULAR NOISE	DAY=	56.6	Leq	EVENING=	55.2	Leq	NIGHT=	49.2	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**57.6**
			CNEL=	**58.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**16**	**35**
	CNEL:	**8**	**18**	**38**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Haven Ave.	Analyst:	NJF
Segment:	Bayfront to City Limit	Date:	25-May-16

ROADWAY INPUTS

ADT	7,397
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS

DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	454	9	3	335	6	3	84	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.7	-20.0	-23.9	-4.0	-21.3	-25.2	-10.0	-27.3	-31.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.7	51.1	53.3	55.4	49.8	52.0	49.3	43.7	45.9
VEHICULAR NOISE	DAY=	59.1	Leq	EVENING=	57.7	Leq	NIGHT=	51.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 60.1**

CNEL= 60.8

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**24**	**51**
	CNEL:	**12**	**26**	**56**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Junipero Serra Blvd.	Analyst:	NJF
Segment:	City Limit to Alpine	Date:	25-May-16

ROADWAY INPUTS	
ADT	16,010
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	36
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	982	19	7	726	14	6	182	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-0.8	-18.1	-22.0	-2.1	-19.4	-23.3	-8.2	-25.4	-29.3
Distance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	64.6	57.1	58.4	63.3	55.8	57.1	57.3	49.8	51.0
VEHICULAR NOISE	DAY=	66.1	Leq	EVENING=	64.8	Leq	NIGHT=	58.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**67.2**
			CNEL=	**67.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**33**	**70**	**152**
	CNEL:	**36**	**78**	**167**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Laurel St.	Analyst:	NJF
Segment:	Oak Grove to Glenwood	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,055
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	249	5	2	184	3	1	46	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-5.3	-22.6	-26.5	-6.6	-23.9	-27.8	-12.7	-29.9	-33.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.1	48.5	50.7	52.7	47.1	49.3	46.7	41.1	43.3
VEHICULAR NOISE	DAY=	56.4	Leq	EVENING=	55.1	Leq	NIGHT=	49.1	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**57.5**
			CNEL=	**58.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**16**	**34**
	CNEL:	**8**	**18**	**38**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Laurel St.	Analyst:	NJF
Segment:	Ravenswood to Oak Grove	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,408
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	270	5	2	200	4	2	50	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-5.0	-22.2	-26.2	-6.3	-23.5	-27.5	-12.3	-29.5	-33.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.4	48.8	51.0	53.1	47.5	49.7	47.1	41.5	43.7
VEHICULAR NOISE	DAY=	56.8	Leq	EVENING=	55.5	Leq	NIGHT=	49.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**57.9**
			CNEL=	**58.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**17**	**36**
	CNEL:	**9**	**19**	**40**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Laurel St.	Analyst:	NJF
Segment:	Willow to Ravenswood	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,471
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	274	5	2	203	4	2	51	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.9	-22.1	-26.1	-6.2	-23.5	-27.4	-12.2	-29.5	-33.4
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.5	48.9	51.1	53.2	47.6	49.8	47.2	41.6	43.8
VEHICULAR NOISE	DAY=	56.9	Leq	EVENING=	55.6	Leq	NIGHT=	49.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 58.0**

CNEL= 58.6

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**17**	**37**
	CNEL:	**9**	**19**	**40**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Marsh Rd.	Analyst:	NJF
Segment:	City Limit to Bay	Date:	25-May-16

ROADWAY INPUTS	
ADT	22,845
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1401	26	11	1036	20	8	259	5	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	0.7	-16.5	-20.5	-0.6	-17.8	-21.8	-6.6	-23.8	-27.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	65.8	58.3	59.5	64.5	56.9	58.2	58.4	50.9	52.2
VEHICULAR NOISE	DAY=	67.3	Leq	EVENING=	66.0	Leq	NIGHT=	59.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**68.4**
			CNEL=	**69.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**39**	**84**	**181**
	CNEL:	**43**	**92**	**199**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Marsh Rd.	Analyst:	NJF
Segment:	Bay to Bohannon	Date:	25-May-16

ROADWAY INPUTS	
ADT	25,828
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1584	30	12	1171	22	9	293	6	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	1.3	-16.0	-19.9	-0.1	-17.3	-21.3	-6.1	-23.3	-27.3
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	67.1	59.6	60.9	65.8	58.3	59.5	59.8	52.3	53.5
VEHICULAR NOISE	DAY=	68.6	Leq	EVENING=	67.3	Leq	NIGHT=	61.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.7**
			CNEL=	**70.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**48**	**103**	**222**
	CNEL:	**53**	**113**	**244**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Marsh Rd.	Analyst:	NJF
Segment:	Bohannon to Scott	Date:	25-May-16

ROADWAY INPUTS	
ADT	32,408
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1988	38	15	1469	28	11	368	7	3
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	2.2	-15.0	-19.0	0.9	-16.3	-20.3	-5.1	-22.3	-26.3
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	68.1	60.6	61.8	66.8	59.3	60.5	60.8	53.2	54.5
VEHICULAR NOISE	DAY=	69.6	Leq	EVENING=	68.3	Leq	NIGHT=	62.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**70.7**
			CNEL=	**71.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**56**	**120**	**258**
	CNEL:	**61**	**132**	**284**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Menlo Ave.	Analyst:	NJF
Segment:	University to Crane	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,360
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	451	9	3	334	6	3	84	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.7	-20.0	-23.9	-4.1	-21.3	-25.2	-10.1	-27.3	-31.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.6	51.1	53.2	55.3	49.7	51.9	49.3	43.7	45.9
VEHICULAR NOISE	DAY=	59.0	Leq	EVENING=	57.7	Leq	NIGHT=	51.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.1**
			CNEL=	**60.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**24**	**51**
	CNEL:	**12**	**26**	**56**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Menlo Ave.	Analyst:	NJF
Segment:	Crane to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,647
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	530	10	4	392	7	3	98	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.0	-19.3	-23.2	-3.4	-20.6	-24.5	-9.4	-26.6	-30.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.3	51.8	53.9	56.0	50.4	52.6	50.0	44.4	46.6
VEHICULAR NOISE	DAY=	59.7	Leq	EVENING=	58.4	Leq	NIGHT=	52.4	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):	**Ldn=**	**60.8**		
	CNEL=	**61.5**		
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**26**	**57**
	CNEL:	**13**	**29**	**63**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Middle Ave.	Analyst:	NJF
Segment:	Olive to University	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,249
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	445	8	3	329	6	2	82	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.6	-20.8	-24.8	-4.9	-22.1	-26.1	-10.9	-28.2	-32.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.9	52.2	53.9	57.5	50.9	52.6	51.5	44.9	46.6
VEHICULAR NOISE	DAY=	60.7	Leq	EVENING=	59.4	Leq	NIGHT=	53.4	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.8**
			CNEL=	**62.4**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**14**	**31**	**66**
	CNEL:	**16**	**34**	**73**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Middle Ave.	Analyst:	NJF
Segment:	University to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,916
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	547	10	4	404	8	3	101	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-2.7	-19.9	-23.9	-4.0	-21.2	-25.2	-10.0	-27.3	-31.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	59.8	53.1	54.8	58.4	51.8	53.5	52.4	45.8	47.5
VEHICULAR NOISE	DAY=	61.6	Leq	EVENING=	60.3	Leq	NIGHT=	54.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.7**
			CNEL=	**63.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**16**	**35**	**76**
	CNEL:	**18**	**39**	**84**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Middlefield Rd.	Analyst:	NJF
Segment:	Ravenswood to Oak Grove	Date:	25-May-16

ROADWAY INPUTS	
ADT	14,757
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	905	17	7	669	13	5	168	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-1.2	-18.4	-22.4	-2.5	-19.7	-23.7	-8.5	-25.7	-29.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.9	56.4	57.6	62.6	55.0	56.3	56.5	49.0	50.3
VEHICULAR NOISE	DAY=	65.4	Leq	EVENING=	64.1	Leq	NIGHT=	58.1	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**66.5**
			CNEL=	**67.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**29**	**63**	**135**
	CNEL:	**32**	**69**	**149**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Middlefield Rd.	Analyst:	NJF
Segment:	Willow to Ravenswood	Date:	25-May-16

ROADWAY INPUTS	
ADT	19,684
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1207	23	9	892	17	7	224	4	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	0.1	-17.2	-21.1	-1.2	-18.5	-22.4	-7.3	-24.5	-28.4
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	65.9	58.4	59.7	64.6	57.1	58.4	58.6	51.1	52.3
VEHICULAR NOISE	DAY=	67.4	Leq	EVENING=	66.1	Leq	NIGHT=	60.1	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**68.5**
			CNEL=	**69.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**40**	**86**	**185**
	CNEL:	**44**	**95**	**204**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Middlefield Rd.	Analyst:	NJF
Segment:	City Limit to Willow	Date:	25-May-16

ROADWAY INPUTS	
ADT	18,416
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1130	21	9	835	16	6	209	4	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-0.2	-17.5	-21.4	-1.5	-18.8	-22.7	-7.5	-24.8	-28.7
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	65.6	58.1	59.4	64.3	56.8	58.1	58.3	50.8	52.1
VEHICULAR NOISE	DAY=	67.1	Leq	EVENING=	65.8	Leq	NIGHT=	59.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**68.2**
			CNEL=	**68.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**38**	**82**	**177**
	CNEL:	**42**	**91**	**195**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Newbridge St.	Analyst:	NJF
Segment:	Willow to Chilco	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,065
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	433	8	3	320	6	2	80	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.9	-20.2	-24.1	-4.2	-21.5	-25.4	-10.2	-27.5	-31.4
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.5	50.9	53.1	55.2	49.6	51.8	49.1	43.5	45.7
VEHICULAR NOISE	DAY=	58.9	Leq	EVENING=	57.5	Leq	NIGHT=	51.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.9**
			CNEL=	**60.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**23**	**50**
	CNEL:	**12**	**25**	**55**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	University to Crane	Date:	25-May-16

ROADWAY INPUTS	
ADT	6,351
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	390	7	3	288	5	2	72	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.4	-20.6	-24.6	-4.7	-21.9	-25.9	-10.7	-27.9	-31.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.0	50.4	52.6	54.7	49.1	51.3	48.7	43.1	45.3
VEHICULAR NOISE	DAY=	58.4	Leq	EVENING=	57.1	Leq	NIGHT=	51.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 59.5**

CNEL= 60.1

		70 dBA	*65 dBA*	*60 dBA*
NOISE CONTOUR:				
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**21**	**46**
	CNEL:	**11**	**24**	**51**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	Crane to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,697
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	472	9	4	349	7	3	87	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.5	-19.8	-23.7	-3.9	-21.1	-25.1	-9.9	-27.1	-31.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.8	51.2	53.4	55.5	49.9	52.1	49.5	43.9	46.1
VEHICULAR NOISE	DAY=	59.2	Leq	EVENING=	57.9	Leq	NIGHT=	51.9	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.3**
			CNEL=	**60.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**24**	**53**
	CNEL:	**12**	**27**	**58**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	El Camino Real to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	9,570
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	587	11	4	434	8	3	109	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-1.6	-18.8	-22.8	-2.9	-20.2	-24.1	-8.9	-26.2	-30.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.8	52.2	54.4	56.5	50.9	53.1	50.5	44.9	47.1
VEHICULAR NOISE	DAY=	60.2	Leq	EVENING=	58.9	Leq	NIGHT=	52.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.3**
			CNEL=	**61.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**13**	**28**	**61**
	CNEL:	**14**	**31**	**67**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	Laurel to Middlefield	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,651
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	531	10	4	392	7	3	98	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.0	-19.3	-23.2	-3.4	-20.6	-24.5	-9.4	-26.6	-30.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.3	51.8	54.0	56.0	50.4	52.6	50.0	44.4	46.6
VEHICULAR NOISE	DAY=	59.7	Leq	EVENING=	58.4	Leq	NIGHT=	52.4	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.8**
			CNEL=	**61.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**26**	**57**
	CNEL:	**13**	**29**	**63**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: EXISTING
Roadway: O'Brien Dr.
Segment: Kavanaugh to Willow

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	6,374
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	391	7	3	289	5	2	72	1	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-4.2	-21.4	-25.4	-5.5	-22.7	-26.7	-11.5	-28.7	-32.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.3	51.7	53.4	57.0	50.3	52.0	51.0	44.3	46.0
VEHICULAR NOISE	DAY=	60.2	Leq	EVENING=	58.9	Leq	NIGHT=	52.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.3**
			CNEL=	**61.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**13**	**28**	**61**
	CNEL:	**14**	**31**	**67**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	O'Brien Dr.	Analyst:	NJF
Segment:	University to Kavanaugh	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,279
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	201	4	2	149	3	1	37	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-7.0	-24.3	-28.2	-8.4	-25.6	-29.5	-14.4	-31.6	-35.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.4	48.8	50.5	54.1	47.5	49.2	48.1	41.5	43.1
VEHICULAR NOISE	DAY=	57.3	Leq	EVENING=	56.0	Leq	NIGHT=	50.0	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.4**
			CNEL=	**59.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**18**	**39**
	CNEL:	**9**	**20**	**43**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Ravenswood Ave.	Analyst:	NJF
Segment:	El Camino Real to Alma	Date:	25-May-16

ROADWAY INPUTS	
ADT	23,981
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1471	28	11	1087	21	8	272	5	2
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	2.4	-14.8	-18.8	1.1	-16.2	-20.1	-4.9	-22.2	-26.1
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.6	57.0	59.2	61.3	55.7	57.9	55.3	49.7	51.9
VEHICULAR NOISE	DAY=	65.0	Leq	EVENING=	63.7	Leq	NIGHT=	57.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**66.1**
			CNEL=	**66.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**27**	**59**	**127**
	CNEL:	**30**	**65**	**140**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Ravenswood Ave.	Analyst:	NJF
Segment:	Alma to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	18,762
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1151	22	9	851	16	6	213	4	2
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	1.3	-15.9	-19.9	0.0	-17.2	-21.2	-6.0	-23.2	-27.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.7	55.1	57.3	59.4	53.8	56.0	53.4	47.8	50.0
VEHICULAR NOISE	DAY=	63.1	Leq	EVENING=	61.8	Leq	NIGHT=	55.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**64.2**
			CNEL=	**64.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**20**	**44**	**95**
	CNEL:	**23**	**49**	**105**

Menlo Park GP

EXISTING

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	Ravenswood Ave.	Laurel to Middlefield	16,553	25	12	Soft	2U	**0%**
2	Ringwood Ave.	Middlefield to Bay	7,302	30	12	Soft	2U	**0%**
3	Sand Hill Rd.	I-280 to Sharon Park	28,048	40	48	Soft	4D	**0%**
4	Sand Hill Rd.	Santa Cruz to Sharon Park	30,785	40	48	Soft	4D	**0%**
5	Sand Hill Rd.	Santa Cruz to City Limit	32,742	40	48	Soft	4D	**0%**
6	Santa Cruz Ave.	Junipero Serra to Sand Hill	26,484	35	48	Soft	4D	**0%**
7	Santa Cruz Ave.	Sand Hill to Alameda de las Pulgas	23,227	35	48	Soft	4D	**0%**
8	Santa Cruz Ave.	Alameda de las Pulgas to Avy/Orange	10,897	30	12	Soft	2U	**0%**
9	Santa Cruz Ave.	Avy/Orange to Olive	14,524	30	12	Soft	2U	**0%**
10	Santa Cruz Ave.	Olive to University	15,314	30	24	Soft	2D	**0%**
11	Santa Cruz Ave.	University to Crane	7,614	30	24	Soft	2D	**0%**
12	Santa Cruz Ave.	Crane to El Camino Real	7,373	30	24	Soft	2D	**0%**
13	Scott Dr.	Marsh to Campbell	4,815	30	12	Soft	2U	**0%**
14	Sharon Park Dr.	Sand Hill to Sharon	9,970	25	24	Soft	2D	**0%**
15	Sharon Rd.	Sharon Park to Alameda de las Pulgas	3,781	25	12	Soft	2U	**0%**
16	University Dr.	Middle to Menlo	5,840	25	12	Soft	2U	**0%**
17	University Dr.	Menlo to Santa Cruz	9,310	25	12	Soft	2U	**0%**
18	University Dr.	Santa Cruz to Oak Grove	7,158	25	12	Soft	2U	**0%**
19	University Dr.	Oak Grove to Valparaiso	5,111	25	12	Soft	2U	**0%**
20	Valparaiso Ave.	Alameda de las Pulgas to Cotton	12,052	35	12	Soft	2U	**0%**
21	Valparaiso Ave.	Cotton to University	14,436	35	12	Soft	2U	**0%**
22	Valparaiso Ave.	University to El Camino Real	13,011	35	12	Soft	2U	**0%**
23	Willow Rd.	Alma to Laurel	3,362	25	24	Soft	2D	**0%**
24	Willow Rd.	Laurel to Middlefield	5,247	25	24	Soft	2D	**0%**
25	Willow Rd.	Middlefield to Gilbert	24,332	25	24	Soft	2D	**0%**
26	Chilco St.	Hamilton to Terminal	4,776	25	12	Soft	2U	**0%**
27	Chilco St.	Ivy to Terminal	2,654	25	12	Soft	2U	**0%**
28	Chilco St.	Newbridge to Ivy	2,114	25	12	Soft	2U	**0%**
29	Hamilton Ave.	Willow to Hamilton Ct.	2,643	25	12	Soft	2U	**0%**
30	Willow Rd.	Gilbert to Coleman	24,353	35	24	Soft	2D	**0%**

ANALYST
NJF

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

73.6	75.55%
13.6	13.96%
10.22	10.49%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.42%	DAY	75.5%
% MT	1.84%	EVENING	14.0%
% HT	0.74%	NIGHT	10.5%

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mitigating Traf

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM tc	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Menlo Park GP
EXISTING CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

#	ROADWAY	SEGMENT	TRAFIC VOLUMES	LEVEL AT 50 FT.	DISTACE TO NOISE CONTOUR (FT.) 70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Ravenswood Ave.	Laurel to Middlefield	16,553	64.3	21	45	96
2	Ringwood Ave.	Middlefield to Bay	7,302	62.5	16	34	73
3	Sand Hill Rd.	I-280 to Sharon Park	28,048	72.1	69	149	320
4	Sand Hill Rd.	Santa Cruz to Sharon Park	30,785	72.5	73	158	341
5	Sand Hill Rd.	Santa Cruz to City Limit	32,742	72.8	77	165	355
6	Santa Cruz Ave.	Junipero Serra to Sand Hill	26,484	70.4	54	115	248
7	Santa Cruz Ave.	Sand Hill to Alameda de las Pulgas	23,227	69.9	49	106	228
8	Santa Cruz Ave.	Alameda de las Pulgas to Avy/Orange	10,897	64.2	21	44	96
9	Santa Cruz Ave.	Avy/Orange to Olive	14,524	65.5	25	54	116
10	Santa Cruz Ave.	Olive to University	15,314	65.8	26	57	123
11	Santa Cruz Ave.	University to Crane	7,614	62.8	17	36	77
12	Santa Cruz Ave.	Crane to El Camino Real	7,373	62.7	16	35	75
13	Scott Dr.	Marsh to Campbell	4,815	60.7	12	26	55
14	Sharon Park Dr.	Sand Hill to Sharon	9,970	62.2	15	33	70
15	Sharon Rd.	Sharon Park to Alameda de las Pulgas	3,781	57.9	8	17	36
16	University Dr.	Middle to Menlo	5,840	59.7	10	22	48
17	University Dr.	Menlo to Santa Cruz	9,310	61.8	14	30	66
18	University Dr.	Santa Cruz to Oak Grove	7,158	60.6	12	26	55
19	University Dr.	Oak Grove to Valparaiso	5,111	59.2	9	20	44
20	Valparaiso Ave.	Alameda de las Pulgas to Cotton	12,052	66.2	28	60	130
21	Valparaiso Ave.	Cotton to University	14,436	67.0	32	68	146
22	Valparaiso Ave.	University to El Camino Real	13,011	66.6	29	63	137
23	Willow Rd.	Alma to Laurel	3,362	57.5	7	16	34
24	Willow Rd.	Laurel to Middlefield	5,247	59.4	10	21	46
25	Willow Rd.	Middlefield to Gilbert	24,332	66.1	27	59	127
26	Chilco St.	Hamilton to Terminal	4,776	58.9	9	20	42
27	Chilco St.	Ivy to Terminal	2,654	56.3	6	13	28
28	Chilco St.	Newbridge to Ivy	2,114	55.3	5	11	24
29	Hamilton Ave.	Willow to Hamilton Ct.	2,643	56.3	6	13	28
30	Willow Rd.	Gilbert to Coleman	24,353	69.4	46	99	212

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Ravenswood Ave.	Analyst:	NJF
Segment:	Laurel to Middlefield	Date:	25-May-16

ROADWAY INPUTS	
ADT	16,553
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1015	19	8	750	14	6	188	4	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	0.8	-16.5	-20.4	-0.5	-17.8	-21.7	-6.5	-23.8	-27.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.2	54.6	56.8	58.8	53.3	55.5	52.8	47.2	49.4
VEHICULAR NOISE	DAY=	62.6	Leq	EVENING=	61.2	Leq	NIGHT=	55.2	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**63.6**
					CNEL=	**64.3**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**19**	**41**	**88**
			CNEL:	**21**	**45**	**96**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Ringwood Ave.	Analyst:	NJF
Segment:	Middlefield to Bay	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,302
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	448	8	3	331	6	3	83	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.6	-20.8	-24.8	-4.9	-22.1	-26.1	-10.9	-28.1	-32.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.9	52.3	53.9	57.6	50.9	52.6	51.6	44.9	46.6
VEHICULAR NOISE	DAY=	60.8	Leq	EVENING=	59.4	Leq	NIGHT=	53.4	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.9**
					CNEL=	**62.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**14**	**31**	**66**
			CNEL:	**16**	**34**	**73**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Sand Hill Rd.	Analyst:	NJF
Segment:	I-280 to Sharon Park	Date:	25-May-16

ROADWAY INPUTS	
ADT	28,048
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1720	32	13	1272	24	10	319	6	2
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	1.0	-16.2	-20.2	-0.3	-17.5	-21.5	-6.3	-23.5	-27.5
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	69.1	60.9	61.7	67.8	59.5	60.4	61.8	53.5	54.4
VEHICULAR NOISE	DAY=	70.4	Leq	EVENING=	69.1	Leq	NIGHT=	63.1	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**71.5**
				CNEL=	**72.1**

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**63**	**135**	**291**
	CNEL:	**69**	**149**	**320**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Sand Hill Rd.	Analyst:	NJF
Segment:	Santa Cruz to Sharon Park	Date:	25-May-16

ROADWAY INPUTS	
ADT	30,785
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1888	36	14	1396	26	11	350	7	3
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	1.4	-15.8	-19.8	0.1	-17.1	-21.1	-5.9	-23.1	-27.1
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	69.5	61.3	62.1	68.2	59.9	60.8	62.2	53.9	54.8
VEHICULAR NOISE	DAY=	70.8	Leq	EVENING=	69.5	Leq	NIGHT=	63.5	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**71.9**
					CNEL=	**72.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**67**	**144**	**310**
			CNEL:	**73**	**158**	**341**

Scenario: EXISTING
Roadway: Sand Hill Rd.
Segment: Santa Cruz to City Limit

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	32,742
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2008	38	15	1484	28	11	372	7	3
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	1.7	-15.5	-19.5	0.4	-16.8	-20.8	-5.6	-22.9	-26.8
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	69.8	61.5	62.4	68.5	60.2	61.1	62.5	54.2	55.1
VEHICULAR NOISE	DAY=	71.0	Leq	EVENING=	69.7	Leq	NIGHT=	63.7	Leq

RESULTS					
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):				**Ldn=**	**72.1**
				CNEL=	**72.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**69**	**150**	**323**	
	CNEL:	**77**	**165**	**355**	

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Junipero Serra to Sand Hill	Date:	25-May-16

ROADWAY INPUTS	
ADT	26,484
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1624	31	12	1201	23	9	301	6	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	1.4	-15.9	-19.8	0.0	-17.2	-21.1	-6.0	-23.2	-27.2
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	67.2	59.7	61.0	65.9	58.4	59.6	59.9	52.4	53.6
VEHICULAR NOISE	DAY=	68.7	Leq	EVENING=	67.4	Leq	NIGHT=	61.4	Leq

RESULTS					
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**69.8**
				CNEL=	**70.4**
NOISE CONTOUR:			*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):		**Ldn:**	**49**	**105**	**226**
		CNEL:	**54**	**115**	**248**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Sand Hill to Alameda de las Pulgas	Date:	25-May-16

ROADWAY INPUTS

ADT	23,227
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS

DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1425	27	11	1053	20	8	264	5	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	0.8	-16.4	-20.4	-0.5	-17.8	-21.7	-6.5	-23.8	-27.7
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	66.6	59.1	60.4	65.3	57.8	59.1	59.3	51.8	53.1
VEHICULAR NOISE	DAY=	68.2	Leq	EVENING=	66.8	Leq	NIGHT=	60.8	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.2**
					CNEL=	**69.9**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**45**	**96**	**207**
			CNEL:	**49**	**106**	**228**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Alameda de las Pulgas to Avy/Orange	Date:	25-May-16

ROADWAY INPUTS	
ADT	10,897
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	668	13	5	494	9	4	124	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-1.8	-19.1	-23.0	-3.1	-20.4	-24.3	-9.2	-26.4	-30.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.6	54.0	55.7	59.3	52.7	54.4	53.3	46.7	48.4
VEHICULAR NOISE	DAY=	62.5	Leq	EVENING=	61.2	Leq	NIGHT=	55.2	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**63.6**
					CNEL=	**64.2**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**19**	**40**	**87**
			CNEL:	**21**	**44**	**96**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Avy/Orange to Olive	Date:	25-May-16

ROADWAY INPUTS	
ADT	14,524
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	891	17	7	658	12	5	165	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.6	-17.8	-21.8	-1.9	-19.1	-23.1	-7.9	-25.1	-29.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	61.9	55.2	56.9	60.6	53.9	55.6	54.6	47.9	49.6
VEHICULAR NOISE	DAY=	63.7	Leq	EVENING=	62.4	Leq	NIGHT=	56.4	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**64.8**
					CNEL=	**65.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**23**	**49**	**105**
			CNEL:	**25**	**54**	**116**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Olive to University	Date:	25-May-16

ROADWAY INPUTS	
ADT	15,314
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	939	18	7	694	13	5	174	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.3	-17.6	-21.5	-1.7	-18.9	-22.9	-7.7	-24.9	-28.9
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.3	55.6	57.3	60.9	54.3	56.0	54.9	48.3	50.0
VEHICULAR NOISE	DAY=	64.1	Leq	EVENING=	62.8	Leq	NIGHT=	56.8	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**65.2**	
				CNEL=	**65.8**	
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**24**	**52**	**111**
			CNEL:	**26**	**57**	**123**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	University to Crane	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,614
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	467	9	4	345	7	3	86	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.4	-20.6	-24.6	-4.7	-21.9	-25.9	-10.7	-27.9	-31.9
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	59.2	52.6	54.3	57.9	51.3	53.0	51.9	45.3	46.9
VEHICULAR NOISE	DAY=	61.1	Leq	EVENING=	59.8	Leq	NIGHT=	53.8	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.2**
			CNEL=	**62.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**15**	**32**	**70**
	CNEL:	**17**	**36**	**77**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Crane to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,373
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	452	9	3	334	6	3	84	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.5	-20.8	-24.7	-4.8	-22.1	-26.0	-10.8	-28.1	-32.0
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	59.1	52.4	54.1	57.8	51.1	52.8	51.8	45.1	46.8
VEHICULAR NOISE	DAY=	60.9	Leq	EVENING=	59.6	Leq	NIGHT=	53.6	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.0**
			CNEL=	**62.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**15**	**32**	**68**
	CNEL:	**16**	**35**	**75**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Scott Dr.	Analyst:	NJF
Segment:	Marsh to Campbell	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,815
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	295	6	2	218	4	2	55	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-5.4	-22.6	-26.6	-6.7	-23.9	-27.9	-12.7	-29.9	-33.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.1	50.4	52.1	55.8	49.1	50.8	49.8	43.1	44.8
VEHICULAR NOISE	DAY=	58.9	Leq	EVENING=	57.6	Leq	NIGHT=	51.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.0**
			CNEL=	**60.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**23**	**50**
	CNEL:	**12**	**26**	**55**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Sharon Park Dr.	Analyst:	NJF
Segment:	Sand Hill to Sharon	Date:	25-May-16

ROADWAY INPUTS	
ADT	9,970
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	611	12	5	452	9	3	113	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-1.4	-18.7	-22.6	-2.7	-20.0	-23.9	-8.7	-26.0	-29.9
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.1	52.5	54.7	56.8	51.2	53.4	50.8	45.2	47.4
VEHICULAR NOISE	DAY=	60.5	Leq	EVENING=	59.2	Leq	NIGHT=	53.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.6**
			CNEL=	**62.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**14**	**30**	**64**
	CNEL:	**15**	**33**	**70**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Sharon Rd.	Analyst:	NJF
Segment:	Sharon Park to Alameda de las Pul	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,781
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	232	4	2	171	3	1	43	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-5.6	-22.9	-26.8	-6.9	-24.2	-28.1	-13.0	-30.2	-34.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.8	48.2	50.4	52.4	46.8	49.0	46.4	40.8	43.0
VEHICULAR NOISE	DAY=	56.1	Leq	EVENING=	54.8	Leq	NIGHT=	48.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):		**Ldn=**		**57.2**
		CNEL=		**57.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**15**	**33**
	CNEL:	**8**	**17**	**36**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Middle to Menlo	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,840
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	358	7	3	265	5	2	66	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.7	-21.0	-24.9	-5.1	-22.3	-26.3	-11.1	-28.3	-32.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.6	50.0	52.2	54.3	48.7	50.9	48.3	42.7	44.9
VEHICULAR NOISE	DAY=	58.0	Leq	EVENING=	56.7	Leq	NIGHT=	50.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.1**
			CNEL=	**59.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**44**
	CNEL:	**10**	**22**	**48**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Menlo to Santa Cruz	Date:	25-May-16

ROADWAY INPUTS	
ADT	9,310
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	571	11	4	422	8	3	106	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-1.7	-19.0	-22.9	-3.0	-20.3	-24.2	-9.0	-26.3	-30.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.7	52.1	54.3	56.4	50.8	53.0	50.3	44.7	46.9
VEHICULAR NOISE	DAY=	60.1	Leq	EVENING=	58.7	Leq	NIGHT=	52.7	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.1**
			CNEL=	**61.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**13**	**28**	**60**
	CNEL:	**14**	**30**	**66**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Santa Cruz to Oak Grove	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,158
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	439	8	3	324	6	2	81	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.9	-20.1	-24.1	-4.2	-21.4	-25.4	-10.2	-27.4	-31.4
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.5	50.9	53.1	55.2	49.6	51.8	49.2	43.6	45.8
VEHICULAR NOISE	DAY=	58.9	Leq	EVENING=	57.6	Leq	NIGHT=	51.6	Leq

RESULTS					
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):				**Ldn=**	**60.0**
				CNEL=	**60.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**23**	**50**	
	CNEL:	**12**	**26**	**55**	

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Oak Grove to Valparaiso	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,111
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	313	6	2	232	4	2	58	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.3	-21.6	-25.5	-5.6	-22.9	-26.8	-11.6	-28.9	-32.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.1	49.5	51.7	53.7	48.2	50.4	47.7	42.1	44.3
VEHICULAR NOISE	DAY=	57.4	Leq	EVENING=	56.1	Leq	NIGHT=	50.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.5**
			CNEL=	**59.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**19**	**40**
	CNEL:	**9**	**20**	**44**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Valparaiso Ave.	Analyst:	NJF
Segment:	Alameda de las Pulgas to Cotton	Date:	25-May-16

ROADWAY INPUTS	
ADT	12,052
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	739	14	6	546	10	4	137	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-2.1	-19.3	-23.3	-3.4	-20.6	-24.6	-9.4	-26.6	-30.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.0	55.5	56.7	61.7	54.2	55.4	55.7	48.1	49.4
VEHICULAR NOISE	DAY=	64.5	Leq	EVENING=	63.2	Leq	NIGHT=	57.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.6**
			CNEL=	**66.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**25**	**55**	**118**
	CNEL:	**28**	**60**	**130**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Valparaiso Ave.	Analyst:	NJF
Segment:	Cotton to University	Date:	25-May-16

ROADWAY INPUTS	
ADT	14,436
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	885	17	7	654	12	5	164	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-1.3	-18.5	-22.5	-2.6	-19.8	-23.8	-8.6	-25.8	-29.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.8	56.3	57.5	62.5	54.9	56.2	56.5	48.9	50.2
VEHICULAR NOISE	DAY=	65.3	Leq	EVENING=	64.0	Leq	NIGHT=	58.0	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**66.4**
			CNEL=	**67.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**29**	**62**	**133**
	CNEL:	**32**	**68**	**146**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Valparaiso Ave.	Analyst:	NJF
Segment:	University to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	13,011
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	798	15	6	590	11	4	148	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-1.7	-19.0	-22.9	-3.0	-20.3	-24.2	-9.1	-26.3	-30.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.3	55.8	57.1	62.0	54.5	55.8	56.0	48.5	49.7
VEHICULAR NOISE	DAY=	64.8	Leq	EVENING=	63.5	Leq	NIGHT=	57.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.9**
			CNEL=	**66.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**27**	**58**	**124**
	CNEL:	**29**	**63**	**137**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Alma to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,362
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	206	4	2	152	3	1	38	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-6.1	-23.4	-27.3	-7.5	-24.7	-28.6	-13.5	-30.7	-34.7
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.4	47.8	50.0	52.1	46.5	48.7	46.1	40.5	42.7
VEHICULAR NOISE	DAY=	55.8	Leq	EVENING=	54.5	Leq	NIGHT=	48.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**56.9**
			CNEL=	**57.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**14**	**31**
	CNEL:	**7**	**16**	**34**

Scenario: EXISTING
Roadway: Willow Rd.
Segment: Laurel to Middlefield

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	5,247
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	322	6	2	238	4	2	60	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.2	-21.4	-25.4	-5.5	-22.8	-26.7	-11.5	-28.8	-32.7
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.3	49.7	51.9	54.0	48.4	50.6	48.0	42.4	44.6
VEHICULAR NOISE	DAY=	57.7	Leq	EVENING=	56.4	Leq	NIGHT=	50.4	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 58.8**
CNEL= 59.4

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**19**	**42**
	CNEL:	**10**	**21**	**46**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Middlefield to Gilbert	Date:	25-May-16

ROADWAY INPUTS	
ADT	24,332
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1492	28	11	1103	21	8	276	5	2
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	2.5	-14.8	-18.7	1.1	-16.1	-20.1	-4.9	-22.1	-26.1
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.0	56.4	58.6	60.7	55.1	57.3	54.7	49.1	51.3
VEHICULAR NOISE	DAY=	64.4	Leq	EVENING=	63.1	Leq	NIGHT=	57.0	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.5**
			CNEL=	**66.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**25**	**54**	**116**
	CNEL:	**27**	**59**	**127**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Hamilton to Terminal	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,776
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	293	6	2	217	4	2	54	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.6	-21.9	-25.8	-5.9	-23.2	-27.1	-11.9	-29.2	-33.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.8	49.2	51.4	53.5	47.9	50.1	47.4	41.8	44.0
VEHICULAR NOISE	DAY=	57.2	Leq	EVENING=	55.8	Leq	NIGHT=	49.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.2**
			CNEL=	**58.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**18**	**38**
	CNEL:	**9**	**20**	**42**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Ivy to Terminal	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,654
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	163	3	1	120	2	1	30	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-7.2	-24.4	-28.4	-8.5	-25.7	-29.7	-14.5	-31.7	-35.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	52.2	46.6	48.8	50.9	45.3	47.5	44.9	39.3	41.5
VEHICULAR NOISE	DAY=	54.6	Leq	EVENING=	53.3	Leq	NIGHT=	47.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**55.7**
			CNEL=	**56.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**12**	**26**
	CNEL:	**6**	**13**	**28**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Newbridge to Ivy	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,114
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	130	2	1	96	2	1	24	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-8.2	-25.4	-29.4	-9.5	-26.7	-30.7	-15.5	-32.7	-36.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	51.2	45.6	47.8	49.9	44.3	46.5	43.9	38.3	40.5
VEHICULAR NOISE	DAY=	53.6	Leq	EVENING=	52.3	Leq	NIGHT=	46.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**54.7**
			CNEL=	**55.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**5**	**10**	**22**
	CNEL:	**5**	**11**	**24**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: EXISTING
Roadway: Hamilton Ave.
Segment: Willow to Hamilton Ct.

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	2,643
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	162	3	1	120	2	1	30	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-7.2	-24.4	-28.4	-8.5	-25.7	-29.7	-14.5	-31.8	-35.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	52.2	46.6	48.8	50.9	45.3	47.5	44.9	39.3	41.5
VEHICULAR NOISE	DAY=	54.6	Leq	EVENING=	53.3	Leq	NIGHT=	47.3	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**55.7**
			CNEL=	**56.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**12**	**26**
	CNEL:	**6**	**13**	**28**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Gilbert to Coleman	Date:	25-May-16

ROADWAY INPUTS	
ADT	24,353
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1494	28	11	1104	21	8	277	5	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	1.0	-16.2	-20.2	-0.3	-17.6	-21.5	-6.3	-23.6	-27.5
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	66.2	58.7	59.9	64.9	57.4	58.6	58.9	51.3	52.6
VEHICULAR NOISE	DAY=	67.7	Leq	EVENING=	66.4	Leq	NIGHT=	60.4	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 68.8**

CNEL= 69.4

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**42**	**89**	**193**
	CNEL:	**46**	**99**	**212**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Coleman to Durham	Date:	25-May-16

ROADWAY INPUTS	
ADT	41,188
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2526	48	19	1867	35	14	468	9	4
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	3.3	-14.0	-17.9	2.0	-15.3	-19.2	-4.0	-21.3	-25.2
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	68.5	61.0	62.2	67.2	59.6	60.9	61.2	53.6	54.9
VEHICULAR NOISE	DAY=	70.0	Leq	EVENING=	68.7	Leq	NIGHT=	62.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**71.1**
			CNEL=	**71.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**59**	**127**	**274**
	CNEL:	**65**	**140**	**301**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Durham to Bay	Date:	25-May-16

ROADWAY INPUTS	
ADT	34,147
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2094	40	16	1548	29	12	388	7	3
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	2.5	-14.8	-18.7	1.2	-16.1	-20.0	-4.9	-22.1	-26.1
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	68.3	60.8	62.1	67.0	59.5	60.8	61.0	53.5	54.7
VEHICULAR NOISE	DAY=	69.8	Leq	EVENING=	68.5	Leq	NIGHT=	62.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**70.9**
			CNEL=	**71.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**58**	**124**	**267**
	CNEL:	**63**	**137**	**294**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Terminal to Constitution	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,103
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	313	6	2	231	4	2	58	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.3	-21.6	-25.5	-5.6	-22.9	-26.8	-11.7	-28.9	-32.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.1	49.5	51.7	53.7	48.1	50.3	47.7	42.1	44.3
VEHICULAR NOISE	DAY=	57.4	Leq	EVENING=	56.1	Leq	NIGHT=	50.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.5**
			CNEL=	**59.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**19**	**40**
	CNEL:	**9**	**20**	**44**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Chrysler Dr.	Analyst:	NJF
Segment:	Constitution to Independence	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,269
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	200	4	2	148	3	1	37	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-6.3	-23.5	-27.5	-7.6	-24.8	-28.8	-13.6	-30.8	-34.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.1	47.5	49.7	51.8	46.2	48.4	45.8	40.2	42.4
VEHICULAR NOISE	DAY=	55.5	Leq	EVENING=	54.2	Leq	NIGHT=	48.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**56.6**
			CNEL=	**57.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**14**	**30**
	CNEL:	**7**	**15**	**33**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Chrysler Dr.	Analyst:	NJF
Segment:	Independence to Commonwealth	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,110
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	68	1	1	50	1	0	13	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-11.0	-28.2	-32.1	-12.3	-29.5	-33.5	-18.3	-35.5	-39.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	48.4	42.8	45.0	47.1	41.5	43.7	41.1	35.5	37.7
VEHICULAR NOISE	DAY=	50.8	Leq	EVENING=	49.5	Leq	NIGHT=	43.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**51.9**
			CNEL=	**52.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**3**	**7**	**14**
	CNEL:	**3**	**7**	**16**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: EXISTING
Roadway: Adams Dr.
Segment: University to Adams

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	1,263
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	77	1	1	57	1	0	14	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-10.4	-27.6	-31.6	-11.7	-28.9	-32.9	-17.7	-35.0	-38.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	49.0	43.4	45.6	47.7	42.1	44.3	41.7	36.1	38.3
VEHICULAR NOISE	DAY=	51.4	Leq	EVENING=	50.1	Leq	NIGHT=	44.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**52.5**
			CNEL=	**53.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**3**	**7**	**16**
	CNEL:	**4**	**8**	**17**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: EXISTING
Roadway: Olive St.
Segment: Santa Cruz to Middle

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	2,449
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	150	3	1	111	2	1	28	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-8.3	-25.5	-29.5	-9.6	-26.9	-30.8	-15.6	-32.9	-36.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.1	47.5	49.2	52.8	46.2	47.9	46.8	40.2	41.9
VEHICULAR NOISE	DAY=	56.0	Leq	EVENING=	54.7	Leq	NIGHT=	48.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 57.1**
CNEL= 57.7

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**15**	**32**
	CNEL:	**8**	**16**	**35**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Olive St.	Analyst:	NJF
Segment:	Middle to Oak	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,051
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA		DAYTIME			EVENING			NIGHT	
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	187	4	1	138	3	1	35	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-7.4	-24.6	-28.5	-8.7	-25.9	-29.9	-14.7	-31.9	-35.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.1	48.5	50.2	53.8	47.1	48.8	47.8	41.1	42.8
VEHICULAR NOISE	DAY=	57.0	Leq	EVENING=	55.7	Leq	NIGHT=	49.6	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.1**
			CNEL=	**58.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**17**	**37**
	CNEL:	**9**	**19**	**41**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Cambridge Ave.	Analyst:	NJF
Segment:	University to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,603
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	98	2	1	73	1	1	18	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-9.4	-26.6	-30.6	-10.7	-27.9	-31.9	-16.7	-33.9	-37.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	50.0	44.4	46.6	48.7	43.1	45.3	42.7	37.1	39.3
VEHICULAR NOISE	DAY=	52.4	Leq	EVENING=	51.1	Leq	NIGHT=	45.1	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**53.5**
			CNEL=	**54.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**4**	**9**	**18**
	CNEL:	**4**	**9**	**20**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Linfield Dr.	Analyst:	NJF
Segment:	Middlefield to Waverley	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,760
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	108	2	1	80	2	1	20	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-9.0	-26.2	-30.1	-10.3	-27.5	-31.5	-16.3	-33.5	-37.5
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	50.6	45.0	47.2	49.3	43.7	45.9	43.3	37.7	39.9
VEHICULAR NOISE	DAY=	53.0	Leq	EVENING=	51.7	Leq	NIGHT=	45.6	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**54.1**
			CNEL=	**54.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**4**	**9**	**20**
	CNEL:	**5**	**10**	**22**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Waverley St.	Analyst:	NJF
Segment:	Laurel to Linfield	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,652
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	101	2	1	75	1	1	19	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-9.2	-26.5	-30.4	-10.5	-27.8	-31.7	-16.6	-33.8	-37.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	50.2	44.6	46.8	48.8	43.3	45.4	42.8	37.2	39.4
VEHICULAR NOISE	DAY=	52.5	Leq	EVENING=	51.2	Leq	NIGHT=	45.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**53.6**
			CNEL=	**54.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**4**	**9**	**19**
	CNEL:	**4**	**10**	**21**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Ivy Dr.	Analyst:	NJF
Segment:	Chilco to Willow	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,200
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	196	4	1	145	3	1	36	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-6.4	-23.6	-27.6	-7.7	-24.9	-28.9	-13.7	-30.9	-34.9
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.2	47.6	49.8	51.9	46.3	48.5	45.8	40.3	42.5
VEHICULAR NOISE	DAY=	55.6	Leq	EVENING=	54.2	Leq	NIGHT=	48.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 56.7**

CNEL= 57.3

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**14**	**30**
	CNEL:	**7**	**15**	**33**

Menlo Park GP

EXISTING

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	SR 82 / El Camino Real	San Mateo County Line to Atherton Ave	31,000	35	72	Soft	6D	**0%**
2	Highway 101	Route 114 to Marsh Rd	199,000	65	130	Soft	10D	**0%**
3	Interstate 280	Sand Hill Road to Route 84	105,000	65	120	Soft	8D	**0%**
4	SR 84 / Bayfront Expy	Highway 101/ Marsh Rd to Route 114 / Willow Rd	33,500	45	80	Soft	6D	**0%**
5	SR 84 / Bayfront Expy	Route 114 / Willow Rd to Route 109 / University Av	54,000	50	80	Soft	6D	**0%**
6	SR 84 / Bayfront Expy	Route 109 / University Ave to Dumbarton Bridge	61,000	55	80	Soft	6D	**0%**
7					#N/A	Soft		**0%**
8					#N/A	Soft		**0%**
9					#N/A	Soft		**0%**
10					#N/A	Soft		**0%**
11					#N/A	Soft		**0%**
12					#N/A	Soft		**0%**
13					#N/A	Soft		**0%**
14					#N/A	Soft		**0%**
15					#N/A	Soft		**0%**
16					#N/A	Soft		**0%**
17					#N/A	Soft		**0%**
18					#N/A	Soft		**0%**
19					#N/A	Soft		**0%**
20					#N/A	Soft		**0%**
21					#N/A	Soft		**0%**
22					#N/A	Soft		**0%**
23					#N/A	Soft		**0%**
24					#N/A	Soft		**0%**
25					#N/A	Soft		**0%**
26					#N/A	Soft		**0%**
27					#N/A	Soft		**0%**
28					#N/A	Soft		**0%**
29					#N/A	Soft		**0%**
30					54	Soft		**0%**

ANALYST
NJF

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

73.6	75.55%
13.6	13.96%
10.22	10.49%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.42%	DAY	75.5%
% MT	1.84%	EVENING	14.0%
% HT	0.74%	NIGHT	10.5%

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mitigating Traf

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM tc	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Source: Caltrans 2014

Menlo Park GP
EXISTING CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

					DISTACE TO NOISE CONTOUR (FT.)		
#	**ROADWAY**	**SEGMENT**	**TRAFIC VOLUMES**	**LEVEL AT 100 FT.**	**70 dBA CNEL**	**65 dBA CNEL**	**60 dBA CNEL**
1	SR 82 / El Camino Real	San Mateo County Line to Atherton Ave	31,000	66.2	56	120	259
2	Highway 101	Route 114 to Marsh Rd	199,000	82.5	677	1459	3144
3	Interstate 280	Sand Hill Road to Route 84	105,000	79.4	420	905	1950
4	SR 84 / Bayfront Expy	Highway 101/ Marsh Rd to Route 114 / Willow	33,500	69.3	90	195	420
5	SR 84 / Bayfront Expy	Route 114 / Willow Rd to Route 109 / Universit	54,000	72.6	149	320	690
6	SR 84 / Bayfront Expy	Route 109 / University Ave to Dumbarton Bridg	61,000	74.2	190	410	883
7	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
8	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
9	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
10	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
11	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
12	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
13	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
14	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
15	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
16	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
17	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
18	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
19	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
20	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
21	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
22	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
23	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
24	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
25	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
26	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
27	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
28	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
29	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
30	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	SR 82 / El Camino Real	Analyst:	NJF
Segment:	San Mateo County Line to Atherton Ave	Date:	25-May-16

ROADWAY INPUTS	
ADT	31,000
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	72
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1901	36	14	1405	27	11	352	7	3
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	2.0	-15.2	-19.2	0.7	-16.5	-20.5	-5.3	-22.5	-26.5
Distance	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2	-4.2
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.0	55.5	56.7	61.7	54.2	55.4	55.7	48.1	49.4
VEHICULAR NOISE	DAY=	64.5	Leq	EVENING=	63.2	Leq	NIGHT=	57.2	Leq

RESULTS

NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.6**
					CNEL=	**66.2**
				70	*65*	*60*
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**51**	**109**	**236**
			CNEL:	**56**	**120**	**259**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	Highway 101	Analyst:	NJF
Segment:	Route 114 to Marsh Rd	Date:	25-May-16

ROADWAY INPUTS	
ADT	199,000
SPEED (mph)	65
ROAD NEAR-FAR LN. DIST.	130
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	12205	231	93	9021	170	69	2260	43	17
Speed in MPH	65	65	65	65	65	65	65	65	65
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	75.5	81.7	85.2	75.5	81.7	85.2	75.5	81.7	85.2
ADJUSTMENTS									
Flow	7.4	-9.8	-13.8	6.1	-11.1	-15.1	0.1	-17.1	-21.1
Distance	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	80.1	69.1	68.6	78.8	67.8	67.3	72.8	61.7	61.3
VEHICULAR NOISE	DAY=	80.7	Leq	EVENING=	79.4	Leq	NIGHT=	73.4	Leq

RESULTS						
NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):			**Ldn=**	**81.8**
					CNEL=	**82.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**615**	**1325**	**2856**
			CNEL:	**677**	**1459**	**3144**

Scenario: EXISTING
Roadway: Interstate 280
Segment: Sand Hill Road to Route 84

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	105,000
SPEED (mph)	65
ROAD NEAR-FAR LN. DIST.	120
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	6440	122	49	4760	90	36	1192	23	9
Speed in MPH	65	65	65	65	65	65	65	65	65
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	75.5	81.7	85.2	75.5	81.7	85.2	75.5	81.7	85.2
ADJUSTMENTS									
Flow	4.7	-12.6	-16.5	3.3	-13.9	-17.9	-2.7	-19.9	-23.9
Distance	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	77.0	66.0	65.5	75.7	64.6	64.2	69.7	58.6	58.2
VEHICULAR NOISE	DAY=	77.6	Leq	EVENING=	76.3	Leq	NIGHT=	70.3	Leq

RESULTS					
NOISE LEVELS AT 100 FEET FROM CENTERLINE (dBA):				**Ldn=**	**78.7**
				CNEL=	**79.4**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**382**	**822**	**1771**	
	CNEL:	**420**	**905**	**1950**	

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	SR 84 / Bayfront Expy	Analyst:	NJF
Segment:	Highway 101/ Marsh Rd to Route 114 / Willow Rd	Date:	25-May-16

ROADWAY INPUTS	
ADT	33,500
SPEED (mph)	45
ROAD NEAR-FAR LN. DIST.	80
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2055	39	16	1519	29	12	380	7	3
Speed in MPH	45	45	45	45	45	45	45	45	45
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	69.3	77.6	82.1	69.3	77.6	82.1	69.3	77.6	82.1
ADJUSTMENTS									
Flow	1.3	-15.9	-19.9	0.0	-17.3	-21.2	-6.0	-23.3	-27.2
Distance	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	66.6	57.6	58.2	65.3	56.3	56.9	59.3	50.3	50.9
VEHICULAR NOISE	DAY=	67.6	Leq	EVENING=	66.3	Leq	NIGHT=	60.3	Leq

RESULTS

NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):			**Ldn=**	**68.7**
					CNEL=	**69.3**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**82**	**177**	**381**
			CNEL:	**90**	**195**	**420**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	SR 84 / Bayfront Expy	Analyst:	NJF
Segment:	Route 114 / Willow Rd to Route 109 / University Av	Date:	25-May-16

ROADWAY INPUTS	
ADT	54,000
SPEED (mph)	50
ROAD NEAR-FAR LN. DIST.	80
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	3312	63	25	2448	46	19	613	12	5
Speed in MPH	50	50	50	50	50	50	50	50	50
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	71.1	78.8	83.0	71.1	78.8	83.0	71.1	78.8	83.0
ADJUSTMENTS									
Flow	2.9	-14.3	-18.3	1.6	-15.6	-19.6	-4.4	-21.7	-25.6
Distance	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	70.0	60.4	60.7	68.7	59.1	59.4	62.6	53.1	53.4
VEHICULAR NOISE	DAY=	70.9	Leq	EVENING=	69.6	Leq	NIGHT=	63.5	Leq

RESULTS

NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):			**Ldn=**	**72.0**
					CNEL=	**72.6**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**135**	**291**	**627**
			CNEL:	**149**	**320**	**690**

Scenario:	EXISTING	Project:	Menlo Park GP
Roadway:	SR 84 / Bayfront Expy	Analyst:	NJF
Segment:	Route 109 / University Ave to Dumbarton Bridge	Date:	25-May-16

ROADWAY INPUTS	
ADT	61,000
SPEED (mph)	55
ROAD NEAR-FAR LN. DIST.	80
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	3741	71	28	2765	52	21	693	13	5
Speed in MPH	55	55	55	55	55	55	55	55	55
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	72.7	79.9	83.8	72.7	79.9	83.8	72.7	79.9	83.8
ADJUSTMENTS									
Flow	3.0	-14.2	-18.2	1.7	-15.5	-19.5	-4.3	-21.5	-25.5
Distance	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	71.7	61.6	61.6	70.4	60.3	60.3	64.4	54.3	54.3
VEHICULAR NOISE	DAY=	72.5	Leq	EVENING=	71.2	Leq	NIGHT=	65.1	Leq

RESULTS

NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):			**Ldn=**	**73.6**
					CNEL=	**74.2**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**173**	**372**	**802**
			CNEL:	**190**	**410**	**883**

Menlo Park GP

FORECAST NEW GP

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	Alameda De Las Pulgas	Avy to Santa Cruz	14,807	30	36	Soft	4U	**0%**
2	Alameda De Las Pulgas	Valparaiso to Avy	18,130	30	24	Soft	2D	**0%**
3	Alameda De Las Pulgas	City Limit Valparaiso	19,276	30	24	Soft	2D	**0%**
4	Alma St.	Ravenswood to Oak Grove	1,822	25	12	Soft	2U	**0%**
5	Alma St.	Willow to Ravenswood	5,069	25	12	Soft	2U	**0%**
6	Alpine Rd.	City Limit to Junipero Serra	26,171	40	12	Soft	2U	**0%**
7	Avy Ave.	City Limit to Alameda de las Pulgas	4,704	25	12	Soft	2U	**0%**
8	Avy Ave.	Alameda de las Pulgas to Santa Cruz	6,195	25	12	Soft	2U	**0%**
9	Bay Rd.	Greenwood to Marsh	10,190	30	12	Soft	2U	**0%**
10	Bay Rd.	Ringwood to Greenwood	10,112	30	12	Soft	2U	**0%**
11	Bay Rd.	Willow to Ringwood	9,667	30	12	Soft	2U	**0%**
12	Bohannon Dr.	Campbell to Marsh	3,908	30	12	Soft	2U	**0%**
13	Chilco St.	Constitution to Bayfront	9,317	40	24	Soft	2D	**0%**
14	Chrysler Dr.	Constitution to Bayfront	4,068	30	12	Soft	2U	**0%**
15	Constitution Dr.	Chilco to Chrysler	5,304	30	12	Soft	2U	**0%**
16	Crane St.	Oak Grove to Santa Cruz	3,271	25	12	Soft	2U	**0%**
17	Crane St.	Santa Cruz to Menlo	2,454	25	12	Soft	2U	**0%**
18	Encinal Ave.	El Camino Real to Laurel	6,416	25	12	Soft	2U	**0%**
19	Encinal Ave.	Laurel to Middlefield	6,275	25	12	Soft	2U	**0%**
20	Glenwood Ave.	El Camino Real to Laurel	6,518	25	12	Soft	2U	**0%**
21	Hamilton Ave.	Willow to Chilco	3,468	30	12	Soft	2U	**0%**
22	Haven Ave.	Bayfront to City Limit	17,487	25	12	Soft	2U	**0%**
23	Junipero Serra Blvd.	City Limit to Alpine	18,374	35	36	Soft	4U	**0%**
24	Laurel St.	Oak Grove to Glenwood	5,566	25	12	Soft	2U	**0%**
25	Laurel St.	Ravenswood to Oak Grove	5,799	25	12	Soft	2U	**0%**
26	Laurel St.	Willow to Ravenswood	5,643	25	12	Soft	2U	**0%**
27	Marsh Rd.	City Limit to Bay	26,084	35	12	Soft	2U	**0%**
28	Marsh Rd.	Bay to Bohannon	33,926	35	48	Soft	4D	**0%**
29	Marsh Rd.	Bohannon to Scott	43,413	35	48	Soft	4D	**0%**
30	Menlo Ave.	University to Crane	7,580	25	12	Soft	2U	**0%**

ANALYST
NJF

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

73.6	75.55%
13.6	13.96%
10.22	10.49%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.42%	DAY	75.5%
% MT	1.84%	EVENING	14.0%
% HT	0.74%	NIGHT	10.5%

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mitigating Traf

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM tc	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Menlo Park GP

FORECAST NEW GP CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

					DISTACE TO NOISE CONTOUR (FT.)		
#	ROADWAY	SEGMENT	TRAFIC VOLUMES	LEVEL AT 50 FT.	70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Alameda De Las Pulgas	Avy to Santa Cruz	14,807	66.0	27	58	125
2	Alameda De Las Pulgas	Valparaiso to Avy	18,130	66.6	30	64	137
3	Alameda De Las Pulgas	City Limit Valparaiso	19,276	66.8	31	66	143
4	Alma St.	Ravenswood to Oak Grove	1,822	54.7	5	10	22
5	Alma St.	Willow to Ravenswood	5,069	59.1	9	20	44
6	Alpine Rd.	City Limit to Junipero Serra	26,171	71.0	58	125	270
7	Avy Ave.	City Limit to Alameda de las Pulgas	4,704	58.8	9	19	42
8	Avy Ave.	Alameda de las Pulgas to Santa Cruz	6,195	60.0	11	23	50
9	Bay Rd.	Greenwood to Marsh	10,190	63.9	20	42	91
10	Bay Rd.	Ringwood to Greenwood	10,112	63.9	20	42	91
11	Bay Rd.	Willow to Ringwood	9,667	63.7	19	41	88
12	Bohannon Dr.	Campbell to Marsh	3,908	59.8	10	22	48
13	Chilco St.	Constitution to Bayfront	9,317	66.7	30	64	139
14	Chrysler Dr.	Constitution to Bayfront	4,068	59.9	11	23	50
15	Constitution Dr.	Chilco to Chrysler	5,304	61.1	13	27	59
16	Crane St.	Oak Grove to Santa Cruz	3,271	57.2	7	15	33
17	Crane St.	Santa Cruz to Menlo	2,454	56.0	6	13	27
18	Encinal Ave.	El Camino Real to Laurel	6,416	60.2	11	24	51
19	Encinal Ave.	Laurel to Middlefield	6,275	60.1	11	23	50
20	Glenwood Ave.	El Camino Real to Laurel	6,518	60.2	11	24	52
21	Hamilton Ave.	Willow to Chilco	3,468	59.2	10	21	45
22	Haven Ave.	Bayfront to City Limit	17,487	64.5	22	46	100
23	Junipero Serra Blvd.	City Limit to Alpine	18,374	68.5	39	85	183
24	Laurel St.	Oak Grove to Glenwood	5,566	59.5	10	22	47
25	Laurel St.	Ravenswood to Oak Grove	5,799	59.7	10	22	48
26	Laurel St.	Willow to Ravenswood	5,643	59.6	10	22	47
27	Marsh Rd.	City Limit to Bay	26,084	69.6	47	101	217
28	Marsh Rd.	Bay to Bohannon	33,926	71.5	63	136	293
29	Marsh Rd.	Bohannon to Scott	43,413	72.6	74	160	345
30	Menlo Ave.	University to Crane	7,580	60.9	12	27	57

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Alameda De Las Pulgas	Analyst:	NJF
Segment:	Avy to Santa Cruz	Date:	25-May-16

ROADWAY INPUTS	
ADT	14,807
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	36
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	908	17	7	671	13	5	168	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.5	-17.7	-21.7	-1.8	-19.0	-23.0	-7.8	-25.1	-29.0
Distance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.4	55.7	57.4	61.1	54.4	56.1	55.0	48.4	50.1
VEHICULAR NOISE	DAY=	64.2	Leq	EVENING=	62.9	Leq	NIGHT=	56.9	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.3**
					CNEL=	**66.0**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**24**	**53**	**113**
			CNEL:	**27**	**58**	**125**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Alameda De Las Pulgas	Analyst:	NJF
Segment:	Valparaiso to Avy	Date:	25-May-16

ROADWAY INPUTS	
ADT	18,130
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1112	21	8	822	16	6	206	4	2
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	0.4	-16.9	-20.8	-0.9	-18.2	-22.1	-6.9	-24.2	-28.1
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.0	56.3	58.0	61.7	55.0	56.7	55.7	49.0	50.7
VEHICULAR NOISE	DAY=	64.9	Leq	EVENING=	63.5	Leq	NIGHT=	57.5	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**65.9**
				CNEL=	**66.6**
NOISE CONTOUR:			*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):		**Ldn:**	**27**	**58**	**125**
		CNEL:	**30**	**64**	**137**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Alameda De Las Pulgas	Analyst:	NJF
Segment:	City Limit Valparaiso	Date:	25-May-16

ROADWAY INPUTS	
ADT	19,276
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1182	22	9	874	17	7	219	4	2
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	0.7	-16.6	-20.5	-0.7	-17.9	-21.9	-6.7	-23.9	-27.9
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.3	56.6	58.3	61.9	55.3	57.0	55.9	49.3	51.0
VEHICULAR NOISE	DAY=	65.1	Leq	EVENING=	63.8	Leq	NIGHT=	57.8	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**66.2**	
				CNEL=	**66.8**	
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**28**	**60**	**130**
			CNEL:	**31**	**66**	**143**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Alma St.	Analyst:	NJF
Segment:	Ravenswood to Oak Grove	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,822
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	112	2	1	83	2	1	21	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-8.8	-26.0	-30.0	-10.1	-27.4	-31.3	-16.1	-33.4	-37.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	50.6	45.0	47.2	49.3	43.7	45.9	43.3	37.7	39.9
VEHICULAR NOISE	DAY=	53.0	Leq	EVENING=	51.7	Leq	NIGHT=	45.6	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**54.1**
					CNEL=	**54.7**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**4**	**9**	**20**
			CNEL:	**5**	**10**	**22**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Alma St.	Analyst:	NJF
Segment:	Willow to Ravenswood	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,069
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	311	6	2	230	4	2	58	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.4	-21.6	-25.6	-5.7	-22.9	-26.9	-11.7	-28.9	-32.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.0	49.4	51.6	53.7	48.1	50.3	47.7	42.1	44.3
VEHICULAR NOISE	DAY=	57.4	Leq	EVENING=	56.1	Leq	NIGHT=	50.1	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.5**
					CNEL=	**59.1**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**9**	**18**	**40**
			CNEL:	**9**	**20**	**44**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Alpine Rd.	Analyst:	NJF
Segment:	City Limit to Junipero Serra	Date:	25-May-16

ROADWAY INPUTS	
ADT	26,171
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1605	30	12	1186	22	9	297	6	2
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	0.7	-16.5	-20.5	-0.6	-17.8	-21.8	-6.6	-23.8	-27.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	68.0	59.7	60.6	66.7	58.4	59.3	60.7	52.4	53.3
VEHICULAR NOISE	DAY=	69.3	Leq	EVENING=	68.0	Leq	NIGHT=	61.9	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**70.4**
					CNEL=	**71.0**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**53**	**114**	**245**
			CNEL:	**58**	**125**	**270**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Avy Ave.	Analyst:	NJF
Segment:	City Limit to Alameda de las Pulgas	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,704
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	289	5	2	213	4	2	53	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.7	-21.9	-25.9	-6.0	-23.2	-27.2	-12.0	-29.2	-33.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.7	49.1	51.3	53.4	47.8	50.0	47.4	41.8	44.0
VEHICULAR NOISE	DAY=	57.1	Leq	EVENING=	55.8	Leq	NIGHT=	49.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):				**Ldn=**	**58.2**
				CNEL=	**58.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**18**	**38**	
	CNEL:	**9**	**19**	**42**	

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Avy Ave.	Analyst:	NJF
Segment:	Alameda de las Pulgas to Santa Cruz	Date:	25-May-16

ROADWAY INPUTS	
ADT	6,195
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	380	7	3	281	5	2	70	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.5	-20.7	-24.7	-4.8	-22.0	-26.0	-10.8	-28.1	-32.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.9	50.3	52.5	54.6	49.0	51.2	48.6	43.0	45.2
VEHICULAR NOISE	DAY=	58.3	Leq	EVENING=	57.0	Leq	NIGHT=	51.0	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.4**
					CNEL=	**60.0**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**10**	**21**	**45**
			CNEL:	**11**	**23**	**50**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Bay Rd.	Analyst:	NJF
Segment:	Greenwood to Marsh	Date:	25-May-16

ROADWAY INPUTS	
ADT	10,190
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	625	12	5	462	9	4	116	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-2.1	-19.4	-23.3	-3.4	-20.7	-24.6	-9.4	-26.7	-30.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.3	53.7	55.4	59.0	52.4	54.1	53.0	46.4	48.1
VEHICULAR NOISE	DAY=	62.2	Leq	EVENING=	60.9	Leq	NIGHT=	54.9	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**63.3**
					CNEL=	**63.9**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**18**	**39**	**83**
			CNEL:	**20**	**42**	**91**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Bay Rd.	Analyst:	NJF
Segment:	Ringwood to Greenwood	Date:	25-May-16

ROADWAY INPUTS	
ADT	10,112
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	620	12	5	458	9	3	115	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-2.2	-19.4	-23.3	-3.5	-20.7	-24.7	-9.5	-26.7	-30.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.3	53.7	55.4	59.0	52.4	54.0	53.0	46.3	48.0
VEHICULAR NOISE	DAY=	62.2	Leq	EVENING=	60.9	Leq	NIGHT=	54.8	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**63.3**
					CNEL=	**63.9**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**18**	**38**	**83**
			CNEL:	**20**	**42**	**91**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Bay Rd.	Analyst:	NJF
Segment:	Willow to Ringwood	Date:	25-May-16

ROADWAY INPUTS	
ADT	9,667
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	593	11	5	438	8	3	110	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-2.3	-19.6	-23.5	-3.7	-20.9	-24.9	-9.7	-26.9	-30.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.1	53.5	55.2	58.8	52.2	53.8	52.8	46.1	47.8
VEHICULAR NOISE	DAY=	62.0	Leq	EVENING=	60.7	Leq	NIGHT=	54.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**63.1**
			CNEL=	**63.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**17**	**37**	**80**
	CNEL:	**19**	**41**	**88**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Bohannon Dr.	Analyst:	NJF
Segment:	Campbell to Marsh	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,908
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	240	5	2	177	3	1	44	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-6.3	-23.5	-27.5	-7.6	-24.8	-28.8	-13.6	-30.8	-34.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.2	49.5	51.2	54.9	48.2	49.9	48.8	42.2	43.9
VEHICULAR NOISE	DAY=	58.0	Leq	EVENING=	56.7	Leq	NIGHT=	50.7	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.1**
			CNEL=	**59.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**44**
	CNEL:	**10**	**22**	**48**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Constitution to Bayfront	Date:	25-May-16

ROADWAY INPUTS

ADT	9,317
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS

DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	571	11	4	422	8	3	106	2	1
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	-3.8	-21.0	-25.0	-5.1	-22.3	-26.3	-11.1	-28.3	-32.3
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.7	55.4	56.3	62.4	54.1	55.0	56.4	48.1	49.0
VEHICULAR NOISE	DAY=	64.9	Leq	EVENING=	63.6	Leq	NIGHT=	57.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 66.0**

CNEL= 66.7

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**27**	**59**	**126**
	CNEL:	**30**	**64**	**139**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chrysler Dr.	Analyst:	NJF
Segment:	Constitution to Bayfront	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,068
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	250	5	2	184	3	1	46	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-6.1	-23.3	-27.3	-7.4	-24.7	-28.6	-13.4	-30.7	-34.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.3	49.7	51.4	55.0	48.4	50.1	49.0	42.4	44.1
VEHICULAR NOISE	DAY=	58.2	Leq	EVENING=	56.9	Leq	NIGHT=	50.9	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.3**
			CNEL=	**59.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**21**	**45**
	CNEL:	**11**	**23**	**50**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Constitution Dr.	Analyst:	NJF
Segment:	Chilco to Chrysler	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,304
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	325	6	2	240	5	2	60	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-5.0	-22.2	-26.1	-6.3	-23.5	-27.5	-12.3	-29.5	-33.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.5	50.9	52.6	56.2	49.6	51.2	50.2	43.5	45.2
VEHICULAR NOISE	DAY=	59.4	Leq	EVENING=	58.1	Leq	NIGHT=	52.0	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.5**
			CNEL=	**61.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**25**	**54**
	CNEL:	**13**	**27**	**59**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Crane St.	Analyst:	NJF
Segment:	Oak Grove to Santa Cruz	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,271
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	201	4	2	148	3	1	37	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-6.3	-23.5	-27.5	-7.6	-24.8	-28.8	-13.6	-30.8	-34.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.1	47.5	49.7	51.8	46.2	48.4	45.8	40.2	42.4
VEHICULAR NOISE	DAY=	55.5	Leq	EVENING=	54.2	Leq	NIGHT=	48.2	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**56.6**
			CNEL=	**57.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**14**	**30**
	CNEL:	**7**	**15**	**33**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Crane St.	Analyst:	NJF
Segment:	Santa Cruz to Menlo	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,454
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	151	3	1	111	2	1	28	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-7.5	-24.7	-28.7	-8.8	-26.1	-30.0	-14.8	-32.1	-36.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	51.9	46.3	48.5	50.6	45.0	47.2	44.5	39.0	41.2
VEHICULAR NOISE	DAY=	54.3	Leq	EVENING=	52.9	Leq	NIGHT=	46.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**55.4**
			CNEL=	**56.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**5**	**11**	**25**
	CNEL:	**6**	**13**	**27**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Encinal Ave.	Analyst:	NJF
Segment:	El Camino Real to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	6,416
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	394	7	3	291	5	2	73	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.3	-20.6	-24.5	-4.6	-21.9	-25.8	-10.7	-27.9	-31.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.0	50.5	52.7	54.7	49.1	51.3	48.7	43.1	45.3
VEHICULAR NOISE	DAY=	58.4	Leq	EVENING=	57.1	Leq	NIGHT=	51.1	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.5**
			CNEL=	**60.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**22**	**47**
	CNEL:	**11**	**24**	**51**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Encinal Ave.	Analyst:	NJF
Segment:	Laurel to Middlefield	Date:	25-May-16

ROADWAY INPUTS	
ADT	6,275
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	385	7	3	284	5	2	71	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.4	-20.7	-24.6	-4.7	-22.0	-25.9	-10.8	-28.0	-32.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.0	50.4	52.6	54.6	49.0	51.2	48.6	43.0	45.2
VEHICULAR NOISE	DAY=	58.3	Leq	EVENING=	57.0	Leq	NIGHT=	51.0	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.4**
			CNEL=	**60.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**21**	**46**
	CNEL:	**11**	**23**	**50**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: FORECAST NEW GP
Roadway: Glenwood Ave.
Segment: El Camino Real to Laurel

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	6,518
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	400	8	3	295	6	2	74	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.3	-20.5	-24.5	-4.6	-21.8	-25.8	-10.6	-27.8	-31.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.1	50.5	52.7	54.8	49.2	51.4	48.8	43.2	45.4
VEHICULAR NOISE	DAY=	58.5	Leq	EVENING=	57.2	Leq	NIGHT=	51.2	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.6**
			CNEL=	**60.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**22**	**47**
	CNEL:	**11**	**24**	**52**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Hamilton Ave.	Analyst:	NJF
Segment:	Willow to Chilco	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,468
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	213	4	2	157	3	1	39	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-6.8	-24.0	-28.0	-8.1	-25.4	-29.3	-14.1	-31.4	-35.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.7	49.0	50.7	54.3	47.7	49.4	48.3	41.7	43.4
VEHICULAR NOISE	DAY=	57.5	Leq	EVENING=	56.2	Leq	NIGHT=	50.2	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.6**
			CNEL=	**59.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**19**	**40**
	CNEL:	**10**	**21**	**45**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Haven Ave.	Analyst:	NJF
Segment:	Bayfront to City Limit	Date:	25-May-16

ROADWAY INPUTS	
ADT	17,487
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1073	20	8	793	15	6	199	4	2
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	1.0	-16.2	-20.2	-0.3	-17.5	-21.5	-6.3	-23.5	-27.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.4	54.8	57.0	59.1	53.5	55.7	53.1	47.5	49.7
VEHICULAR NOISE	DAY=	62.8	Leq	EVENING=	61.5	Leq	NIGHT=	55.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**63.9**
			CNEL=	**64.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**20**	**42**	**91**
	CNEL:	**22**	**46**	**100**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Junipero Serra Blvd.	Analyst:	NJF
Segment:	City Limit to Alpine	Date:	25-May-16

ROADWAY INPUTS	
ADT	18,374
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	36
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA									
	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1127	21	9	833	16	6	209	4	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-0.2	-17.5	-21.4	-1.5	-18.8	-22.7	-7.6	-24.8	-28.7
Distance	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	65.2	57.7	59.0	63.9	56.4	57.7	57.9	50.4	51.6
VEHICULAR NOISE	DAY=	66.7	Leq	EVENING=	65.4	Leq	NIGHT=	59.4	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**67.8**
			CNEL=	**68.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**36**	**77**	**166**
	CNEL:	**39**	**85**	**183**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Laurel St.	Analyst:	NJF
Segment:	Oak Grove to Glenwood	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,566
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	341	6	3	252	5	2	63	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.0	-21.2	-25.1	-5.3	-22.5	-26.5	-11.3	-28.5	-32.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.4	49.8	52.0	54.1	48.5	50.7	48.1	42.5	44.7
VEHICULAR NOISE	DAY=	57.8	Leq	EVENING=	56.5	Leq	NIGHT=	50.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.9**
			CNEL=	**59.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**42**
	CNEL:	**10**	**22**	**47**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Laurel St.	Analyst:	NJF
Segment:	Ravenswood to Oak Grove	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,799
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	356	7	3	263	5	2	66	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.8	-21.0	-25.0	-5.1	-22.3	-26.3	-11.1	-28.3	-32.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.6	50.0	52.2	54.3	48.7	50.9	48.3	42.7	44.9
VEHICULAR NOISE	DAY=	58.0	Leq	EVENING=	56.7	Leq	NIGHT=	50.7	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.1**
			CNEL=	**59.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**43**
	CNEL:	**10**	**22**	**48**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Laurel St.	Analyst:	NJF
Segment:	Willow to Ravenswood	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,643
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	346	7	3	256	5	2	64	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.9	-21.1	-25.1	-5.2	-22.4	-26.4	-11.2	-28.5	-32.4
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.5	49.9	52.1	54.2	48.6	50.8	48.2	42.6	44.8
VEHICULAR NOISE	DAY=	57.9	Leq	EVENING=	56.6	Leq	NIGHT=	50.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.0**
			CNEL=	**59.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**43**
	CNEL:	**10**	**22**	**47**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Marsh Rd.	Analyst:	NJF
Segment:	City Limit to Bay	Date:	25-May-16

ROADWAY INPUTS	
ADT	26,084
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1600	30	12	1182	22	9	296	6	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	1.3	-15.9	-19.9	0.0	-17.3	-21.2	-6.0	-23.3	-27.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	66.3	58.8	60.1	65.0	57.5	58.8	59.0	51.5	52.8
VEHICULAR NOISE	DAY=	67.8	Leq	EVENING=	66.5	Leq	NIGHT=	60.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**68.9**
			CNEL=	**69.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**43**	**92**	**197**
	CNEL:	**47**	**101**	**217**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Marsh Rd.	Analyst:	NJF
Segment:	Bay to Bohannon	Date:	25-May-16

ROADWAY INPUTS	
ADT	33,926
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2081	39	16	1538	29	12	385	7	3
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	2.4	-14.8	-18.8	1.1	-16.1	-20.1	-4.9	-22.1	-26.1
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	68.3	60.8	62.0	67.0	59.5	60.7	61.0	53.4	54.7
VEHICULAR NOISE	DAY=	69.8	Leq	EVENING=	68.5	Leq	NIGHT=	62.5	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**70.9**
			CNEL=	**71.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**57**	**124**	**266**
	CNEL:	**63**	**136**	**293**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Marsh Rd.	Analyst:	NJF
Segment:	Bohannon to Scott	Date:	25-May-16

ROADWAY INPUTS

ADT	43,413
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS

DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2663	50	20	1968	37	15	493	9	4
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	3.5	-13.7	-17.7	2.2	-15.0	-19.0	-3.8	-21.1	-25.0
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	69.4	61.8	63.1	68.1	60.5	61.8	62.0	54.5	55.8
VEHICULAR NOISE	DAY=	70.9	Leq	EVENING=	69.6	Leq	NIGHT=	63.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**72.0**
			CNEL=	**72.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**68**	**146**	**314**
	CNEL:	**74**	**160**	**345**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Menlo Ave.	Analyst:	NJF
Segment:	University to Crane	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,580
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	465	9	4	344	6	3	86	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.6	-19.8	-23.8	-3.9	-21.2	-25.1	-9.9	-27.2	-31.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.8	51.2	53.4	55.5	49.9	52.1	49.4	43.9	46.1
VEHICULAR NOISE	DAY=	59.2	Leq	EVENING=	57.8	Leq	NIGHT=	51.8	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.3**
			CNEL=	**60.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**24**	**52**
	CNEL:	**12**	**27**	**57**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Menlo Ave.	Analyst:	NJF
Segment:	Crane to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,611
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	528	10	4	390	7	3	98	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.1	-19.3	-23.3	-3.4	-20.6	-24.6	-9.4	-26.6	-30.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.3	51.7	53.9	56.0	50.4	52.6	50.0	44.4	46.6
VEHICULAR NOISE	DAY=	59.7	Leq	EVENING=	58.4	Leq	NIGHT=	52.4	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.8**
			CNEL=	**61.4**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**26**	**57**
	CNEL:	**13**	**29**	**62**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Middle Ave.	Analyst:	NJF
Segment:	Olive to University	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,698
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	472	9	4	349	7	3	87	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.3	-20.6	-24.5	-4.6	-21.9	-25.8	-10.7	-27.9	-31.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	59.1	52.5	54.2	57.8	51.2	52.9	51.8	45.2	46.8
VEHICULAR NOISE	DAY=	61.0	Leq	EVENING=	59.7	Leq	NIGHT=	53.7	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.1**
			CNEL=	**62.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**15**	**32**	**69**
	CNEL:	**16**	**35**	**76**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Middle Ave.	Analyst:	NJF
Segment:	University to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	9,330
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	572	11	4	423	8	3	106	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-2.5	-19.7	-23.7	-3.8	-21.1	-25.0	-9.8	-27.1	-31.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.0	53.3	55.0	58.6	52.0	53.7	52.6	46.0	47.7
VEHICULAR NOISE	DAY=	61.8	Leq	EVENING=	60.5	Leq	NIGHT=	54.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.9**
			CNEL=	**63.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**17**	**36**	**78**
	CNEL:	**19**	**40**	**86**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: FORECAST NEW GP
Roadway: Middlefield Rd.
Segment: Ravenswood to Oak Grove

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	16,630
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1020	19	8	754	14	6	189	4	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-0.7	-17.9	-21.9	-2.0	-19.2	-23.2	-8.0	-25.2	-29.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	64.4	56.9	58.1	63.1	55.6	56.8	57.1	49.5	50.8
VEHICULAR NOISE	DAY=	65.9	Leq	EVENING=	64.6	Leq	NIGHT=	58.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**67.0**
			CNEL=	**67.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**31**	**68**	**146**
	CNEL:	**35**	**75**	**161**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: FORECAST NEW GP
Roadway: Middlefield Rd.
Segment: Willow to Ravenswood

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	21,794
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1337	25	10	988	19	8	247	5	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	0.5	-16.7	-20.7	-0.8	-18.0	-22.0	-6.8	-24.0	-28.0
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	66.4	58.9	60.1	65.1	57.5	58.8	59.0	51.5	52.8
VEHICULAR NOISE	DAY=	67.9	Leq	EVENING=	66.6	Leq	NIGHT=	60.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.0**
			CNEL=	**69.6**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**43**	**92**	**198**
	CNEL:	**47**	**101**	**218**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Middlefield Rd.	Analyst:	NJF
Segment:	City Limit to Willow	Date:	25-May-16

ROADWAY INPUTS	
ADT	22,310
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1368	26	10	1011	19	8	253	5	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	0.6	-16.6	-20.6	-0.7	-17.9	-21.9	-6.7	-23.9	-27.9
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	66.5	59.0	60.2	65.2	57.6	58.9	59.1	51.6	52.9
VEHICULAR NOISE	DAY=	68.0	Leq	EVENING=	66.7	Leq	NIGHT=	60.7	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.1**
			CNEL=	**69.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**43**	**93**	**201**
	CNEL:	**48**	**103**	**222**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Newbridge St.	Analyst:	NJF
Segment:	Willow to Chilco	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,995
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	490	9	4	362	7	3	91	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.4	-19.6	-23.6	-3.7	-20.9	-24.9	-9.7	-26.9	-30.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.0	51.4	53.6	55.7	50.1	52.3	49.7	44.1	46.3
VEHICULAR NOISE	DAY=	59.4	Leq	EVENING=	58.1	Leq	NIGHT=	52.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.5**
			CNEL=	**61.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**25**	**54**
	CNEL:	**13**	**28**	**59**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	University to Crane	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,428
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	456	9	3	337	6	3	84	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.7	-19.9	-23.9	-4.0	-21.3	-25.2	-10.0	-27.3	-31.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.7	51.1	53.3	55.4	49.8	52.0	49.4	43.8	46.0
VEHICULAR NOISE	DAY=	59.1	Leq	EVENING=	57.8	Leq	NIGHT=	51.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.2**
			CNEL=	**60.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**24**	**51**
	CNEL:	**12**	**26**	**56**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	Crane to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	10,540
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	646	12	5	478	9	4	120	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-1.2	-18.4	-22.4	-2.5	-19.7	-23.7	-8.5	-25.7	-29.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.2	52.6	54.8	56.9	51.3	53.5	50.9	45.3	47.5
VEHICULAR NOISE	DAY=	60.6	Leq	EVENING=	59.3	Leq	NIGHT=	53.3	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.7**
			CNEL=	**62.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**14**	**30**	**65**
	CNEL:	**15**	**33**	**71**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	El Camino Real to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	11,486
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA		DAYTIME			EVENING			NIGHT	
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	704	13	5	521	10	4	130	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-0.8	-18.0	-22.0	-2.1	-19.4	-23.3	-8.1	-25.4	-29.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.6	53.0	55.2	57.3	51.7	53.9	51.3	45.7	47.9
VEHICULAR NOISE	DAY=	61.0	Leq	EVENING=	59.7	Leq	NIGHT=	53.6	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.1**
			CNEL=	**62.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**15**	**32**	**69**
	CNEL:	**16**	**35**	**76**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Oak Grove Ave.	Analyst:	NJF
Segment:	Laurel to Middlefield	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,803
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	540	10	4	399	8	3	100	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.0	-19.2	-23.2	-3.3	-20.5	-24.5	-9.3	-26.5	-30.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.4	51.8	54.0	56.1	50.5	52.7	50.1	44.5	46.7
VEHICULAR NOISE	DAY=	59.8	Leq	EVENING=	58.5	Leq	NIGHT=	52.5	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.9**
			CNEL=	**61.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**27**	**57**
	CNEL:	**14**	**29**	**63**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	O'Brien Dr.	Analyst:	NJF
Segment:	Kavanaugh to Willow	Date:	25-May-16

ROADWAY INPUTS	
ADT	13,754
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	844	16	6	624	12	5	156	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.8	-18.1	-22.0	-2.1	-19.4	-23.3	-8.1	-25.4	-29.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	61.6	55.0	56.7	60.3	53.7	55.4	54.3	47.7	49.4
VEHICULAR NOISE	DAY=	63.5	Leq	EVENING=	62.2	Leq	NIGHT=	56.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**64.6**
			CNEL=	**65.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**22**	**47**	**101**
	CNEL:	**24**	**52**	**112**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	O'Brien Dr.	Analyst:	NJF
Segment:	University to Kavanaugh	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,613
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	344	7	3	254	5	2	64	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-4.7	-21.9	-25.9	-6.0	-23.3	-27.2	-12.0	-29.3	-33.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.7	51.1	52.8	56.4	49.8	51.5	50.4	43.8	45.5
VEHICULAR NOISE	DAY=	59.6	Leq	EVENING=	58.3	Leq	NIGHT=	52.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.7**
			CNEL=	**61.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**26**	**56**
	CNEL:	**13**	**28**	**61**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Ravenswood Ave.	Analyst:	NJF
Segment:	El Camino Real to Alma	Date:	25-May-16

ROADWAY INPUTS	
ADT	25,914
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1589	30	12	1175	22	9	294	6	2
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	2.7	-14.5	-18.5	1.4	-15.8	-19.8	-4.6	-21.8	-25.8
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.9	57.3	59.5	61.6	56.0	58.2	55.6	50.0	52.2
VEHICULAR NOISE	DAY=	65.3	Leq	EVENING=	64.0	Leq	NIGHT=	58.0	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**66.4**
			CNEL=	**67.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**29**	**62**	**134**
	CNEL:	**32**	**68**	**147**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Ravenswood Ave.	Analyst:	NJF
Segment:	Alma to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	19,155
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1175	22	9	868	16	7	218	4	2
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	1.4	-15.8	-19.8	0.1	-17.1	-21.1	-5.9	-23.1	-27.1
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.8	55.2	57.4	59.5	53.9	56.1	53.5	47.9	50.1
VEHICULAR NOISE	DAY=	63.2	Leq	EVENING=	61.9	Leq	NIGHT=	55.9	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			Ldn=	64.3
			CNEL=	64.9
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**21**	**45**	**96**
	CNEL:	**23**	**49**	**106**

Menlo Park GP

FORECAST NEW GP

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	Ravenswood Ave.	Laurel to Middlefield	17,384	25	12	Soft	2U	**0%**
2	Ringwood Ave.	Middlefield to Bay	8,662	30	12	Soft	2U	**0%**
3	Sand Hill Rd.	I-280 to Sharon Park	29,902	40	48	Soft	4D	**0%**
4	Sand Hill Rd.	Santa Cruz to Sharon Park	33,574	40	48	Soft	4D	**0%**
5	Sand Hill Rd.	Santa Cruz to City Limit	35,165	40	48	Soft	4D	**0%**
6	Santa Cruz Ave.	Junipero Serra to Sand Hill	30,814	35	48	Soft	4D	**0%**
7	Santa Cruz Ave.	Sand Hill to Alameda de las Pulgas	26,850	35	48	Soft	4D	**0%**
8	Santa Cruz Ave.	Alameda de las Pulgas to Avy/Orange	11,861	30	12	Soft	2U	**0%**
9	Santa Cruz Ave.	Avy/Orange to Olive	15,992	30	12	Soft	2U	**0%**
10	Santa Cruz Ave.	Olive to University	16,285	30	24	Soft	2D	**0%**
11	Santa Cruz Ave.	University to Crane	8,197	30	24	Soft	2D	**0%**
12	Santa Cruz Ave.	Crane to El Camino Real	6,717	30	24	Soft	2D	**0%**
13	Scott Dr.	Marsh to Campbell	4,815	30	12	Soft	2U	**0%**
14	Sharon Park Dr.	Sand Hill to Sharon	10,473	25	24	Soft	2D	**0%**
15	Sharon Rd.	Sharon Park to Alameda de las Pulgas	3,891	25	12	Soft	2U	**0%**
16	University Dr.	Middle to Menlo	5,715	25	12	Soft	2U	**0%**
17	University Dr.	Menlo to Santa Cruz	9,222	25	12	Soft	2U	**0%**
18	University Dr.	Santa Cruz to Oak Grove	7,381	25	12	Soft	2U	**0%**
19	University Dr.	Oak Grove to Valparaiso	6,415	25	12	Soft	2U	**0%**
20	Valparaiso Ave.	Alameda de las Pulgas to Cotton	12,543	35	12	Soft	2U	**0%**
21	Valparaiso Ave.	Cotton to University	14,973	35	12	Soft	2U	**0%**
22	Valparaiso Ave.	University to El Camino Real	14,058	35	12	Soft	2U	**0%**
23	Willow Rd.	Alma to Laurel	5,178	25	24	Soft	2D	**0%**
24	Willow Rd.	Laurel to Middlefield	7,824	25	24	Soft	2D	**0%**
25	Willow Rd.	Middlefield to Gilbert	24,462	25	24	Soft	2D	**0%**
26	Chilco St.	Hamilton to Terminal	8,280	25	12	Soft	2U	**0%**
27	Chilco St.	Ivy to Terminal	5,994	25	12	Soft	2U	**0%**
28	Chilco St.	Newbridge to Ivy	4,026	25	12	Soft	2U	**0%**
29	Hamilton Ave.	Willow to Hamilton Ct.	2,643	25	12	Soft	2U	**0%**
30	Willow Rd.	Gilbert to Coleman	25,924	35	24	Soft	2D	**0%**

ANALYST
NJF

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

73.6	75.55%
13.6	13.96%
10.22	10.49%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.42%	DAY	75.5%
% MT	1.84%	EVENING	14.0%
% HT	0.74%	NIGHT	10.5%

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mitigating Traf

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM tc	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Menlo Park GP

FORECAST NEW GP CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

					DISTACE TO NOISE CONTOUR (FT.)		
#	ROADWAY	SEGMENT	TRAFIC VOLUMES	LEVEL AT 50 FT.	70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Ravenswood Ave.	Laurel to Middlefield	17,384	64.5	21	46	100
2	Ringwood Ave.	Middlefield to Bay	8,662	63.2	18	38	82
3	Sand Hill Rd.	I-280 to Sharon Park	29,902	72.4	72	155	334
4	Sand Hill Rd.	Santa Cruz to Sharon Park	33,574	72.9	78	168	361
5	Sand Hill Rd.	Santa Cruz to City Limit	35,165	73.1	80	173	372
6	Santa Cruz Ave.	Junipero Serra to Sand Hill	30,814	71.1	59	128	275
7	Santa Cruz Ave.	Sand Hill to Alameda de las Pulgas	26,850	70.5	54	116	251
8	Santa Cruz Ave.	Alameda de las Pulgas to Avy/Orange	11,861	64.6	22	47	101
9	Santa Cruz Ave.	Avy/Orange to Olive	15,992	65.9	27	57	123
10	Santa Cruz Ave.	Olive to University	16,285	66.1	28	59	128
11	Santa Cruz Ave.	University to Crane	8,197	63.1	17	37	81
12	Santa Cruz Ave.	Crane to El Camino Real	6,717	62.3	15	33	71
13	Scott Dr.	Marsh to Campbell	4,815	60.7	12	26	55
14	Sharon Park Dr.	Sand Hill to Sharon	10,473	62.4	16	34	73
15	Sharon Rd.	Sharon Park to Alameda de las Pulgas	3,891	58.0	8	17	37
16	University Dr.	Middle to Menlo	5,715	59.7	10	22	47
17	University Dr.	Menlo to Santa Cruz	9,222	61.7	14	30	65
18	University Dr.	Santa Cruz to Oak Grove	7,381	60.8	12	26	56
19	University Dr.	Oak Grove to Valparaiso	6,415	60.2	11	24	51
20	Valparaiso Ave.	Alameda de las Pulgas to Cotton	12,543	66.4	29	62	133
21	Valparaiso Ave.	Cotton to University	14,973	67.2	32	70	150
22	Valparaiso Ave.	University to El Camino Real	14,058	66.9	31	67	144
23	Willow Rd.	Alma to Laurel	5,178	59.4	10	21	45
24	Willow Rd.	Laurel to Middlefield	7,824	61.2	13	28	60
25	Willow Rd.	Middlefield to Gilbert	24,462	66.1	28	59	128
26	Chilco St.	Hamilton to Terminal	8,280	61.3	13	28	61
27	Chilco St.	Ivy to Terminal	5,994	59.9	11	23	49
28	Chilco St.	Newbridge to Ivy	4,026	58.1	8	17	38
29	Hamilton Ave.	Willow to Hamilton Ct.	2,643	56.3	6	13	28
30	Willow Rd.	Gilbert to Coleman	25,924	69.7	48	103	221

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Ravenswood Ave.	Analyst:	NJF
Segment:	Laurel to Middlefield	Date:	25-May-16

ROADWAY INPUTS	
ADT	17,384
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1066	20	8	788	15	6	197	4	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	1.0	-16.2	-20.2	-0.3	-17.6	-21.5	-6.3	-23.6	-27.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	60.4	54.8	57.0	59.1	53.5	55.7	53.1	47.5	49.7
VEHICULAR NOISE	DAY=	62.8	Leq	EVENING=	61.5	Leq	NIGHT=	55.4	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**63.9**
				CNEL=	**64.5**

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**19**	**42**	**90**
	CNEL:	**21**	**46**	**100**

Scenario: FORECAST NEW GP
Roadway: Ringwood Ave.
Segment: Middlefield to Bay

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	8,662
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	531	10	4	393	7	3	98	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-2.8	-20.1	-24.0	-4.1	-21.4	-25.3	-10.1	-27.4	-31.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	59.6	53.0	54.7	58.3	51.7	53.4	52.3	45.7	47.4
VEHICULAR NOISE	DAY=	61.5	Leq	EVENING=	60.2	Leq	NIGHT=	54.2	Leq

RESULTS					
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):				**Ldn=**	**62.6**
				CNEL=	**63.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**16**	**35**	**74**	
	CNEL:	**18**	**38**	**82**	

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Sand Hill Rd.	Analyst:	NJF
Segment:	I-280 to Sharon Park	Date:	25-May-16

ROADWAY INPUTS	
ADT	29,902
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1834	35	14	1356	26	10	340	6	3
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	1.3	-15.9	-19.9	0.0	-17.2	-21.2	-6.0	-23.3	-27.2
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	69.4	61.1	62.0	68.1	59.8	60.7	62.1	53.8	54.7
VEHICULAR NOISE	DAY=	70.7	Leq	EVENING=	69.3	Leq	NIGHT=	63.3	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**71.8**
					CNEL=	**72.4**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**65**	**141**	**304**
			CNEL:	**72**	**155**	**334**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Sand Hill Rd.	Analyst:	NJF
Segment:	Santa Cruz to Sharon Park	Date:	25-May-16

ROADWAY INPUTS	
ADT	33,574
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2059	39	16	1522	29	12	381	7	3
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	1.8	-15.4	-19.4	0.5	-16.7	-20.7	-5.5	-22.8	-26.7
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	69.9	61.6	62.5	68.6	60.3	61.2	62.6	54.3	55.2
VEHICULAR NOISE	DAY=	71.2	Leq	EVENING=	69.8	Leq	NIGHT=	63.8	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**72.3**
					CNEL=	**72.9**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**71**	**152**	**328**
			CNEL:	**78**	**168**	**361**

Scenario: FORECAST NEW GP
Roadway: Sand Hill Rd.
Segment: Santa Cruz to City Limit

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	35,165
SPEED (mph)	40
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2157	41	16	1594	30	12	399	8	3
Speed in MPH	40	40	40	40	40	40	40	40	40
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	67.4	76.3	81.2	67.4	76.3	81.2	67.4	76.3	81.2
ADJUSTMENTS									
Flow	2.0	-15.2	-19.2	0.7	-16.5	-20.5	-5.3	-22.6	-26.5
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	70.1	61.8	62.7	68.8	60.5	61.4	62.8	54.5	55.4
VEHICULAR NOISE	DAY=	71.4	Leq	EVENING=	70.0	Leq	NIGHT=	64.0	Leq

RESULTS					
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):				**Ldn=**	**72.5**
				CNEL=	**73.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**73**	**157**	**338**	
	CNEL:	**80**	**173**	**372**	

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Junipero Serra to Sand Hill	Date:	25-May-16

ROADWAY INPUTS	
ADT	30,814
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1890	36	14	1397	26	11	350	7	3
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	2.0	-15.2	-19.2	0.7	-16.5	-20.5	-5.3	-22.5	-26.5
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	67.9	60.4	61.6	66.6	59.0	60.3	60.6	53.0	54.3
VEHICULAR NOISE	DAY=	69.4	Leq	EVENING=	68.1	Leq	NIGHT=	62.1	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):		**Ldn=**	**70.5**	
				CNEL=	**71.1**	
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**54**	**116**	**250**
			CNEL:	**59**	**128**	**275**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Sand Hill to Alameda de las Pulgas	Date:	25-May-16

ROADWAY INPUTS	
ADT	26,850
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1647	31	13	1217	23	9	305	6	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	1.4	-15.8	-19.8	0.1	-17.1	-21.1	-5.9	-23.1	-27.1
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	67.3	59.8	61.0	66.0	58.4	59.7	60.0	52.4	53.7
VEHICULAR NOISE	DAY=	68.8	Leq	EVENING=	67.5	Leq	NIGHT=	61.5	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.9**
					CNEL=	**70.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**49**	**106**	**228**
			CNEL:	**54**	**116**	**251**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Alameda de las Pulgas to Avy/Orange	Date:	25-May-16

ROADWAY INPUTS	
ADT	11,861
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	727	14	6	538	10	4	135	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-1.5	-18.7	-22.7	-2.8	-20.0	-24.0	-8.8	-26.0	-30.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	61.0	54.4	56.0	59.7	53.0	54.7	53.7	47.0	48.7
VEHICULAR NOISE	DAY=	62.9	Leq	EVENING=	61.5	Leq	NIGHT=	55.5	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**64.0**
					CNEL=	**64.6**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**20**	**43**	**92**
			CNEL:	**22**	**47**	**101**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Avy/Orange to Olive	Date:	25-May-16

ROADWAY INPUTS	
ADT	15,992
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	981	19	7	725	14	6	182	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.2	-17.4	-21.4	-1.5	-18.7	-22.7	-7.5	-24.7	-28.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.3	55.7	57.3	61.0	54.3	56.0	55.0	48.3	50.0
VEHICULAR NOISE	DAY=	64.2	Leq	EVENING=	62.8	Leq	NIGHT=	56.8	Leq

RESULTS						
NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.3**
					CNEL=	**65.9**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**24**	**52**	**112**
			CNEL:	**27**	**57**	**123**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Olive to University	Date:	25-May-16

ROADWAY INPUTS	
ADT	16,285
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	999	19	8	738	14	6	185	3	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-0.1	-17.3	-21.3	-1.4	-18.6	-22.6	-7.4	-24.6	-28.6
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.5	55.9	57.6	61.2	54.6	56.3	55.2	48.6	50.2
VEHICULAR NOISE	DAY=	64.4	Leq	EVENING=	63.1	Leq	NIGHT=	57.1	Leq

RESULTS

NOISE LEVELS AT	50	FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.5**
					CNEL=	**66.1**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**25**	**54**	**116**
			CNEL:	**28**	**59**	**128**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	University to Crane	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,197
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	503	9	4	372	7	3	93	2	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.1	-20.3	-24.3	-4.4	-21.6	-25.6	-10.4	-27.6	-31.6
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	59.5	52.9	54.6	58.2	51.6	53.3	52.2	45.6	47.3
VEHICULAR NOISE	DAY=	61.4	Leq	EVENING=	60.1	Leq	NIGHT=	54.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**62.5**
			CNEL=	**63.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**16**	**34**	**73**
	CNEL:	**17**	**37**	**81**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Santa Cruz Ave.	Analyst:	NJF
Segment:	Crane to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	6,717
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	412	8	3	305	6	2	76	1	1
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-3.9	-21.2	-25.1	-5.2	-22.5	-26.4	-11.3	-28.5	-32.4
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.7	52.0	53.7	57.4	50.7	52.4	51.3	44.7	46.4
VEHICULAR NOISE	DAY=	60.5	Leq	EVENING=	59.2	Leq	NIGHT=	53.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.6**
			CNEL=	**62.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**14**	**30**	**64**
	CNEL:	**15**	**33**	**71**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Scott Dr.	Analyst:	NJF
Segment:	Marsh to Campbell	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,815
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	295	6	2	218	4	2	55	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-5.4	-22.6	-26.6	-6.7	-23.9	-27.9	-12.7	-29.9	-33.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.1	50.4	52.1	55.8	49.1	50.8	49.8	43.1	44.8
VEHICULAR NOISE	DAY=	58.9	Leq	EVENING=	57.6	Leq	NIGHT=	51.6	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.0**
			CNEL=	**60.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**23**	**50**
	CNEL:	**12**	**26**	**55**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: FORECAST NEW GP
Roadway: Sharon Park Dr.
Segment: Sand Hill to Sharon

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	10,473
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	642	12	5	475	9	4	119	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-1.2	-18.4	-22.4	-2.5	-19.8	-23.7	-8.5	-25.8	-29.7
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	58.3	52.7	54.9	57.0	51.4	53.6	51.0	45.4	47.6
VEHICULAR NOISE	DAY=	60.7	Leq	EVENING=	59.4	Leq	NIGHT=	53.4	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.8**
			CNEL=	**62.4**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**14**	**31**	**66**
	CNEL:	**16**	**34**	**73**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Sharon Rd.	Analyst:	NJF
Segment:	Sharon Park to Alameda de las Pul	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,891
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	239	5	2	176	3	1	44	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-5.5	-22.7	-26.7	-6.8	-24.1	-28.0	-12.8	-30.1	-34.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.9	48.3	50.5	52.6	47.0	49.2	46.5	41.0	43.2
VEHICULAR NOISE	DAY=	56.3	Leq	EVENING=	55.0	Leq	NIGHT=	48.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**57.4**
			CNEL=	**58.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**15**	**33**
	CNEL:	**8**	**17**	**37**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Middle to Menlo	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,715
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	351	7	3	259	5	2	65	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.8	-21.1	-25.0	-5.2	-22.4	-26.3	-11.2	-28.4	-32.4
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.5	50.0	52.2	54.2	48.6	50.8	48.2	42.6	44.8
VEHICULAR NOISE	DAY=	57.9	Leq	EVENING=	56.6	Leq	NIGHT=	50.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.0**
			CNEL=	**59.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**20**	**43**
	CNEL:	**10**	**22**	**47**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Menlo to Santa Cruz	Date:	25-May-16

ROADWAY INPUTS	
ADT	9,222
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	566	11	4	418	8	3	105	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-1.8	-19.0	-23.0	-3.1	-20.3	-24.3	-9.1	-26.3	-30.3
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.6	52.0	54.2	56.3	50.7	52.9	50.3	44.7	46.9
VEHICULAR NOISE	DAY=	60.0	Leq	EVENING=	58.7	Leq	NIGHT=	52.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**61.1**
			CNEL=	**61.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**13**	**28**	**59**
	CNEL:	**14**	**30**	**65**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Santa Cruz to Oak Grove	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,381
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	453	9	3	335	6	3	84	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.7	-20.0	-23.9	-4.0	-21.3	-25.2	-10.1	-27.3	-31.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.7	51.1	53.3	55.3	49.8	51.9	49.3	43.7	45.9
VEHICULAR NOISE	DAY=	59.0	Leq	EVENING=	57.7	Leq	NIGHT=	51.7	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.1**
			CNEL=	**60.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**24**	**51**
	CNEL:	**12**	**26**	**56**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	University Dr.	Analyst:	NJF
Segment:	Oak Grove to Valparaiso	Date:	25-May-16

ROADWAY INPUTS	
ADT	6,415
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	393	7	3	291	5	2	73	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.3	-20.6	-24.5	-4.6	-21.9	-25.8	-10.7	-27.9	-31.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.0	50.5	52.7	54.7	49.1	51.3	48.7	43.1	45.3
VEHICULAR NOISE	DAY=	58.4	Leq	EVENING=	57.1	Leq	NIGHT=	51.1	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.5**
			CNEL=	**60.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**22**	**47**
	CNEL:	**11**	**24**	**51**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Valparaiso Ave.	Analyst:	NJF
Segment:	Alameda de las Pulgas to Cotton	Date:	25-May-16

ROADWAY INPUTS	
ADT	12,543
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	769	15	6	569	11	4	142	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-1.9	-19.1	-23.1	-3.2	-20.4	-24.4	-9.2	-26.4	-30.4
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.2	55.6	56.9	61.9	54.3	55.6	55.8	48.3	49.6
VEHICULAR NOISE	DAY=	64.7	Leq	EVENING=	63.4	Leq	NIGHT=	57.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.8**
			CNEL=	**66.4**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**26**	**56**	**121**
	CNEL:	**29**	**62**	**133**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Valparaiso Ave.	Analyst:	NJF
Segment:	Cotton to University	Date:	25-May-16

ROADWAY INPUTS	
ADT	14,973
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	918	17	7	679	13	5	170	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-1.1	-18.4	-22.3	-2.4	-19.7	-23.6	-8.4	-25.7	-29.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.9	56.4	57.7	62.6	55.1	56.4	56.6	49.1	50.4
VEHICULAR NOISE	DAY=	65.4	Leq	EVENING=	64.1	Leq	NIGHT=	58.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 66.5**

CNEL= 67.2

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**29**	**63**	**136**
	CNEL:	**32**	**70**	**150**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Valparaiso Ave.	Analyst:	NJF
Segment:	University to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	14,058
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	862	16	7	637	12	5	160	3	1
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	-1.4	-18.6	-22.6	-2.7	-19.9	-23.9	-8.7	-26.0	-29.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	63.7	56.1	57.4	62.3	54.8	56.1	56.3	48.8	50.1
VEHICULAR NOISE	DAY=	65.2	Leq	EVENING=	63.9	Leq	NIGHT=	57.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**66.3**
			CNEL=	**66.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**28**	**61**	**131**
	CNEL:	**31**	**67**	**144**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Alma to Laurel	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,178
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	318	6	2	235	4	2	59	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.3	-21.5	-25.5	-5.6	-22.8	-26.8	-11.6	-28.8	-32.8
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.3	49.7	51.9	53.9	48.4	50.6	47.9	42.3	44.5
VEHICULAR NOISE	DAY=	57.7	Leq	EVENING=	56.3	Leq	NIGHT=	50.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.7**
			CNEL=	**59.4**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**19**	**41**
	CNEL:	**10**	**21**	**45**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Laurel to Middlefield	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,824
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	480	9	4	355	7	3	89	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.5	-19.7	-23.7	-3.8	-21.0	-25.0	-9.8	-27.0	-31.0
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.1	51.5	53.7	55.7	50.2	52.3	49.7	44.1	46.3
VEHICULAR NOISE	DAY=	59.4	Leq	EVENING=	58.1	Leq	NIGHT=	52.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.5**
			CNEL=	**61.2**

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**25**	**54**
	CNEL:	**13**	**28**	**60**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Middlefield to Gilbert	Date:	25-May-16

ROADWAY INPUTS	
ADT	24,462
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1500	28	11	1109	21	8	278	5	2
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	2.5	-14.8	-18.7	1.2	-16.1	-20.0	-4.8	-22.1	-26.0
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	62.0	56.4	58.6	60.7	55.1	57.3	54.7	49.1	51.3
VEHICULAR NOISE	DAY=	64.4	Leq	EVENING=	63.1	Leq	NIGHT=	57.1	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**65.5**
			CNEL=	**66.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**25**	**54**	**116**
	CNEL:	**28**	**59**	**128**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Hamilton to Terminal	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,280
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	508	10	4	375	7	3	94	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.2	-19.5	-23.4	-3.5	-20.8	-24.7	-9.6	-26.8	-30.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.2	51.6	53.8	55.8	50.3	52.4	49.8	44.2	46.4
VEHICULAR NOISE	DAY=	59.5	Leq	EVENING=	58.2	Leq	NIGHT=	52.2	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.6**
			CNEL=	**61.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**26**	**55**
	CNEL:	**13**	**28**	**61**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Ivy to Terminal	Date:	25-May-16

ROADWAY INPUTS	
ADT	5,994
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	368	7	3	272	5	2	68	1	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-3.6	-20.9	-24.8	-4.9	-22.2	-26.1	-11.0	-28.2	-32.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.8	50.2	52.4	54.4	48.8	51.0	48.4	42.8	45.0
VEHICULAR NOISE	DAY=	58.1	Leq	EVENING=	56.8	Leq	NIGHT=	50.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**59.2**
			CNEL=	**59.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**10**	**21**	**44**
	CNEL:	**11**	**23**	**49**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Newbridge to Ivy	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,026
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	247	5	2	183	3	1	46	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-5.4	-22.6	-26.6	-6.7	-23.9	-27.9	-12.7	-29.9	-33.9
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.0	48.4	50.6	52.7	47.1	49.3	46.7	41.1	43.3
VEHICULAR NOISE	DAY=	56.4	Leq	EVENING=	55.1	Leq	NIGHT=	49.1	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**57.5**
			CNEL=	**58.1**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**16**	**34**
	CNEL:	**8**	**17**	**38**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Hamilton Ave.	Analyst:	NJF
Segment:	Willow to Hamilton Ct.	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,643
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	162	3	1	120	2	1	30	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-7.2	-24.4	-28.4	-8.5	-25.7	-29.7	-14.5	-31.8	-35.7
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	52.2	46.6	48.8	50.9	45.3	47.5	44.9	39.3	41.5
VEHICULAR NOISE	DAY=	54.6	Leq	EVENING=	53.3	Leq	NIGHT=	47.3	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**55.7**
			CNEL=	**56.3**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**12**	**26**
	CNEL:	**6**	**13**	**28**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Gilbert to Coleman	Date:	25-May-16

ROADWAY INPUTS	
ADT	25,924
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	1590	30	12	1175	22	9	294	6	2
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	1.3	-16.0	-19.9	0.0	-17.3	-21.2	-6.1	-23.3	-27.3
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	66.5	58.9	60.2	65.2	57.6	58.9	59.1	51.6	52.9
VEHICULAR NOISE	DAY=	68.0	Leq	EVENING=	66.7	Leq	NIGHT=	60.6	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.1**
			CNEL=	**69.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**43**	**93**	**201**
	CNEL:	**48**	**103**	**221**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Coleman to Durham	Date:	25-May-16

ROADWAY INPUTS	
ADT	42,639
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2615	49	20	1933	37	15	484	9	4
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	3.4	-13.8	-17.8	2.1	-15.1	-19.1	-3.9	-21.1	-25.1
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	68.6	61.1	62.4	67.3	59.8	61.1	61.3	53.8	55.0
VEHICULAR NOISE	DAY=	70.1	Leq	EVENING=	68.8	Leq	NIGHT=	62.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**71.2**
			CNEL=	**71.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**60**	**130**	**280**
	CNEL:	**66**	**143**	**308**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Willow Rd.	Analyst:	NJF
Segment:	Durham to Bay	Date:	25-May-16

ROADWAY INPUTS	
ADT	37,724
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	48
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2314	44	18	1710	32	13	428	8	3
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	2.9	-14.3	-18.3	1.6	-15.7	-19.6	-4.4	-21.7	-25.6
Distance	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	68.8	61.2	62.5	67.4	59.9	61.2	61.4	53.9	55.2
VEHICULAR NOISE	DAY=	70.3	Leq	EVENING=	68.9	Leq	NIGHT=	62.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**71.4**
			CNEL=	**72.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**62**	**133**	**286**
	CNEL:	**68**	**146**	**314**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chilco St.	Analyst:	NJF
Segment:	Terminal to Constitution	Date:	25-May-16

ROADWAY INPUTS	
ADT	8,492
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	521	10	4	385	7	3	96	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.1	-19.4	-23.3	-3.4	-20.7	-24.6	-9.4	-26.7	-30.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	57.3	51.7	53.9	56.0	50.4	52.6	49.9	44.3	46.5
VEHICULAR NOISE	DAY=	59.7	Leq	EVENING=	58.3	Leq	NIGHT=	52.3	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.7**
			CNEL=	**61.4**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**12**	**26**	**56**
	CNEL:	**13**	**29**	**62**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chrysler Dr.	Analyst:	NJF
Segment:	Constitution to Independence	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,269
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	200	4	2	148	3	1	37	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-6.3	-23.5	-27.5	-7.6	-24.8	-28.8	-13.6	-30.8	-34.8
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	53.1	47.5	49.7	51.8	46.2	48.4	45.8	40.2	42.4
VEHICULAR NOISE	DAY=	55.5	Leq	EVENING=	54.2	Leq	NIGHT=	48.2	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**56.6**
			CNEL=	**57.2**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**6**	**14**	**30**
	CNEL:	**7**	**15**	**33**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Chrysler Dr.	Analyst:	NJF
Segment:	Independence to Commonwealth	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,110
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	68	1	1	50	1	0	13	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-11.0	-28.2	-32.1	-12.3	-29.5	-33.5	-18.3	-35.5	-39.5
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	48.4	42.8	45.0	47.1	41.5	43.7	41.1	35.5	37.7
VEHICULAR NOISE	DAY=	50.8	Leq	EVENING=	49.5	Leq	NIGHT=	43.5	Leq

RESULTS				
NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**51.9**
			CNEL=	**52.5**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**3**	**7**	**14**
	CNEL:	**3**	**7**	**16**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Adams Dr.	Analyst:	NJF
Segment:	University to Adams	Date:	25-May-16

ROADWAY INPUTS	
ADT	7,762
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	476	9	4	352	7	3	88	2	1
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-2.5	-19.7	-23.7	-3.8	-21.1	-25.0	-9.8	-27.1	-31.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	56.9	51.3	53.5	55.6	50.0	52.2	49.5	44.0	46.2
VEHICULAR NOISE	DAY=	59.3	Leq	EVENING=	58.0	Leq	NIGHT=	51.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**60.4**
			CNEL=	**61.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**11**	**25**	**53**
	CNEL:	**13**	**27**	**58**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Olive St.	Analyst:	NJF
Segment:	Santa Cruz to Middle	Date:	25-May-16

ROADWAY INPUTS	
ADT	2,557
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	157	3	1	116	2	1	29	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-8.1	-25.4	-29.3	-9.4	-26.7	-30.6	-15.4	-32.7	-36.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	54.3	47.7	49.4	53.0	46.4	48.1	47.0	40.4	42.1
VEHICULAR NOISE	DAY=	56.2	Leq	EVENING=	54.9	Leq	NIGHT=	48.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**57.3**
			CNEL=	**57.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**7**	**15**	**33**
	CNEL:	**8**	**17**	**36**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Olive St.	Analyst:	NJF
Segment:	Middle to Oak	Date:	25-May-16

ROADWAY INPUTS	
ADT	3,272
SPEED (mph)	30
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	201	4	2	148	3	1	37	1	0
Speed in MPH	30	30	30	30	30	30	30	30	30
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	62.5	73.1	78.8	62.5	73.1	78.8	62.5	73.1	78.8
ADJUSTMENTS									
Flow	-7.1	-24.3	-28.2	-8.4	-25.6	-29.6	-14.4	-31.6	-35.6
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.4	48.8	50.5	54.1	47.5	49.1	48.1	41.4	43.1
VEHICULAR NOISE	DAY=	57.3	Leq	EVENING=	56.0	Leq	NIGHT=	49.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**58.4**
			CNEL=	**59.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**8**	**18**	**39**
	CNEL:	**9**	**20**	**43**

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Cambridge Ave.	Analyst:	NJF
Segment:	University to El Camino Real	Date:	25-May-16

ROADWAY INPUTS	
ADT	1,551
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	95	2	1	70	1	1	18	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-9.5	-26.7	-30.7	-10.8	-28.1	-32.0	-16.8	-34.1	-38.0
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	49.9	44.3	46.5	48.6	43.0	45.2	42.6	37.0	39.2
VEHICULAR NOISE	DAY=	52.3	Leq	EVENING=	51.0	Leq	NIGHT=	44.9	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**53.4**
			CNEL=	**54.0**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**4**	**8**	**18**
	CNEL:	**4**	**9**	**20**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario: FORECAST NEW GP
Roadway: Linfield Dr.
Segment: Middlefield to Waverley

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	1,794
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	110	2	1	81	2	1	20	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-8.9	-26.1	-30.1	-10.2	-27.4	-31.4	-16.2	-33.4	-37.4
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	50.7	45.1	47.3	49.3	43.8	46.0	43.3	37.7	39.9
VEHICULAR NOISE	DAY=	53.0	Leq	EVENING=	51.7	Leq	NIGHT=	45.7	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**54.1**
			CNEL=	**54.8**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**4**	**9**	**20**
	CNEL:	**5**	**10**	**22**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Waverley St.	Analyst:	NJF
Segment:	Laurel to Linfield	Date:	25-May-16

ROADWAY INPUTS

ADT	1,895
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	12
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS

DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	116	2	1	86	2	1	22	0	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-8.6	-25.9	-29.8	-9.9	-27.2	-31.1	-16.0	-33.2	-37.2
Distance	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	50.8	45.2	47.4	49.4	43.8	46.0	43.4	37.8	40.0
VEHICULAR NOISE	DAY=	53.1	Leq	EVENING=	51.8	Leq	NIGHT=	45.8	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA):			**Ldn=**	**54.2**
			CNEL=	**54.9**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**4**	**10**	**21**
	CNEL:	**5**	**11**	**23**

FHWA RD-77-108 NOISE PREDICTION MODEL

Scenario:	FORECAST NEW GP	Project:	Menlo Park GP
Roadway:	Ivy Dr.	Analyst:	NJF
Segment:	Chilco to Willow	Date:	25-May-16

ROADWAY INPUTS	
ADT	4,977
SPEED (mph)	25
ROAD NEAR-FAR LN. DIST.	24
DISTANCE ROAD CL (ft)	50
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	305	6	2	226	4	2	57	1	0
Speed in MPH	25	25	25	25	25	25	25	25	25
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	59.4	71.1	77.2	59.4	71.1	77.2	59.4	71.1	77.2
ADJUSTMENTS									
Flow	-4.4	-21.7	-25.6	-5.8	-23.0	-26.9	-11.8	-29.0	-33.0
Distance	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	55.1	49.5	51.7	53.8	48.2	50.4	47.8	42.2	44.4
VEHICULAR NOISE	DAY=	57.5	Leq	EVENING=	56.2	Leq	NIGHT=	50.2	Leq

RESULTS

NOISE LEVELS AT 50 FEET FROM CENTERLINE (dBA): **Ldn= 58.6**

CNEL= 59.2

NOISE CONTOUR:		70 dBA	65 dBA	60 dBA
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**9**	**19**	**40**
	CNEL:	**10**	**21**	**44**

Menlo Park GP

Forecast

#	ROADWAY	SEGMENT	ADT	POSTED SPEED LIMIT	LANE DISTANCE	SITE CONDITION	LANES	GRADE (%)
1	SR 82 / El Camino Real	San Mateo County Line to Atherton Ave	40,153	35	84	Soft	6D	0%
2	Highway 101	Route 114 to Marsh Rd	257,756	65	130	Soft	10D	0%
3	Interstate 280	Sand Hill Road to Route 84	136,002	65	120	Soft	8D	0%
4	SR 84 / Bayfront Expy	Highway 101/ Marsh Rd to Route 114 / Willow Rd	43,391	45	80	Soft	6D	0%
5	SR 84 / Bayfront Expy	Route 114 / Willow Rd to Route 109 / University Av	69,944	50	80	Soft	6D	0%
6	SR 84 / Bayfront Expy	Route 109 / University Ave to Dumbarton Bridge	79,011	55	80	Soft	6D	0%
7					#N/A	Soft		0%
8					#N/A	Soft		0%
9					#N/A	Soft		0%
10					#N/A	Soft		0%
11					#N/A	Soft		0%
12					#N/A	Soft		0%
13					#N/A	Soft		0%
14					#N/A	Soft		0%
15					#N/A	Soft		0%
16					#N/A	Soft		0%
17					#N/A	Soft		0%
18					#N/A	Soft		0%
19					#N/A	Soft		0%
20					#N/A	Soft		0%
21					#N/A	Soft		0%
22					#N/A	Soft		0%
23					#N/A	Soft		0%
24					#N/A	Soft		0%
25					#N/A	Soft		0%
26					#N/A	Soft		0%
27					#N/A	Soft		0%
28					#N/A	Soft		0%
29					#N/A	Soft		0%
30					54	Soft		0%

ANALYST
NJF

ROAD CLASSIFICATION	SPEED	LANE DISTANCE
2U	40	12
4U	40	36
4D	45	48
6D	45	84
2D	40	24

73.6	75.55%
13.6	13.96%
10.22	10.49%

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.42%	DAY	75.5%
% MT	1.84%	EVENING	14.0%
% HT	0.74%	NIGHT	10.5%

Source: Riverside, County of, Department of Public Health, Office of Industrial Hygiene. 2009, November. For Determining and Mitigating Trat

Riverside County Fleet Mix: Secondary, Collectors, or Smaller

Vehicle	Overall %	Day (7 AM tc	Evening (7	Night (10 PM to 7 AM)
Auto	97%	73.60	13.60	10.22
Medium Truck	2%	0.90	0.04	0.90
Heavy Truck	1%	0.35	0.04	0.35
		74.85	13.68	11.47

Source: Caltrans 2014

Menlo Park GP
Forecast CONDITIONS NOISE CONTOURS RESULT SUMMARY TABLE

					DISTACE TO NOISE CONTOUR (FT.)		
#	**ROADWAY**	**SEGMENT**	**TRAFIC VOLUMES**	**LEVEL AT 100 FT.**	**70 dBA CNEL**	**65 dBA CNEL**	**60 dBA CNEL**
1	SR 82 / El Camino Real	San Mateo County Line to Atherton Ave	40,153	67.5	68	147	317
2	Highway 101	Route 114 to Marsh Rd	257,756	83.6	805	1734	3736
3	Interstate 280	Sand Hill Road to Route 84	136,002	80.5	499	1076	2317
4	SR 84 / Bayfront Expy	Highway 101/ Marsh Rd to Route 114 / Willow	43,391	70.5	107	232	499
5	SR 84 / Bayfront Expy	Route 114 / Willow Rd to Route 109 / Universit	69,944	73.7	177	381	820
6	SR 84 / Bayfront Expy	Route 109 / University Ave to Dumbarton Bridg	79,011	75.3	226	487	1049
7	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
8	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
9	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
10	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
11	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
12	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
13	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
14	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
15	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
16	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
17	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
18	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
19	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
20	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
21	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
22	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
23	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
24	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
25	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
26	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
27	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
28	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
29	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!
30	0	0	0	#NUM!	#NUM!	#NUM!	#NUM!

Scenario:	Forecast	Project:	Menlo Park GP
Roadway:	SR 82 / El Camino Real	Analyst:	NJF
Segment:	San Mateo County Line to Atherton Ave	Date:	25-May-16

ROADWAY INPUTS	
ADT	40,153
SPEED (mph)	35
ROAD NEAR-FAR LN. DIST.	84
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2463	47	19	1820	34	14	456	9	3
Speed in MPH	35	35	35	35	35	35	35	35	35
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	65.1	74.8	80.0	65.1	74.8	80.0	65.1	74.8	80.0
ADJUSTMENTS									
Flow	3.2	-14.1	-18.0	1.9	-15.4	-19.3	-4.2	-21.4	-25.4
Distance	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0	-4.0
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	64.3	56.8	58.0	63.0	55.5	56.7	57.0	49.4	50.7
VEHICULAR NOISE	DAY=	65.8	Leq	EVENING=	64.5	Leq	NIGHT=	58.5	Leq

RESULTS

NOISE LEVELS AT 100 FEET FROM CENTERLINE (dBA):				**Ldn=**	**66.9**
				CNEL=	**67.5**
		70	*65*	*60*	
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**62**	**134**	**288**	
	CNEL:	**68**	**147**	**317**	

Scenario:	Forecast	Project:	Menlo Park GP
Roadway:	Highway 101	Analyst:	NJF
Segment:	Route 114 to Marsh Rd	Date:	25-May-16

ROADWAY INPUTS	
ADT	######
SPEED (mph)	65
ROAD NEAR-FAR LN. DIST.	130
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	15809	299	120	11685	221	89	2927	55	22
Speed in MPH	65	65	65	65	65	65	65	65	65
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	75.5	81.7	85.2	75.5	81.7	85.2	75.5	81.7	85.2
ADJUSTMENTS									
Flow	8.6	-8.7	-12.6	7.2	-10.0	-14.0	1.2	-16.0	-20.0
Distance	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	81.3	70.2	69.7	80.0	68.9	68.4	73.9	62.9	62.4
VEHICULAR NOISE	DAY=	81.9	Leq	EVENING=	80.6	Leq	NIGHT=	74.5	Leq

RESULTS					
NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):		**Ldn=**	**83.0**
				CNEL=	**83.6**
NOISE CONTOUR:			*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):		**Ldn:**	**731**	**1575**	**3393**
		CNEL:	**805**	**1734**	**3736**

Scenario:	Forecast	Project:	Menlo Park GP
Roadway:	Interstate 280	Analyst:	NJF
Segment:	Sand Hill Road to Route 84	Date:	25-May-16

ROADWAY INPUTS	
ADT	######
SPEED (mph)	65
ROAD NEAR-FAR LN. DIST.	120
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	8341	158	63	6165	116	47	1544	29	12
Speed in MPH	65	65	65	65	65	65	65	65	65
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	75.5	81.7	85.2	75.5	81.7	85.2	75.5	81.7	85.2
ADJUSTMENTS									
Flow	5.8	-11.5	-15.4	4.5	-12.8	-16.7	-1.5	-18.8	-22.7
Distance	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2	-3.2
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	78.2	67.1	66.6	76.8	65.8	65.3	70.8	59.8	59.3
VEHICULAR NOISE	DAY=	78.8	Leq	EVENING=	77.4	Leq	NIGHT=	71.4	Leq

RESULTS

NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):			**Ldn=**	**79.8**
					CNEL=	**80.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**453**	**977**	**2105**
			CNEL:	**499**	**1076**	**2317**

Scenario: Forecast
Roadway: SR 84 / Bayfront Expy
Segment: Highway 101/ Marsh Rd to Route 114 / Willow Rd

Project: Menlo Park GP
Analyst: NJF
Date: 25-May-16

ROADWAY INPUTS	
ADT	43,391
SPEED (mph)	45
ROAD NEAR-FAR LN. DIST.	80
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	2661	50	20	1967	37	15	493	9	4
Speed in MPH	45	45	45	45	45	45	45	45	45
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	69.3	77.6	82.1	69.3	77.6	82.1	69.3	77.6	82.1
ADJUSTMENTS									
Flow	2.4	-14.8	-18.8	1.1	-16.1	-20.1	-4.9	-22.2	-26.1
Distance	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	67.7	58.7	59.3	66.4	57.4	58.0	60.4	51.4	52.0
VEHICULAR NOISE	DAY=	68.7	Leq	EVENING=	67.4	Leq	NIGHT=	61.4	Leq

RESULTS						
NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):			**Ldn=**	**69.8**
					CNEL=	**70.5**
NOISE CONTOUR:				*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):			**Ldn:**	**98**	**210**	**453**
			CNEL:	**107**	**232**	**499**

Scenario:	Forecast	Project:	Menlo Park GP
Roadway:	SR 84 / Bayfront Expy	Analyst:	NJF
Segment:	Route 114 / Willow Rd to Route 109 / University Av	Date:	25-May-16

ROADWAY INPUTS	
ADT	69,944
SPEED (mph)	50
ROAD NEAR-FAR LN. DIST.	80
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA

	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	4290	81	33	3171	60	24	794	15	6
Speed in MPH	50	50	50	50	50	50	50	50	50
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	71.1	78.8	83.0	71.1	78.8	83.0	71.1	78.8	83.0
ADJUSTMENTS									
Flow	4.0	-13.2	-17.2	2.7	-14.5	-18.5	-3.3	-20.5	-24.5
Distance	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	71.1	61.5	61.8	69.8	60.2	60.5	63.8	54.2	54.5
VEHICULAR NOISE	DAY=	72.0	Leq	EVENING=	70.7	Leq	NIGHT=	64.7	Leq

RESULTS

NOISE LEVELS AT 100 FEET FROM CENTERLINE (dBA):				**Ldn=**	**73.1**
				CNEL=	**73.7**
NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*	
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**161**	**346**	**745**	
	CNEL:	**177**	**381**	**820**	

Scenario:	Forecast	Project:	Menlo Park GP
Roadway:	SR 84 / Bayfront Expy	Analyst:	NJF
Segment:	Route 109 / University Ave to Dumbarton Bridge	Date:	25-May-16

ROADWAY INPUTS	
ADT	79,011
SPEED (mph)	55
ROAD NEAR-FAR LN. DIST.	80
DISTANCE ROAD CL (ft)	100
SOFT/HARD CONDITIONS	Soft
GRADE (%)	0%
LEFT VIEW	-90
RIGHT VIEW	90

VEHICLE MIX INPUTS			
DAILY		HOURLY	
% A	97.4%	DAY	75.5%
% MT	1.8%	EVENING	14.0%
% HT	0.7%	NIGHT	10.5%

CALCULATION AREA	DAYTIME			EVENING			NIGHT		
	AUTOS	MT	HT	AUTOS	MT	HT	AUTOS	MT	HT
Vehicles per hour	4846	92	37	3582	68	27	897	17	7
Speed in MPH	55	55	55	55	55	55	55	55	55
Left angle	-90	-90	-90	-90	-90	-90	-90	-90	-90
Right angle	90	90	90	90	90	90	90	90	90
Reference levels (dBA)	72.7	79.9	83.8	72.7	79.9	83.8	72.7	79.9	83.8
ADJUSTMENTS									
Flow	4.1	-13.1	-17.0	2.8	-14.4	-18.4	-3.2	-20.4	-24.4
Distance	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1	-4.1
Finite Roadway	0	0	0	0	0	0	0	0	0
Barrier	0	0	0	0	0	0	0	0	0
Grade	0	0	0	0	0	0	0	0	0
LEQ	72.8	62.7	62.7	71.5	61.4	61.4	65.5	55.4	55.4
VEHICULAR NOISE	DAY=	73.6	Leq	EVENING=	72.3	Leq	NIGHT=	66.3	Leq

RESULTS

NOISE LEVELS AT	100	FEET FROM CENTERLINE (dBA):		**Ldn=**	**74.7**
				CNEL=	**75.3**

NOISE CONTOUR:		*70 dBA*	*65 dBA*	*60 dBA*
ROAD CENTERLINE DISTANCE TO NOISE CONTOUR (FEET):	**Ldn:**	**205**	**442**	**953**
	CNEL:	**226**	**487**	**1049**

APPENDIX H:
PUBLIC SERVICES DATA

FIRE PROTECTION SERVICES

October 20, 2015

Harold Schapelhouman, Fire Chief
Menlo Park Fire Protection District
170 Middlefield Road
Menlo Park, CA 94025

Re: Fire Protection Services

Dear Chief Schapelhouman:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

General Plan Update

The proposed Land Use and Circulation Elements are intended to guide development and conservation in the city through the 2040 buildout horizon of this General Plan. These two elements are central components of the General Plan because they describe which land uses should be allowed in the city, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the city and its residents. The Land Use Element frames the type and scale of potential development that may occur over the next 24 years, particularly in the Bayfront Area. The Circulation Element addresses transportation issues throughout the city. Both updated Elements have been written to be consistent with the other General Plan Elements and the 2012 El Camino Real/Downtown Specific Plan.

Bayfront Area Zoning Ordinance Update

The Project includes an update to the City's Zoning Ordinance for the Bayfront Area formerly referred to as the "M-2 General Industrial Zoning District", including both development regulations and design standards, to ensure consistency with the General Plan Update and previously adopted ordinances and policies. The proposed Zoning Ordinance Update would create the following five new districts, which would apply to lands within the Bayfront Area: Light Industrial (I-L), Business Park (C-BP), Office/Tech/Research and Development (O), Life Sciences (LS), and Mixed Use Residential (R-MU). These districts are intended to foster innovation and emerging technologies; promote the creation of an employment district with travel patterns that are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]
BAYFRONT AREA									
Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
Population[h]	32,900		1,300		2,190		n/a		35,390
Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
Non-residential Square Feet	***14.6 million***		***1.5 million***		***1.8 million***		***2.3 million***		***20.6 million***
Hotel Rooms[g]	***570***		***520***		***0***		***400***		***1,490***
Residential Units	***13,100***		***1,280***		***1,000***		***4,500***		***19,880***
Population[h]	***32,900***		***3,300***		***2,580***		***11,570***		***50,350***
Employees	***30,900***		***12,450***		***4,400***		***5,500***		***53,250***

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.

g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.

h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.

i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing police protection service facilities thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment. We've received letters dated March 31, 2015 and June 16, 2015 to the City Council regarding the potential impacts to Station 77 as a result of the Project and appreciate and value the input that the Fire Protection District has provided thus far.

Below is an excerpt from Existing Conditions Reports that were released for public review in January 2015, followed by several questions. Please confirm the information in the excerpt and update as needed, and address the questions. Because the information included in the Existing Conditions Reports was gathered in the previous fiscal year, information regarding number of staff, operating budget, equipment, may no longer reflect current existing conditions. Your input in confirming and/or updating the information below will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to **fire protection services**, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's public safety, provided by the Menlo Park Fire Protection District. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Below are excerpts from the 2015 Existing Conditions Report for the Project. Please confirm the information regarding staffing and response times, and any assistance that you can provide with the questions that follow would be greatly appreciated:

Menlo Park Fire Protection District Operations

Dispatching for the MPFPD is conducted through the Countywide consolidated Fire Dispatch Center. MPFPD personnel respond to more than 8,000 calls for service annually, of which 61 percent are medical emergencies. The Menlo Park Fire Protection District operates seven stations at the following locations:

- Station 1: 300 Middlefield Rd. (1250 plus calls for service per year)
- Station 2: 2290 University Ave. (East Palo Alto – 2000 plus calls for service per year)
- Station 3: 32 Almendral (Atherton – 800 plus calls for service per year)
- Station 4: 3322 Alameda de Las Pulgas (unincorporated County – 1100 plus calls for service per year)
- Station 5: 4101 Fair Oaks Avenue (unincorporated county – 700 plus calls for service per year)
- Station 6: 700 Oak Grove Avenue – (1200 plus calls for service per year)
- Station 77: 1467 Chilco Avenue – (700 plus calls for service per year)

The Fire District maintains the following equipment and vehicle fleet:[1]

- One battalion SUV command vehicle (operating out of Station 1)
- One reserve battalion SUV command vehicle
- Seven Type 1 heavy fire engines (one at each station)
- Three Type 1 heavy reserve fire engines
- One ladder truck (105-foot ladder, operating out of Station 1)
- One reserve ladder truck (100-foot aerial ladder)
- One medium-duty technical rescue vehicle
- One utility truck with skid mount pump
- Three inflatable rescue boats and trailer
- Two jet skis and trailer
- One Office of Emergency Services (OES) water rescue truck
- One airboat and trailer
- Four fire prevention/investigation vehicles
- Two fire mechanic field utility trucks
- One dually crew cab truck (used to tow trailers)

Each of the seven fire stations is equipped with one Type 1 heavy fire engine and is continuously staffed by three fire crew members: a captain, an apparatus driver, and a paramedic. Every station operates on three rotating 48-hour shifts to ensure 24-hour constant service. Fire District staff also includes two full-time mechanics who maintain District response vehicles. Administrative offices for the Menlo Park Fire Protection District are located at 170

[1] Menlo Park Fire Protection District (MPFPD). http://www.menlofire.org, accessed October 23, 2014. 20 Menlo Park Fire Protection District, Fiscal Year 2014–2015 Adopted District Budget & CA-TF2 US&R Budget, http://www.menlofire.org/pdf/
budget1415/Budget%2014-15.pdf, accessed October 23, 2014. Edited, updated, and confirmed by the MPFPD, December 2014.

Middlefield Road, near the Willow Road intersection. For fiscal year 2014–2015, MPFPD's staffing level was anticipated to be 115.5 full-time equivalents.[2]

The MPFPD provides in-department training in the following areas: emergency medical technician/paramedic response; technical rescue; auto extrication; live fire training; ropes operations; incident simulation and career development; hazardous materials first response, situational awareness, command and control; and incident command special training in Urban Search and Rescue (USAR) consisting of collapsed structure, trench and confined space training. To maintain these training programs, the MPFPD training unit engages in annual requirements for all specialties including driver operator and acting officer testing, as well as probationary testing, and mandates requirements for yearly training, which consists of on-line computer and hands-on training formats. Additionally, the MPFPD runs a variety of community training and education programs, including community emergency preparedness consisting of agency to agency or inter-governmental service agreements to meet mandated training, plans and exercise requirements for unified command, Community Emergency Response Team (CERT) training, Get Ready, and the Boy Scouts high school explorer and College of San Mateo fire cadet work experience programs, which teach and train young people and students about careers in the Fire Service. MPFPD also provides custom-designed school and workplace fire safety education programs for the public by request.[3]

Fire District Budget

The 2014/2015 total budget for the Menlo Park Fire Protection District is $37.7 million, which represents a 3 percent decrease from the 2013/2014 budget, primarily due to decreased capital expenditures. The MPFPD receives the majority of its funding through property taxes and operational/developmental permitting fees, with smaller amounts coming from intergovernmental transfers, such as grants or funding provided by other agencies. The 2014/2015 budget for MPFPD includes $5.8 million for the completion of construction on Station 2 and $6.7 million for the redevelopment of Station 6.

The MPFPD maintains a schedule of fees for a variety of uses and permits in order to help support cost recovery for the District. These fees were adopted in 2012 subsequent to a fee study that was completed earlier that year. In early 2014, Facebook partnered with the Menlo Park Fire Protection District to provide $150,000 for the installation of traffic signal preemption devices that would give emergency vehicles priority at key intersections along Marsh Road, Bayfront Expressway, Willow Road, and University Avenue.[4]

1. Would the Menlo Park Fire Protection District need to construct new facilities or expand existing facilities in order to accommodate the project's demand for fire protection services?

2. Is the information in the above text accurate? If not, please provide updated information as needed.

3. How many emergency medical incident calls does the department respond to per year? What is the response goal for an emergency medical incident?

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[2] Menlo Park Fire Protection District (MPFPD). http://www.menlofire.org, accessed October 23, 2014. 20 Menlo Park Fire Protection District, Fiscal Year 2014–2015 Adopted District Budget & CA-TF2 US&R Budget, http://www.menlofire.org/pdf/budget1415/Budget%2014-15.pdf, accessed October 23, 2014. Edited, updated, and confirmed by the MPFPD, December 2014.

[3] Communication with Menlo Park Fire Protection District (MPFPD) by City of Menlo Park, November 2014.

[4] Communication with Menlo Park Fire Protection District (MPFPD) by City of Menlo Park, November 2014.

4. Are there any existing deficiencies, such as lack of staffing and/or facilities and equipment?

5. Are there any existing plans for expansion or relocation of stations that would serve the project? If so, please describe the expansion or relocation.

6. Would the project require the Fire Protection District to hire more firefighters or staff?

7. What is the status of the department's Fire Protection Facilities Impact Fee Program? Has it been adopted and is it currently being levied on new residential and non-residential development in the department's boundaries? Does your department recommend other standard criteria for assessing the significance of a proposed project's impacts in an EIR or other environmental impact documentation? If so, what are those criteria?

8. Please provide recommendations that could reduce the demand for fire protection services created by the proposed project.

9. Please provide any current documents on fire protection service in the City including background reports, number of incidents, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to police services as a result of the proposed project.

10. In addition to concerns in the letters received by the City Council dated March 31, 2015 and June 16, 2015 regarding potential impacts to Station 77, are there any other concerns regarding potential impacts to the Fire Protection District as a result of the Project? If so, please describe.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

PLACEWORKS

October 20. 2015

Harold Schapelhouman, Fire Chief
Menlo Park Fire Protection District
170 Middlefield Road
Menlo Park, CA 94025

Re: Fire Protection Services

Dear Chief Schapelhouman:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees. Menlo Fire Comment - We believe the Facebook Expansion Project should be included in the cumulative impacts analysis in the General Plan EIR.

General Plan Update

The proposed Land Use and Circulation Elements are intended to guide development and conservation in the city through the 2040 buildout horizon of this General Plan. These two elements are central components of the General Plan because they describe which land uses should be allowed in the city, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the city and its residents. The Land Use Element frames the type and scale of potential development that may occur over the next 24 years, particularly in the Bayfront Area. The Circulation Element addresses transportation issues throughout the city. Both updated Elements have been written to be consistent with the other General Plan Elements and the 2012 El Camino Real/Downtown Specific Plan.

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The Project includes an update to the City's Zoning Ordinance for the Bayfront Area formerly referred to as the "M-2 General Industrial Zoning District", including both development regulations and design standards, to ensure consistency with the General Plan Update and previously adopted ordinances and policies. The proposed Zoning Ordinance Update would create the following five new districts, which would apply to lands within the Bayfront Area: Light Industrial (I-L), Business Park (C-BP), Office/Tech/Research and Development (O), Life Sciences (LS), and Mixed Use Residential (R-MU). These districts are intended to foster innovation and emerging technologies; promote the creation of an employment district with travel patterns that are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

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BAYFRONT AREA									
Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
Population[h]	32,900		1,300		2,190		n/a		35,390
Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
Non-residential Square Feet	*14.6 million*		*1.5 million*		*1.8 million*		*2.3 million*		*20.6 million*
Hotel Rooms[g]	*570*		*520*		*0*		*400*		*1,490*
Residential Units	*13,100*		*1,280*		*1,000*		*4,500*		*19,880*
Population[h]	*32,900*		*3,300*		*2,580*		*11,570*		*50,350*
Employees	*30,900*		*12,450*		*4,400*		*5,500*		*53,250*

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.

g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.

h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.

i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Sub regional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing police protection service facilities due to not maintaining acceptable service ratios, response times or other performance objectives thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment. We've received letters dated March 31, 2015 and June 16, 2015 to the City Council regarding the potential impacts to Station 77 as a result of the Project and appreciate and value the input that the Fire Protection District has provided thus far.

PLEASE ALSO REVIEW AND CONSIDER INFORMATION IN FIRE DISTRICT LETTER ON NOP DATED JULY 20, 2015, A COPY OF WHICH IS ATTACHED.

Below is an excerpt from Existing Conditions Reports that were released for public review in January 2015, followed by several questions. Please confirm the information in the excerpt and update as needed, and address the questions. Because the information included in the Existing Conditions Reports was gathered in the previous fiscal year, information regarding number of staff, operating budget, equipment, may no longer reflect current existing conditions. Your input in confirming and/or updating the information below will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to fire protection services, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for fire protection services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's public safety, provided by the Menlo Park Fire Protection District. THE EIR SHOULD CONSIDER IMPACTS OF TRAFFIC CONGESTION ON RESPONSE TIME AND EMERGENCY SERVICE ROUTES. IMPACTS DUE TO INCREASED BUILDING HEIGHT AND NEW RESIDENTIAL USES IN M-2 SHOULD BE ANALYZED. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Below are excerpts from the 2015 Existing Conditions Report for the Project. Please confirm the information regarding staffing and response times, and any assistance that you can provide with the questions that follow would be greatly appreciated:

Menlo Park Fire Protection District Operations

Dispatching for the MPFPD is conducted through the Countywide consolidated Fire Dispatch Center. MPFPD personnel respond to more than 8,200 calls for service annually, of which 63 percent are medical emergencies.

The Fire District maintains the following equipment and vehicle fleet:

- One battalion SUV command vehicle (operating out of Station 1)
- One reserve battalion SUV command vehicle
- Seven Type 1 heavy fire engines (one at each station)
- Three Type 1 heavy reserve fire engines
- One ladder truck (105-foot ladder, operating out of Station 1)
- One reserve ladder truck (100-foot aerial ladder)
- One medium-duty technical rescue vehicle
- One utility truck with skid mount pump
- Three inflatable rescue boats and trailer
- Two jet skis and trailer
- One Office of Emergency Services (OES) water rescue truck
- One airboat and trailer
- Four fire prevention/investigation vehicles
- Two fire mechanic field utility trucks
- One dually crew cab truck (used to tow trailers)

Each of the seven fire stations is equipped with one Type 1 heavy fire engine and is continuously staffed by three fire crew members: a captain, an apparatus driver, and a paramedic. Every station operates on three rotating 48-hour shifts to ensure 24-hour constant service. Fire District staff also includes two full-time mechanics who maintain District response vehicles. Administrative offices for the Menlo Park Fire Protection District are located at 170 Middlefield Road, near the Willow Road intersection. For fiscal year 2015–20156 MPFPD's staffing level was anticipated to be 113.80 full-time equivalents.

The MPFPD provides in-department training in the following areas: emergency medical technician/paramedic response; technical rescue; auto extrication; live fire training; ropes operations; incident simulation and career development; hazardous materials first response, situational awareness, command and control; and incident command special training in Urban Search and Rescue (USAR) consisting of collapsed structure, trench and confined space training. To maintain these training programs, the MPFPD training unit engages in annual requirements for all specialties including driver operator and acting officer testing, as well as probationary testing, and mandates requirements for yearly training, which consists of on-line computer and hands-on training formats. Additionally, the MPFPD runs a variety of community training and education programs, including community emergency preparedness consisting of agency to agency or inter-governmental service agreements to meet mandated training, plans and exercise requirements for unified command, Community Emergency Response Team (CERT) training, Get Ready, and the Boy Scouts high school explorer and College of San Mateo fire cadet work experience programs, which teach and train young people and students about careers in the Fire Service. MPFPD also provides custom-designed school and workplace fire safety education programs for the public by request.

Fire District Budget

The 2015-16 adopted total budget is $37.5 million, which is a 22 percent decrease from the FY 2014-15 adjusted budget. The decrease is due to two major events:

- ☑ In FY 2014-15, the unfunded actuarial accrued liability for the Safety group retirement benefit was paid down by $12 million.
- ☑ The Capital Improvement Project funds budget decreased significantly due to the near completion of Station #2 construction.

For the FY 2015-16 adopted budget, $3.5 million is budgeted for the construction and improvement of stations. Specifically, $1.5 million is budgeted to complete Station No. 2 construction and $1.6 million to start Station No. 6 construction. As of June 30, 2015, the Fire District has set aside $21.8 million for the construction and replacement of stations, including $6.9 million for the construction of Station 6. However, as of June 30, 2015, the projected unfunded amount for capital improvement projects is $29 million.

The MPFPD maintains a schedule of fees for a variety of uses and permits in order to help support cost recovery for the District. The District also forms partnership with local businesses to improve public safety. For example, the District partnered with Facebook, Inc. to fund traffic preemptions and thermal imaging equipment. Facebook conducted a major redevelopment of its property and the Fire District is in the process of working closely with the company on the construction of its West campus, which consists of about 1,000,000 square feet on the old Tyco electronics property. With a growing number of employees and a growing campus, Facebook has helped the local economy tremendously. However, the Fire District's challenges have grown along with the business expansion.

1. Would the Menlo Park Fire Protection District need to construct new facilities or expand existing facilities in order to accommodate the project's demand for fire protection services?

   The Fire District will need to significantly remodel or rebuild Fire Station 77 to accommodate this level of growth and expansion.

2. Is the information in the above text accurate? If not, please provide updated information as needed.

   We have modified and updated the text.

3. How many emergency medical incident calls does the department respond to per year? What is the response goal for an emergency medical incident?

   The Fire District currently responds to over 8200 emergency incidents per year of which roughly 63% are for emergency medical incidents. See Standards of Cover Assessment Report for current information on response times. Our response time standard, under Board Resolution 1818, is to be on-scene of any incident within 7 minutes 90% of the time.

   7 Minutes includes 1 minute for dispatch, up to 2 minutes for turnout time and 4 minutes

for response or drive time. Per Fire Board Resolution 1818

4. Are there any existing deficiencies, such as lack of staffing and/or facilities and equipment?

The updated Standards of Cover Assessment report has identified that the existing fire stations, staffing and unit deployment are adequate for existing development and service population but are being strained by traffic congestion and by growth, specifically on the Eastern side of the District, or the Belle Haven, M2 area.

The report identifies that additional apparatus and personnel will be needed based upon growth and increased congestion. The Report states that: "Traffic congestion is also an increasing problem as the communities the District protects continue to evolve. The District's growing employment base and regional post-recession economic jobs recovery is yielding intense traffic congestion at rush hours. The GIS travel time analysis in this study and the prior incident travel time data for District responses clearly show the substantial hindrance this causes to emergency response travel in the District.

The only way going forward to maintain reasonable travel times will be for the District to add more crews, positioned initially east of Highway 101. Other crews may be needed later in the central and western District on a full- or part-time basis. One way to visualize this would be the tight fire station spacing needed in downtown urban areas like San Francisco, Manhattan, and Chicago, where traffic congestion impairs typical fire station spacing."

5. Are there any existing plans for expansion or relocation of stations that would serve the project? If so, please describe the expansion or relocation.

All Fire District stations serve this project area.

The Menlo Park Fire Protection District operates seven stations at the following locations

- Station 1: 300 Middlefield Rd. (1250 plus calls for service per year) – Needs to be rebuilt, constructed in 1955
- Station 2: 2290 University Ave. (East Palo Alto – 2000 plus calls for service per year) – Under construction – Completion 2016
- Station 3: 32 Almendral (Atherton – 800 plus calls for service per year) – Adequate – Built 1997
- Station 4: 3322 Alameda de Las Pulgas (unincorporated County – 1100 plus calls for service per year) – Needs to be rebuilt – Constructed in 1949
- Station 5: 4101 Fair Oaks Avenue (unincorporated county – 700 plus calls for service per year) – Adequate – Built 1997

- Station 6: 700 Oak Grove Avenue – (1200 plus calls for service per year) – Breaks ground in 2016 – Constructed in 1953
- Station 77: 1467 Chilco Avenue – (700 plus calls for service per year) – Will need to be rebuilt/remodeled – Built 1996

The Fire District has offered to purchase the land for Station 77 from the City or extend the lease agreement.

6. Would the project require the Fire Protection District to hire more firefighters or staff?

The Fire District would need to hire more personnel and raise the minimum daily staffing levels to be able to support this level of growth and expansion in order to maintain existing service levels based on fire safety personnel per 1,000 service population. MPFPD's current ratio of .86 firefighters per 1000 service population may need to be increased to at least 1 per 1000, which is in line with other similar communities

7. What is the status of the department's Fire Protection Facilities Impact Fee Program? Has it been adopted and is it currently being levied on new residential and non-residential development in the department's boundaries? Does your department recommend other standard criteria for assessing the significance of a proposed project's impacts in an EIR or other environmental impact documentation? If so, what are those criteria?

The Nexus Impact Fee study is complete and has been presented to the Fire Board for review. Staff is currently making modifications to a formal response back to the Board that includes local jurisdiction and developer comments and feedback.

Board adopted response time standards should be used as standard of significance in EIR.

Standard of significance should include maintaining current ratio for District fire safety personnel positions per 1,000 residents and 1,000 service population. MPFPD's current ratio of .86 firefighters per 1000 service population may need to be increased to at least 1 per 1000, which is in line with other similar communities.

8. Please provide recommendations that could reduce the demand for fire protection services created by the proposed project.

Increased fire prevention design and risk management services.

9. Please provide any current documents on fire protection service in the City including background reports, number of incidents, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to police services as a result of the proposed project.

Please reference our web-site at www.menlofire.org for any required or requested documents. See, in particular, Standards of Cover Assessment dated June 16, 2015.

10. In addition to concerns in the letters received by the City Council dated March 31, 2015 and June 16, 2015 regarding potential impacts to Station 77, are there any other concerns regarding potential impacts to the Fire Protection District as a result of the Project? If so, please describe.

The Fire District is concerned about increased demands for Fire Prevention/Code Enforcement, public education, recreational activity, in or around the Bay, which could lead to technical rescues and water recues and additional traffic congestion that comes with a greater level of density and population.

See also concerns about impacts of future growth and development in Standards of Coverage Report dated June 16, 2015. See information from Report quoted in response to Question #4.

The EIR should also address the issues raised in the District's letter on the NOP dated July 20, 2015.

Updated 11/10/2015 – HS

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

POLICE PROTECTION SERVICES

PLACEWORKS

October 20, 2015

Dave Bertini, Commander
Menlo Park Police Department
701 Laurel Street
Menlo Park, CA 94025

Re: Police Protection Services

Dear Commander Bertini:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

General Plan Update

The proposed Land Use and Circulation Elements are intended to guide development and conservation in the city through the 2040 buildout horizon of this General Plan. These two elements are central components of the General Plan because they describe which land uses should be allowed in the city, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the city and its residents. The Land Use Element frames the type and scale of potential development that may occur over the next 24 years, particularly in the Bayfront Area. The Circulation Element addresses transportation issues throughout the city. Both updated Elements have been written to be consistent with the other General Plan Elements and the 2012 El Camino Real/Downtown Specific Plan.

Bayfront Area Zoning Ordinance Update

The Project includes an update to the City's Zoning Ordinance for the Bayfront Area formerly referred to as the "M-2 General Industrial Zoning District", including both development regulations and design standards, to ensure consistency with the General Plan Update and previously adopted ordinances and policies. The proposed Zoning Ordinance Update would create the following five new districts, which would apply to lands within the Bayfront Area: Light Industrial (I-L), Business Park (C-BP), Office/Tech/Research and Development (O), Life Sciences (LS), and Mixed Use Residential (R-MU). These districts are intended to foster innovation and emerging technologies; promote the creation of an employment district with travel patterns that are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

PLACEWORKS

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]
BAYFRONT AREA									
Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
Population[h]	32,900		1,300		2,190		n/a		35,390
Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
Non-residential Square Feet	***14.6 million***		***1.5 million***		***1.8 million***		***2.3 million***		***20.6 million***
Hotel Rooms[g]	***570***		***520***		***0***		***400***		***1,490***
Residential Units	***13,100***		***1,280***		***1,000***		***4,500***		***19,880***
Population[h]	***32,900***		***3,300***		***2,580***		***11,570***		***50,350***
Employees	***30,900***		***12,450***		***4,400***		***5,500***		***53,250***

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.

g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.

h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.

i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing police protection service facilities thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment. In a November 19, 2014 interview with PlaceWorks, information was provided regarding Police Department staffing levels and response times. Below is an excerpt from Existing Conditions Reports that were released for public review in January 2015, including the information from the interview, followed by several questions. Because the information included in the Existing Conditions Reports was gathered in the previous fiscal year, information regarding number of staff, operating budget, equipment, may no longer reflect current existing conditions. Your input in confirming and/or updating the information below will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to police protection services, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for police services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's public safety, provided by the Menlo Park Police Department. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Below are excerpts from the 2015 Existing Conditions Report for the Project. Please confirm the information regarding staffing and response times, and any assistance that you can provide with the questions that follow would be greatly appreciated:

MENLO PARK POLICE DEPARTMENT

The Menlo Park Police Department (MPPD) provides law enforcement services in the City of Menlo Park. One police station, located at City Hall, primarily covers the whole service area. The MPPD operates one newly opened 1,800-square-foot substation on the bayside of US 101 in the Neighborhood Service Center, which is staffed and open to the public during normal business hours. The Belle Haven Neighborhood Service Center and Substation is also used for officers to use restrooms, make calls, or interview and process suspects, victims, or witnesses. The substation is also a location used during critical incidents in the Belle Haven neighborhood. The MPPD divides its service area by three beats:

- Beat 1 covers the area of the City on the hillside of El Camino Real
- Beat 2 covers the area between El Camino Real and US 101
- Beat 3 covers the bayside of US 101

The MPPD has a mutual aid agreement with every other police agency in the County of San Mateo. This agreement includes all neighboring jurisdictions: Atherton Police Department, East Palo Alto Police Department, Redwood City Police Department, and the San Mateo County Sherriff's Office, which is responsible for law enforcement in unincorporated areas of Menlo Park and Redwood City. The MPPD also has an informal mutual aid agreement with the Palo Alto Police Department which borders Menlo Park, but is in Santa Clara County.

STAFFING

MPPD staffing includes 48 sworn officers and 22 professional staff, resulting in a total full-time equivalent (FTE) of 70 as of 2014. The sworn officers consist of one chief, two commanders, eight sergeants, and 37 police officers, with a staffing ratio of 1.4 officers per 1,000 residents. Recent budget shortfalls in the City have resulted in staff deficiencies in the MPPD. To maintain service levels with limited budget, the MPPD has tightened its resources by assigning some sworn officer's tasks to non-sworn staff. Recently, MPPD has been able to revive its traffic unit with the staffing of two motorcycle positions. Currently there is one full time motorcycle traffic officer on duty with a second motorcycle officer in training.

RESPONSE TIMES

The MPPD prioritizes calls for police services as follows: Priority 1 calls involve life-threatening situations; Priority 2 calls are not life-threatening but necessitate immediate response; all other calls are designated Priority 3. In 2014, the average response time for Priority 1 calls was 3:35 minutes, for Priority 2 calls was 7:39 minutes, and for Priority 3 calls was 11:30 minutes. Vehicle traffic and congestion are the primary impediment to improving response times.

Call Volumes

From November 18, 2013 to November 18, 2014, the MPPD received 401 Priority 1 calls, 10,833 Priority 2 calls, and 10,507 Priority 3 calls for service. This does not include the 18,448 additional officer-initiated calls that the dispatch center handled. These officer initiated calls could be priority 1, 2, or 3 depending on their nature. The MPPD identified the Beat 3 area as a "crime hot spot" because of entrenched gang activity in the area and rival gangs in East Palo Alto, although violent crime has dramatically decreased throughout the City in 2014.

1. What is the current service population, including resident (fulltime) service population and daytime (with employees) service population? How does the Police Department account for employee service population?

2. Would the Menlo Park Police Department need to construct new facilities or expand existing facilities in order to accommodate the project's demand for police services?

3. What is the standard ratio of officers per number of population or acreage that the department would like to maintain? Is the Department currently meeting this ratio?

4. Does the Menlo Park Police Department have identified Developer Impact Fees for new commercial and residential development? If so, please describe the fees.

5. Does the Menlo Park Police Department have an established target response time for responding to Priority 1, 2, and 3 calls? If so, is the MPPD currently meeting those response times?

6. What is the existing equipment inventory at each station included in your response above?

7. Are there any existing deficiencies, such as lack of staffing and/or facilities and equipment?

8. Are the existing staff levels at the station(s) adequate to meet current demands for protection services in the project areas?

9. Are the equipment levels adequate to meet the project area's current demand for police protection services?

10. Are there any plans for expansion or relocation of stations that would serve the project? If so, please describe the expansion or relocation.

11. Would the project require the Menlo Park Police Department to hire more officers or staff?

12. Would the project require the Menlo Park Police Department to purchase more equipment?

13. Please provide recommendations that could reduce the demand for police services created by the proposed project.

14. Please provide any current documents on police service in the City including background reports, number of incidents, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to police services as a result of the proposed project.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

CITY OF MENLO PARK

November 18, 2015

Mr. Ricky Caperton
Placeworks
1625 Shattuck Ave. Suite 300
Berkeley, CA. 94709

RE: Police Protection Services – General Plan Update

Dear Mr. Caperton:

The Menlo Park Police Department is in receipt of your request for information regarding Police Protection Services as it relates to the City of Menlo Park General Plan update process. The description of the Police Department and its current staffing, along with facilities and service areas, remains the same as stated in the 2015 Existing Conditions Report (referenced in your letter). Below are the answers to the specific questions and requests for information:

1. Service Population-The current service population for the Menlo Park Police Department is 42,046. This number is derived by taking the total city population and adding 1/3 of all employees within the city.

2. Facilities-No new or expanded facilities are anticipated at this time. The City currently operates a police substation and neighborhood service center at the corner of Hamilton Ave., and Willow Road (north of Highway 101 in the Belle Haven neighborhood). This location opened in the spring of 2014, with funding provided by Facebook. The renovated facility is a location for community members to meet with law enforcement and each other and includes a new interior and free public Wi-Fi. The substation also houses the department's Code Enforcement Officer and Community Safety Police Officer.

3. Officer Ratio-The current ratio of officers to population is: 1.14 sworn for every 1,000 service population, with 48 sworn officers. This ratio has steadily increased over the last seven years. In 2008, the ratio of officers to service population was one officer per 605 residents (due to the fact the department had 52 sworn officers working within the three service areas). The average in San Mateo County is 1.25 sworn for every 1,000 service population. We would prefer to maintain an officer to population ratio of one sworn officer for every 1,000 service population, and at this time the department is meeting that ratio.

4. Developer Impact Fees-The Police Department does not levy nor collect "Developer Impact Fees".

5. Response Times- The department's optimal response time to calls for service is: less than 5 minutes for Priority 1 calls, 7-8 minutes for Priority 2 calls and 10-12

minutes for Priority 3 calls. Presently, the average response time for Priority 1 calls is slightly over 5 minutes, 8 minutes for Priority 2 calls, and 10 minutes for Priority 3 calls. These response times have increased over the past year, but are considered acceptable and within the average of response times throughout the County. Vehicle traffic and congestion is the primary impediment to improving response times.

6. Equipment Inventory-The existing inventory of equipment for the Police Department is currently sufficient to equip all sworn officers and non-sworn professional staff. The Police Department also maintains a small equipment reserve to cover breakage and routine maintenance.

7. Existing Deficiencies- At this time, there are no existing deficiencies in sworn staffing or facilities and equipment. The one area of deficiency is in Code Enforcement services. Unlike many other municipalities, Code Enforcement is operated through the Police Department and is currently staffed with one full-time, non-sworn employee. In the past, Code Enforcement was staffed with sworn personnel, including one Police Sergeant, one Police Officer and one non-sworn expert. With the current level of development and demand by residents, the current non-sworn Code Enforcement Officer is not able to conduct any proactive enforcement and is also unable to respond to complaints in a timely manner. The Police Department is currently supplementing Code Enforcement services with non-sworn Community Service Officers, which detracts from their normal duties.

8. Current Demands-Currently, existing staffing levels are adequate to meet current demands for services, except for those listed above, in #7.

9. Equipment Levels-Currently, existing equipment levels are adequate to meet the current demands for services.

10. Expansion or Relocation Plans-At this time, there are no plans to relocate or expand any stations for the Police Department. It should be noted that all day-to-day operations are conducted through the main Police Department which is located in the basement level of City Hall at 701 Laurel Street. The City Service Center/Substation only houses the Code Enforcement Officer and City Safety Police Officer, two specialized positions, and is a location for officers who are housed at the main station to use when operating in the beat-3 area.

11. Staffing-The "Maximum Citywide 2040 Buildout" indicates a possible increase of 17,450 in city population and 22,350 in employees within the city, by the year 2040. This scenario increases the service population to 67,922, which is a significant increase from the current population. In order to maintain the 1:1000 sworn officer ratio, sworn staff would need to be increased by 19 positions, along with commensurate equipment for those positions. This figure could be affected by any change in crime, traffic, or other new or changing demands for police services.

    The "Proposed Project-Bayfront Area" indicates a possible increase of 11,570 in population and an increase of 5,500 in employees within the city. This scenario increases the service population to 55,431. In order to maintain the 1:1000 sworn officer ratio, sworn staff would need to be increased by 7 along with commensurate equipment for these positions.

The “Current General Plan” indicates a possible increase of 2,580 in population and an increase of 4,400 in employees within the city. This scenario increases the service population to 44,626. In this scenario, no increases in staffing or equipment would be needed.

It should be noted that, in any of the above three scenarios, code enforcement services would be deficient under current levels and would need to be increased.

12. Equipment Purchase- As stated above, in two of the listed scenarios, equipment levels would need to be increased commensurate with the increased number of sworn officers.

13. Plans for Reduced Demand-Reducing demand for police services created by the proposed projects could include: built in surveillance equipment and security staffing to monitor those systems, use of Crime Prevention Through Environmental Design (CPTED) recommendations and procedures during the design and construction of each project, hired security personnel to monitor project areas and upgraded traffic planning in order to minimize traffic accidents and congestion.

14. Background Documents-Specific documents are available upon request.

Sincerely,

David C. Bertini

Commander Dave Bertini
Menlo Park Police Department

PARKS AND RECREATION SERVICES

October 20, 2015

Cherise Brandell, Community Services Director
Menlo Park Community Services
701 Laurel Street
Menlo Park, CA 94025

Re: Parks and Recreational Services

Dear Cherise Brandell:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

General Plan Update

The proposed Land Use and Circulation Elements are intended to guide development and conservation in the city through the 2040 buildout horizon of this General Plan. These two elements are central components of the General Plan because they describe which land uses should be allowed in the city, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the city and its residents. The Land Use Element frames the type and scale of potential development that may occur over the next 24 years, particularly in the Bayfront Area. The Circulation Element addresses transportation issues throughout the city. Both updated Elements have been written to be consistent with the other General Plan Elements and the 2012 El Camino Real/Downtown Specific Plan.

Bayfront Area Zoning Ordinance Update

The Project includes an update to the City's Zoning Ordinance for the Bayfront Area formerly referred to as the "M-2 General Industrial Zoning District", including both development regulations and design standards, to ensure consistency with the General Plan Update and previously adopted ordinances and policies. The proposed Zoning Ordinance Update would create the following five new districts, which would apply to lands within the Bayfront Area: Light Industrial (I-L), Business Park (C-BP), Office/Tech/Research and Development (O), Life Sciences (LS), and Mixed Use Residential (R-MU). These districts are intended to foster innovation and emerging technologies; promote the creation of an employment district with travel patterns that are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]
BAYFRONT AREA									
Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
Population[h]	32,900		1,300		2,190		n/a		35,390
Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
Non-residential Square Feet	***14.6 million***		***1.5 million***		***1.8 million***		***2.3 million***		***20.6 million***
Hotel Rooms[g]	***570***		***520***		***0***		***400***		***1,490***
Residential Units	***13,100***		***1,280***		***1,000***		***4,500***		***19,880***
Population[h]	***32,900***		***3,300***		***2,580***		***11,570***		***50,350***
Employees	***30,900***		***12,450***		***4,400***		***5,500***		***53,250***

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.

g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.

h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.

i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing parks and recreation facilities thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment. Below is an excerpt from Existing Conditions Reports that were released for public review in January 2015, including the information from the interview, followed by several questions. Because the information included in the Existing Conditions Reports was gathered in the previous fiscal year, information regarding parks and recreational facilities may no longer reflect current existing conditions. Your input in confirming and/or updating the information below will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to **parks and recreation services**, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for parks and recreation services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's parks and recreation facilities. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Below are excerpts from the 2015 Existing Conditions Report for the Project. Please confirm the information, and any assistance that you can provide with the questions that follow would be greatly appreciated:

PARK AND RECREATION FACILITIES

Public park and recreation facilities are an important facet of Menlo Park's high quality of life and are generally considered to be in adequate or good states of repair. Menlo Park currently has 265.1 acres of park space, and community and recreation facilities, with these facilities spread out across the city. Table 8 shows the acreages for all City park, recreation, and community facilities, and Figure 12 shows their locations. A significant portion of Menlo Park's parkland is contained in Bedwell Bayfront Park, which also represents a potential opportunity for improvements to existing facilities. Going forward, planning for improvements to this and other park facilities will require carefully balancing competing needs. For example, Bedwell Bayfront Park could potentially benefit from increased tree cover and from new picnic facilities; however, such improvements could serve to attract birds of prey, which would impact the ecosystem of the park. Alternatively, improvements to the restrooms at Bedwell Bayfront Park could be carried out in an environmentally sensitive manner; however, although these upgrades have been considered by Capital Improvements Plans for the future, funding is not currently in place for the project.

Similarly, there are a number of improvements for parks and recreation facilities that are planned for in applicable Capital Improvements Plans, although funding has yet to be secured. For example, at Kelly Park, a new soccer field with new fixtures and turf has seen sustained high use, but a project to install a sound wall adjacent to the field has yet to receive funding. The Belle Haven Swimming Pool is another popular recreation facility where funding could allow for new upgrades. Originally designed for brief, seasonal use, the pool has become a year-round attraction, leading to a need for an improved heating system for the pool, new lighting, and expanded locker and shower facilities. Funding is currently in place to conduct an audit to determine the full extent of these needs; but the additional funding necessary to make improvements to the pool has not yet been secured. In addition, dog park facilities in Menlo Park are in need of improvement. Currently, the softball field at Nealon Park doubles as both a ball field and as a dog park during weekday mornings. Although this arrangement has worked for some time, a need to separate facilities is contemplated in the Capital Improvements Plan.

TABLE 8 PARK, RECREATION, AND COMMUNITY FACILITIES IN MENLO PARK

FACILITY NAME	ACREAGE
CITY PARK FACILITIES	
Bedwell Bayfront Park	155
Burgess Park	9.3
Fremont Park	0.4
Hamilton Park	1.2
Jack W. Lyle Park	4.6
Joseph P. Kelly Park	8.3
Market Place Park	1
Nealon Park	9
Seminary Oaks Park	3.5
Sharon Hills Park	12.5
Sharon Park	9.8
Stanford Hills Park	3.1
Tinker Park	0.5
Willow Oaks Park	2.6
Subtotal	**220.8**[a]
COUNTY PARK FACILITIES	
Flood Park	24.1
Total of All Park Facilities	**245**
CITY RECREATION/COMMUNITY FACILITIES	
Belle Haven Child Development Center	0.7
Belle Haven Community Library	0.6
Belle Haven Neighborhood Service Center and Substation	0.1
Menlo Park Civic Center	14.7 [b]
Onetta Harris Community Center	3.9
Total of Recreation/Community Facilities	20.1
Grand Total	**265.1**

a. Subtotal has appearance of being off by 0.1 acres due to rounding errors.
b. Acreage for this facility excludes Burgess Park acreage.

Source: City of Menlo Park Zoning Map data and PlaceWorks, 2014.

Additional underserved service needs in Menlo Park include child care and senior center services. With regard to Senior Centers, operating hours are currently limited to 9:00 a.m. to 3:00 p.m., but there are members of the senior population who could benefit from extended hours of operation. Additional staff and staff training could allow future service expansions, potentially including additional capacity to host and provide support for special-needs populations. Similarly, childcare programs for low-income households in Belle Haven are currently at capacity and experience long waiting lists for childcare at the more highly subsidized slots serving the lowest income categories. Additional funding for new classroom space and staff positions at the Belle Haven childcare center could allow for capacity increases that would help reduce or eliminate waitlists.

1. Is the information on the location and size of parks and open spaces available identified in the table above accurate? If not, please provide updated information on the size and/or location of parks.

2. According to Chapter 15.16.020 of the City's Municipal Code, there is a requirement of in-lieu fees and/or dedication of parkland to mitigation impacts to parks and recreation facilities – what are the current fees for residential and/or commercial development?

3. Are there any plans for new or expanded recreational facilities beyond what is identified in the existing conditions text above? If so, please provide specific details including expansion location, size, and new facilities.

4. Does the City currently meet its adopted goal of maintaining a ratio of five acres of developed parkland per 1,000 residents?

5. Please provide recommendations that could reduce the demand for park and recreational services created by the proposed project.

6. Are there any other issues related to maintaining the adequacy of parkland per the City's adopted goal? If so, please provide details.

7. Please provide any current documents on park and recreational services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to park and recreational services as a result of the proposed project.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

Menlo Park Community Services Department

Response to October 20 Memo re Parks and Recreational Services

1. Information on location and size of parks and open spaces in the attached table is accurate
2. Please contact the Planning Department for information on in-lieu fees to mitigate impacts to parks and recreation
3. There are no plans for “new” or expanded facilities beyond what is described in the existing conditions report
4. The City currently meets the adopted goal of five acres of parkland per 1000, however, if the 155 acre Bedwell Bayfront Park is removed from the list (the park is isolated in one corner of the community and difficult for most residents to access) the ratio is greatly impacted.
5. Staff feels the following facilities additions (along with commensurate programming and maintenance staff) would be required to serve the additional residents and employees projected in the project:
    a. Addition of open space amenities at Bedwell Bayfront Park (trails, interpretive programming, Rangers, all to be identified by community in upcoming Master Plan Update)
    b. Ped / Bike bridge to Bedwell Bayfront Park over Bayfront Expressway
    c. Additional Field Space (ie partnership with San Mateo County to upgrade fields at Flood Park)
    d. Accessibility improvements to Onetta Harris Campus ie ped/bike crossing at Dumbarton Rail line
    e. Updated pool facility similar to Burgess Campus Pool
    f. Additional partnerships and spaces for child care programs
    g. Additional partnerships and spaces for after school programs
    h. Funding for expansion of hours and services at the Senior Center
    i. If a new “neighborhood” is created, parkland needs to be acquired / included
6. Maintenance staff are stretched to capacity with current facilities. If additional facilities come on line, maintenance staffing and budgets would need to increase as well as programming and operational staff
7. Community Services Department 2025 Strategic Plans (drafts) are attached. Within the next 6 months, Menlo Park Community Services will have the results of our assessment by PRORAGIS, the National Parks and Recreation Association’s national benchmarking program and we will be able to provide more specific comparisons of where our facilities measure up to national standards.

SCHOOL SERVICES

October 20, 2015

Carolyn Chow, Chief Business Officer
Las Lomitas Elementary School District
1011 Altschul Avenue
Menlo Park, CA 94025

Re: School Services

Dear Carolyn Chow:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

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are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

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Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
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Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
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Employees	***30,900***		***12,450***		***4,400***		***5,500***		***53,250***

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.

g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.

h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]

Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.

i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing school facilities thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment. Below are several questions to be addressed. Your input will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to school services, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for school services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's school facilities. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Any assistance that you can provide with the following questions would be greatly appreciated:

1. What is the capacity of the schools that would serve Menlo Park, and what is the current enrollment? Does the School District currently exceed its student capacity? If so, by how much?

2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?

3. What are the student generation rates the District uses to determine enrollment projections?

4. Does the District assess development fees for new commercial and residential development? If so, what are the fees?

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?

6. Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meeting those standards?

7. Are there any other issues related to maintaining the adequacy and quality of school facilities? If so, please provide details.

8. Would the District need to construct new or expand existing facilities to accommodate the Project?

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

Connect Menlo Project

<u>Response to PlaceWorks Questions:</u>

1. The Las Lomitas Elementary School District operates two schools: Las Lomitas Elementary School and La Entrada Middle school. There are 581 students enrolled at Las Lomitas and 803 at La Entrada, for a total district enrollment of 1,384. The District has experienced a growth in enrollment and both schools are overcapacity. There are currently 25 portable classroom buildings between the two sites to house students and operate instructional programs.

2. The District bases its enrollment data on demographic studies conducted by Tom Williams of Enrollment Projection Consultants. The most recent data projects the following student enrollment:
   2016-17: 1,406
   2017-18: 1,419
   2018-19: 1,425
   2020-21: 1,413
   2023-24: 1,478

   Enrollment data is closely monitored because at this level of facility overcapacity, in addition to hiring new staff, portable classrooms need to be installed as new students are enrolled. Projections beyond 2018-19 are challenging since kindergarten students for these out years are not yet born.

   Single Family Dwellings account for 78% of the total enrollment. Enrollment from this housing type grew 14% between 2008 and 2011. Enrollment of students living in attached units (condos, apartments, townhouses, etc.) increased 26% between 2008 and 2011 and accounts for 15% of total enrollment.

   Our demographic study projects the district to reach a maximum student enrollment of nearly 1,500 in 2023. Additional facilities to house these students, and any number beyond 1,500, will require the community to support another bond measure.

3. Projections are based upon middle sized single family dwellings generating 0.4 students per home (see attached Enrollment Projection Report, March 2014).

4. The District assesses a one-time Developer Fee for new residential and commercial development on a revenue sharing model with the Sequoia Union High School District. The fee is $3.36/sq. ft. for residential and $0.54/sq. ft. for commercial. Of this amount, the District receives 60% ($2.016 for residential and $0.32 for commercial) and the high school district receives 40%.

5. The District passed a $60 million facilities bond (Measure S) in Nov. 2013 for the purpose of building additional permanent classrooms for students and removing the portable classrooms added in recent years. This $60 will allow the District to add only the number of new classrooms necessary to replace the existing portable classrooms.

The District has been working with CAW Architects and is currently in the programming and conceptual design phase for the La Entrada Middle School. We plan on entering into design development and construction documents in January 2016, followed by a five month DSA review period beginning in fall 2016, and breaking ground for construction in January 2017. Las Lomitas Elementary School will follow a similar schedule and they are approximately six months behind the La Entrada timeline.

6. The student to teacher ratio in grades kindergarten through 3rd cannot exceed 24:1. The ratio for grades 4 and 5 is a maximum of 25:1, and it is 28:1 for grades 6-8. The District is currently meeting these staffing ratios. The Las Lomitas Education Foundation raises approximately 11% of the District's annual revenue based on class sizes being within these ranges.

7. Available space and new funding sources are the biggest challenges to maintaining the adequacy of quality school facilities. The community has been supportive of building new facilities to get students out of portable classrooms with the 2013 passage of Measure S. We hope the community will again support another bond measure in the near future to modernize existing classrooms and complete the balance of the $120 million in projects identified in the Facilities Master Plan. Beyond these two bonds, it becomes highly questionable if the residents of the community can willingly and feasibly support additional facilities bonds.

8. A project of this size and scope is likely to have a considerable impact on the Las Lomitas School District. The District is a very desirable school district for families who value education and want to send their children to public schools. The type of employees likely to be working at the new "innovation and emerging technologies" development would be highly educated and have the level of income to live in Menlo Park and surrounding neighborhoods. These families tend to seek out high performing school districts and make housing decisions based upon the school district to which they wish to send their children.

   Both school sites are currently overcapacity. Expanding a K-3 elementary school that has an enrollment of nearly 600 students is not an educationally responsible decision. The same holds true for growing a middle school beyond 900 students. The District would need to construct new school facilities to accommodate the Project.

   Findings from the attached Development Impact Fee Justification back in 2008 establish that the District has no excess capacity; "it will need additional school facilities to accommodate students generated from new development projects."

9. See attached:
   Development Impact Fee Justification, 2008
   Review and Update of the Development Impact Fee Justification, 2012
   Enrollment Projection Report, March 2014
   CAW Facilities Master Plan, June 2015

October 20, 2015

Maurice Ghysels, Superintendent
Menlo Park City School District
181 Encinal Avenue
Atherton, CA 94027

Re: School Services

Dear Maurice Ghysels:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

General Plan Update

The proposed Land Use and Circulation Elements are intended to guide development and conservation in the city through the 2040 buildout horizon of this General Plan. These two elements are central components of the General Plan because they describe which land uses should be allowed in the city, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the city and its residents. The Land Use Element frames the type and scale of potential development that may occur over the next 24 years, particularly in the Bayfront Area. The Circulation Element addresses transportation issues throughout the city. Both updated Elements have been written to be consistent with the other General Plan Elements and the 2012 El Camino Real/Downtown Specific Plan.

Bayfront Area Zoning Ordinance Update

The Project includes an update to the City's Zoning Ordinance for the Bayfront Area formerly referred to as the "M-2 General Industrial Zoning District", including both development regulations and design standards, to ensure consistency with the General Plan Update and previously adopted ordinances and policies. The proposed Zoning Ordinance Update would create the following five new districts, which would apply to lands within the Bayfront Area: Light Industrial (I-L), Business Park (C-BP), Office/Tech/Research and Development (O), Life Sciences (LS), and Mixed Use Residential (R-MU). These districts are intended to foster innovation and emerging technologies; promote the creation of an employment district with travel patterns that

are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]
BAYFRONT AREA									
Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
Population[h]	32,900		1,300		2,190		n/a		35,390
Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
Non-residential Square Feet	***14.6 million***		***1.5 million***		***1.8 million***		***2.3 million***		***20.6 million***
Hotel Rooms[g]	***570***		***520***		***0***		***400***		***1,490***
Residential Units	***13,100***		***1,280***		***1,000***		***4,500***		***19,880***
Population[h]	***32,900***		***3,300***		***2,580***		***11,570***		***50,350***
Employees	***30,900***		***12,450***		***4,400***		***5,500***		***53,250***

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

PLACEWORKS

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

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f. The Maximum Citywide Buildout represents the total of the 5 previous columns.
g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.
h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.
i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing school facilities thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment. Below are several questions to be addressed. Your input will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to **school services**, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for school services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's school facilities. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Any assistance that you can provide with the following questions would be greatly appreciated:

1. What is the capacity of the schools that would serve Menlo Park, and what is the current enrollment? Does the School District currently exceed its student capacity? If so, by how much?

2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?

3. What are the student generation rates the District uses to determine enrollment projections?

4. Does the District assess development fees for new commercial and residential development? If so, what are the fees?

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?

6. Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meeting those standards?

7. Are there any other issues related to maintaining the adequacy and quality of school facilities? If so, please provide details.

8. Would the District need to construct new or expand existing facilities to accommodate the Project?

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

1. What is the capacity of the schools that would serve Menlo Park, and what is the current enrollment? Does the School District currently exceed its student capacity? If so, by how much?

   The District is currently beyond its target at Oak Knoll, Encinal, and Laurel Elementary Schools. The District is building a new elementary school that will expand its capacity.

   The reconfiguration will occur in 2016-17 with the opening of Laurel School Upper Campus.

   2016-17 Configuration

   Encinal School (K-5) Target Capacity: 720

   Oak Knoll School (K-5) Target Capacity: 720

   Laurel School Lower Campus (K-2) Target Capacity: 360

   Laurel School Upper Campus (3-5): 360

   Hillview School (6-8) Target Capacity: 1100

2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?

   See attached Enrollment Projections Study that was recently completed.

3. What are the student generation rates the District uses to determine enrollment projections?

   Reference EPC Report dated 2015. SGR of 0.44 for new single family housing and 0.18 for attached housing.

4. Does the District assess development fees for new commercial and residential development? If so, what are the fees?

   Yes, the District collects developer fees to the statutory limit of $3.36 per square foot for residential and up to $.54 per square foot for commercial/industrial. This collection is shared with Sequoia Union High School District. At the 60% rate, the District's portion would be $2.016 per square foot for residential.

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?

Yes, see response to question 1. Reference web site at

http://district.mpcsd.org/modules/cms/pages.phtml?pageid=304267&

6. Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meeting those standards?

District Policy is to keep K-3 at 1:20 and 4-8 at 1:24 with a flexibility of +/- 3 students. Yes, The District does maintain the class targets in the Board policy.

7. Are there any other issues related to maintaining the adequacy and quality of school facilities? If so, please provide details.

District facilities are in good condition with recent expansions and modernization work. District's has long-term maintenance program and funding allocation.

8. Would the District need to construct new or expand existing facilities to accommodate the Project?

The District target capacity with the expanded school is 3,300 students with average classes of 360 students per grade level. Beyond this limit the District will need to expand existing schools or build new schools. Because the availability of land is limited at the schools, especially its single middle, school expansion is not possible. The elementary schools are built out completely and further expansion would aggravate local traffic.

It is important to note that the expansion of residential housing in the "Bayfront" area is not in the District's boundary. See attached school locater link that defines the District's boundary area.

http://locator.decisioninsite.com/?studyID=113757

New housing in the District boundary which the District has not accounted for in its enrollment study that produces students beyond the 3300 capacity will have a facility impact to the District. The current per pupil cost is $14,100. Additional students, will have an impact to the District' finances as it the District is a community funded school and does not receive additional funding per student. Reference attached web site regarding District finances.

http://finance.district.mpcsd.org/modules/groups/integrated_home.phtml?gid=1573172&

Please note that while the Bayfront area is not in the Menlo Park City School District, however the increased employment from the area will have a direct impact to the MPCSD. MPCSD is a high performing school District, which is very attractive to parents. Many of the new employees with have families (current and future) may find the District attractive and locate in the MPCSD boundary. We have seen that with the current Facebook expansion and job market that housing demands remain high. MPCSD has seen a 38% student growth in the last 10 years. I have attached our most updated projection that does not include the proposed project.

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

October 20, 2015

Kevin Sved, Planning and Development Consultant
Ravenswood City School District
2120 Euclid Avenue
East Palo Alto, CA 94303

Re: School Services

Dear Kevin Sved:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

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Any assistance that you can provide with the following questions would be greatly appreciated:

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2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?

3. What are the student generation rates the District uses to determine enrollment projections?

4. Does the District assess development fees for new commercial and residential development? If so, what are the fees?

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?

6. Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meeting those standards?

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8. Would the District need to construct new or expand existing facilities to accommodate the Project?

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

Responses from Ravenswood City School District to Placeworks
Regarding Menlo Park General Plan Update

1. What is the capacity of the schools that would serve Menlo Park, and what is the current enrollment? Does the School District currently exceed its student capacity? If so, by how much?

Currently, all of the District's schools serve students residing in both the City of Menlo Park and the City of East Palo Alto as the District has provided parent choice regarding school of attendance for many years. Table 1.0 shows the current and planned future capacities of schools within the Ravenswood City School District. Beginning in 2015-16, the District began to implement neighborhood attendance area boundaries so over time it is planned that Belle Haven Elementary and Willow Oaks Elementary will both be PreK-5 schools that serve predominantly students residing in the City of Menlo Park based on the neighborhood boundaries. This process will take many years as the District is allowing students to matriculate from their current school. In other words, implementation does not require students who currently attend a district school that is outside of the attendance area to transfer to the school within their attendance area. Furthermore, the District makes allowances for siblings to attend schools outside of the their attendance area as well. Even with the preK-5 planned shift to neighborhood schools, there will be two significant enrollment practices that will continue to mix students residing in the two cities within the District's boundaries. The first is the Los Robles Dual Language Immersion Academy which will continue to be a school of choice for all district families. The second is the planned Comprehensive Middle School to be located at the current Cesar Chavez campus which is planned to house all middle school students residing in the district boundaries.

Taking into consideration the factors discussed above, it is important to evaluate District's capacity on a district-wide basis. Currently, the District utilizes temporary portable classrooms to help meet the enrollment demands. In evaluating the district's capacity district-wide without the portable classrooms, which are nearing the end of their useful life, the total district capacity is approximately 2,850. Currently, the District has enrollment of 3,291. The District addresses this current limited capacity in the permanent classroom buildings in its Facilities Master Plan which includes new classroom construction to house students currently located in temporary portable classrooms. Additionally, the proposed new construction that is outlined in the District's Facilities Master Plan includes classroom space for preschool and transitional kindergarten.

2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?

As described in the response to question number one above, students residing in Menlo Park will continue to attend schools located in East Palo Alto. In looking at the District's capacity across the district, enrollment will exceed capacity when the temporary current portables being utilized are beyond their useful life unless the District is able to construct new classrooms to meet this enrollment need.

3. What are the student generation rates the District uses to determine enrollment projections?

The District contracted with Davis Demographics and Planning to prepare a Student Population Projections Report. A link to the document can be found here: https://www.dropbox.com/s/taa4xa3dnkujp7x/Fall2013FinalReport%20copy.pdf?dl=0
The Student Yield Factor is described on page 8. The study uses "a 0.39 K-8 yield factor for single-family units and a 0.56 K-8 yield factor for multi-family units."

4. Does the District assess development fees for new commercial and residential development? If so, what are the fees?

Sequoia Union High School District administers assessment, collection, and distribution of development fees for Ravenswood and several other elementary school districts within the overlapping boundaries of the high school district. Fees are $3.36 per square foot for residential development and $0.54 per square foot for commercial development.

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?

Ravenswood school district facilities are in severe disrepair and temporary portable classrooms are utilized extensively in the District to help meet the demand for classroom space. To address these needs, the district conducted an extensive facilities assessment resulting in a comprehensive Facilities Master Plan. A link to this document can be found here:
https://www.dropbox.com/s/unbq0k0pmptnjst/RCSD%20Final%20Master%20Plan%20Report%202-5-15%20copy.pdf?dl=0

The projected cost of critical and educational program needs for school facilities alone exceeds $250 million. The District is currently in the process of determining priorities and creating a funding plan to begin the implementation of the Facilities Master Plan. At this time, there is no set timeline for the construction of new or expanded facilities.

6. Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meeting those standards?

The current standard for grades K-3 is 24 to 1 and for grades 4-8 is 31 to 1. Currently the District is meeting both of these standards.

7. Are there any other issues related to maintaining the adequacy and quality of school facilities? If so, please provide details.

As described above, Ravenswood school district facilities are in severe disrepair. Currently, all of the district's permanent buildings have roofs that are beyond their useful life and require annual patching to make it through the rainy season. There is an urgent need for approximately $7 million of roofing work. Additionally, there are extensive needs to replace heating systems and to improve ADA access at all schools district-wide. To address these needs, the district conducted an extensive facilities assessment resulting in a comprehensive Facilities Master Plan. The projected cost of critical and educational program needs for school facilities alone exceeds $250 million. The District is currently in the process of determining priorities and creating a funding plan to begin the implementation of the Facilities Master Plan.

8. Would the District need to construct new or expand existing facilities to accommodate the Project?

The student population projection study referenced above did not take into account the scale of growth described in the 2040 Buildout cited in the ConnectMenlo proposed General Plan updates. With the addition of the proposed 14,150 new residents and 9,900 new employees, we would anticipate a significant need for new and expanded school facilities.

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

The two relevant documents are:
Student Population Projections Report:
https://www.dropbox.com/s/taa4xa3dnkujp7x/Fall2013FinalReport%20copy.pdf?dl=0

Facilities Master Plan:
https://www.dropbox.com/s/unbq0k0pmptnjst/RCSD%20Final%20Master%20Plan%20Report%202-5-15%20copy.pdf?dl=0

October 20, 2015

Wael Saleh, Chief Business Official
Redwood City School District
750 Bradford Street
Redwood City, CA 94063

Re: School Services

Dear Wael Saleh:

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Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
Population[h]	32,900		1,300		2,190		n/a		35,390
Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
Non-residential Square Feet	***14.6 million***		***1.5 million***		***1.8 million***		***2.3 million***		***20.6 million***
Hotel Rooms[g]	***570***		***520***		***0***		***400***		***1,490***
Residential Units	***13,100***		***1,280***		***1,000***		***4,500***		***19,880***
Population[h]	***32,900***		***3,300***		***2,580***		***11,570***		***50,350***
Employees	***30,900***		***12,450***		***4,400***		***5,500***		***53,250***

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.

g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]

h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.

i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing school facilities thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment. Below are several questions to be addressed. Your input will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to **school services**, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for school services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's school facilities. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Any assistance that you can provide with the following questions would be greatly appreciated:

1. What is the capacity of the schools that would serve Menlo Park, and what is the current enrollment? Does the School District currently exceed its student capacity? If so, by how much?

2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?

3. What are the student generation rates the District uses to determine enrollment projections?

4. Does the District assess development fees for new commercial and residential development? If so, what are the fees?

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?

6. Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meeting those standards?

7. Are there any other issues related to maintaining the adequacy and quality of school facilities? If so, please provide details.

8. Would the District need to construct new or expand existing facilities to accommodate the Project?

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

1.What is the capacity of the schools that would serve Menlo Park,
947
and what is the current enrollment?
490
Does the School District currently exceed its student capacity? **No** If so, by how much?

2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools? **No**

3. What are the student generation rates the District uses to determine enrollment projections?
See Residential Research Summary Report

4. Does the District assess development fees for new commercial and residential development? **Yes** If so, what are the fees?
$1.92/SF for residential and $0.306/SF for commercial.

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence? **No**

6. Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meeting those standards? **30:1**

7. Are there any other issues related to maintaining the adequacy and quality of school facilities? **No** If so, please provide details.

8. Would the District need to construct new or expand existing facilities to accommodate the Project?**No**

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

http://www.rcsd.k12.ca.us/Page/6104

October 20, 2015

James Lianides, Superintendent
Sequoia Union High School District
460 James Avenue
Redwood City, CA 94062

Re: School Services

Dear James Lianides:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

General Plan Update

The proposed Land Use and Circulation Elements are intended to guide development and conservation in the city through the 2040 buildout horizon of this General Plan. These two elements are central components of the General Plan because they describe which land uses should be allowed in the city, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the city and its residents. The Land Use Element frames the type and scale of potential development that may occur over the next 24 years, particularly in the Bayfront Area. The Circulation Element addresses transportation issues throughout the city. Both updated Elements have been written to be consistent with the other General Plan Elements and the 2012 El Camino Real/Downtown Specific Plan.

Bayfront Area Zoning Ordinance Update

The Project includes an update to the City's Zoning Ordinance for the Bayfront Area formerly referred to as the "M-2 General Industrial Zoning District", including both development regulations and design standards, to ensure consistency with the General Plan Update and previously adopted ordinances and policies. The proposed Zoning Ordinance Update would create the following five new districts, which would apply to lands within the Bayfront Area: Light Industrial (I-L), Business Park (C-BP), Office/Tech/Research and Development (O), Life Sciences (LS), and Mixed Use Residential (R-MU). These districts are intended to foster innovation and emerging technologies; promote the creation of an employment district with travel patterns that

are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]
BAYFRONT AREA									
Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
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Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
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CITYWIDE TOTALS									
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Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.
b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.
d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.
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TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.
g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.
h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.
i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

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2. What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?

3. What are the student generation rates the District uses to determine enrollment projections?

4. Does the District assess development fees for new commercial and residential development? If so, what are the fees?

5. Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?

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7. Are there any other issues related to maintaining the adequacy and quality of school facilities? If so, please provide details.

8. Would the District need to construct new or expand existing facilities to accommodate the Project?

9. Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

Sequoia Union High School District

480 JAMES AVENUE, REDWOOD CITY, CALIFORNIA 94062-1098

CONSTRUCTION DEPARTMENT
TEL. (650) 306-1788
FAX (650) 306-1791

December 4, 2015

Placeworks – Menlo Park General Plan Update

1. **What is the capacity of the schools that would serve Menlo Park, and what is the current enrollment? Does the School District currently exceed its student capacity? If so, by how much?**
   One existing school serves Menlo Park (Menlo-Atherton High School).
   That school is building to expand its capacity. The school has approximately 2278 students and a capacity of 2250. Enrollment is growing approximately 50-75 students a year at the high school, which serves Atherton, East Palo Alto, and Menlo Park.

2. **What are the student enrollment projections for the schools that would serve Menlo Park? Does the School District anticipate that enrollment will exceed capacity at any of the schools?**
   a) The projections are based on recent enrollment studies completed by the School District.
   b) Enrollment will exceed capacity at Menlo-Atherton at points during the next five years. Ongoing construction, related to the District's Measure A bond program, is working to keep up with the enrollment growth by developing additional classrooms and facilities as the student population increases.

3. **What are the student generation rates the District uses to determine enrollment projections?**
   The District uses the State of California generation rate of 0.2 students per housing unit.

4. **Does the District assess development fees for the new commercial and residential development? If so, what are the fees?**
   The District assesses impact fees on commercial and residential development and collects on behalf of the eight elementary school districts within the Sequoia Union High School District (please see the attached document entitled "Developer Fee Schedule" for additional information on fees charged for this year).

5. **Are there any plans for new or expanded school facilities? If so, where, to what extent, and when are the expanded or new facilities expected to be commence?**
   Menlo-Atherton is in the midst of a campus-wide expansion.
   a) A 21 classroom building unit has broken ground (for a net addition of 10 classrooms).
   b) A 6 classroom lab building is in design (and could begin construction in winter of 2017).
   c) An expanded guidance office and other renovation work related to enrollment growth is also planned.
   d) The District is building a small high school (for approximately 400 students) in Menlo Park at 150 Jefferson Drive to accommodate enrollment growth.

6. **Is there a teacher to student ratio or some other performance standard established that the District must maintain? If so, what are those standards and is the District currently meting those standards?**
Contractually the District staffs at a 27.5 to 1 ratio for teachers. The District exceeds that staffing ratio currently (this is different from average class size).

7. **Are there any other issues related to maintaining the adequacy and quality of school facilities? If so, please provide details.**
There is six to ten million dollars of deferred maintenance items on the Menlo-Atherton campus presently, which is only partially funded.

8. **Would the District need to construct new or expand existing facilities to accommodate the Project?**
In the next twenty years, many of the campus classroom wings will come to the end of their useful life and will need to be replaced.
With a planned increase of 5430 residential units, the project will have a significant impact on Menlo-Atherton, which is the District's largest and most impacted high school in terms of enrollment.
This project could drive the high school beyond its projected enrollment of 2600 and cause over-crowding. None of the District's projections include these housing units (and the potential for high school aged children living in them). The District facility master plan for Menlo-Atherton High School does not allocate any construction dollars to the school to build for an enrollment beyond 2600. (In fact, six portable rooms are slated to remain on the campus in front of the aquatic facility to create capacity for the last part of the planned enrollment growth.)
In sum, this project will result in direct costs to build new facilities (classrooms, offices, athletic space, etc.) to the District.

9. **Please provide any current documents on school services in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to school facilities as a result of the proposed project.**
Enrollment reports are attached, as is the most current Menlo-Atherton facility master plan.

Sequoia Union High School District

Maintenance and Operations Department

Developer Fee Schedule

Atherton, Belmont, County of San Mateo, East Palo Alto, Menlo Park, Portola Valley, Redwood City, San Ca rlos and Woodside.

On August 10, 2014 the new rate for the district will come into effect.

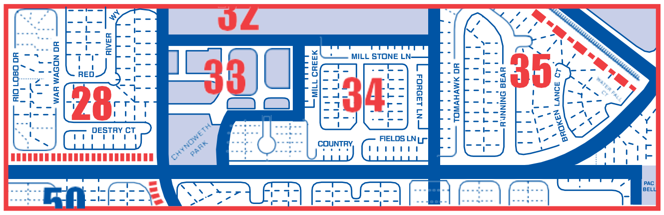
Elementary School District & Project Type	**Approved** Fee	**E.S.D.**	**S.U.H.S.D.**	**Approved** Fee	**E.S.D.**	**S.U;H.S.D.**
Effective Date.. >	08/26/12	08/26/12	08/26/12	08/10/14	08/10/14	08/10/14
*1vli11i-Starage Rates - Applies to **ALL** Districts'*				$0.07	0.042	0.028
Belmont - Redwood Shores *(Resolution #26) effective08/1Y 4*						
Residential	$3.20	1.920	1.280	$3.36	2.016	1.344
Commercial	$0.51	0.306	0.204	$0.54	0.324	0.216
Las Lomitas *(Resolution #1314-16:03-14)effective 05/15/14*						
Residential.......................................	$3.36	2.076		$3.36	2.016	1.344
Commercial.......................................	$0.54	0.384	0.156	$0.54	0.324	0.216
Menlo Park						
Residential	$3.20	1.920	1.280	$3.36	1.920	1.440
Commercial	$0.51	0.306	0.204	$0.54	0.306	0.234
Portola Valley						
Residential.......................................	$3.20	1.782	1.418	$3.36	1.780	1.580
Commercial	$0.51	0.282	0.228	$0.54	0.282	0.258
Ravenswood						
Residential	$3.20	1.782	1.418	$3.36	1.780	1.580
Commercial	$0.51	0.282	0.228	$0.54	0.282	0.258
Redwood City -						
Residential	$3.20	1.920	1.280	$3.36	1920	1.440
Commercial	$0.51	0.306	0.204	$0.54	0.306	0.234
San Carlos						
Residential	$3.20	1.920	1.280	$3.36	1.920	1.440
Commercial	$0.51	0.306	0.204	$0.54	0.306	0.234
Woodside						
Residential	$3.20	1.920	1.280	$3.36	1.920	1.440
Commercial.......................................	$0.51	0.306	0.204	$0.54	0.306	0.234

Developer Fee Schedule
updated 10/15/14-ar

Area 32
Older Mobile Home Park
450 units, 90 K-8 students, 0.20 SGR

Area 28
Recent Upper-Income Det. Homes
218 units, 85 K-8 students, 0.39 SGR

Area 33
Recent Upscale Townhouses
82 units, 9 K-8 students, 0.11 SGR



Area 34
Recent Middle-Income Det. Homes
94 units, 33 K-8 students, 0.35 SGR

Area 35
Older Middle-income Det. Homes
89 units, 57 K-8 students, 0.64 SGR

Elementary and Middle School Attendance Boundaries

Superintendent and Board Members
Sequoia Union High School District
480 James Avenue
Redwood City, CA 94062-1098

December 30, 2014

- DRAFT FOR DISTRICT STAFF REVIEW ONLY -

Dear Superintendent and Board Members:

This is the concluding documentation to the forecast update. As in our last report, the sections below provide a summary of the findings and some background information. Subsequent sections follow the order of the tables, starting with the projected enrollments in Tables 1A and 1B and then the underlying factors to those numbers in Tables 2 to 4. The appendices provide additional details for those who want to delve further into the data.

Projections Summary

Total enrollment in the five Sequoia Union High School District (SUHSD) schools is forecast to rise by nearly 1,000 students in the next six years. The annual gains should be relatively modest at first, with projected growth by 101 to October 2015 and another 131 (232 total) to October 2016. The rate of increase then accelerates after 2016, with 741 more students added to 2020, for an average annual increase by 185 students in that four-year period. The result is a projected 2020 enrollment of just under 9,600, compared to the current total of 8,601.[1]

Our previous forecast had 482 more students in 2020, but there are now several reasons to expect less growth. One key factor is a shift to an enrollment decline in the Redwood City School District (Redwood CSD) region. Also contributing is an easing this year of what had been some unusually high “advancement” rates into and through the high school grades in the Carlmont part of the SUHSD. A third factor is that we no longer are including NPS and Community Day students in the projections.

The projected increase is again concentrated in the (pending) Carlmont region, but all four regular high schools should have some resident (home school) student growth occur in their attendance areas. Stating what those numbers will be has become more difficult because the pending attendance regions include “option” areas; for the sake of clarity in this summary, we are including those as part of the resident totals with the main schools for *the 2015-16 attendance areas (i.e., as if they existed today)*. The projected Carlmont population adds 40 in 2015 and a cumulative 533 to 2020, to a total of almost 2,400 students. Our previous forecast for this region was much higher because that had a section of East Palo Alto that we are now including in the Menlo-Atherton data instead. Nonetheless, if option area and Tinsley gains are allowed to continue to the same degree as currently exists in ninth grade, then the Carlmont enrollment could be in the upper 2,500s in 2020. Unique to this attendance area is an expectation of modest further growth in subsequent years. The next largest projected increase occurs in the Menlo-Atherton (M-A) attendance area, with 95 resident students added in 2015 and a cumulative rise by 240 to 2020. The result would be a resident total of essentially 2,800 students, but continued transfers to other schools and Redwood High should result in much lower enrollment numbers, including with less enrollment growth for

[1] “Current” refers to the enrollment as of October 1, 2014, in a modified student file provided to EPC by the SUHSD. Please note that whenever just a year is stated in the text, such as 2020, the reference is for October of that year.

next year. The pending Sequoia and Woodside regions have only modest resident differences projected over the next 72 months, with nominal declines by 14 and 18, respectively, in 2015 and net gains of around 100 each to 2020. Both of these areas could have consequential resident student reductions after 2020, but any figures for more than six years hence should be considered as simply general estimates rather then specific amounts.

Background Information

This section is repeated from our last report for the consideration of first-time readers. Our methodology is based on the use of numerous “planning areas”. In our original study for most client districts, we will drive every street to learn the community and divide it into suitable areas for trend analysis purposes. Each of those areas usually represents a single dominant housing type (wherever feasible) by subjective price ranges and average home and parcel sizes. We have found that even subtle differences in residential type and value can generate divergent enrollment trends in some districts.

This process was applied to varying degrees in the SUHSD region. Our first study for the SUHSD occurred in the 2011-12 school year. As with this study, the goal was neither short-term staffing decisions nor determining the enrollment impacts of potential new housing. Those goals require more refined projections with corresponding cost, especially in terms of the fieldwork required to establish numerous housing-category-specific planning areas. The SUHSD instead requested a lower cost, more generalized trend study suitable for evaluating the high school attendance areas and basic facility capacity needs. We already, however, had provided more in-depth studies for the Menlo Park City (MPCSD), Los Lomitas (LLSD) and Belmont – Redwood Shores (BRSSD) school districts with more refined planning areas and those were used for these SUHSD studies. We also provided some housing situation refinements in 2011-12 in the Redwood City (Redwood CSD) region because that was needed for sufficiently accurate projections in a crucial section of the SUHSD. The impacts of new housing developments such as that proposed next to Seaport Blvd. in Redwood City are excluded.

Projected SUHSD Students in Current Attendance Areas

This forecast is again based on analyses of where the students live (the resident population[2]) rather than the schools they happen to attend (the attending enrollment). Such analyses are important due to both across-attendance-boundary enrollments, including to Redwood continuation high, and incoming students from outside the SUHSD region. These intra- and inter-district contributions have blurred the ability to see many of the population shifts that are occurring in different sections of the community. By coding all of the student addresses from the current and several preceding school years to planning areas that represent various housing types and locations, we have been able to identify and evaluate how the student population is evolving in each situation. We flip back-and-forth between these "resident" and "enrollment" amounts in the text below and it is important to remember the distinction between these two types.

Complicating these “resident” identifications are the “option” areas for the boundaries that will be effective in the 2015-16 school year. New students in each location that was transferred to a different high school will have the option to choose to attend the previous school of assignment, if the District determines there is sufficient capacity available at that former school. Incoming ninth graders who graduated from a middle school via the “Tinsley” program also will have the option, if capacity permits, to attend the high school relevant to that middle school’s location. These “option” area and Tinsley-related choices for new students will have higher priority than other requests for intra-district attendance (i.e., across SUHSD attendance boundaries).

It is difficult to identify the long-term enrollment impacts of these attendance area shifts. The SUHSD already has extensive intra-district attendance for the current attendance areas and with all ongoing students “grandfathered” (continuing to be assigned) to their currently enrolled schools next year, most of that former intra-district flow will

[2] “Resident” throughout this report means physical resident, not legal resident.

still exist in 11-12. But the way that the District has allowed the current ninth grade intra-district attendance to occur in the pending option areas provides a good indication of how the enrollment at each school might evolve.

To deal with these changes, we are presenting the projected resident student numbers by two methods. The first, which is shown in Table 1A on page 4, ignores the option areas and Tinsley allowances in the resident totals. All net intra- and incoming inter-district amounts, regardless of reason or grade, are compiled into one attending adjustment number (which is explained below) for each regular high school. The second method extrapolates the current percentage choices in ninth grade from the option areas into the total projected resident 9-12 student populations. This more complex, but potentially more accurate, calculation underlies the numbers in Table 1B on page 5. The following subsection describes how to read the figures in these two tables.

Understanding the Data in Tables 1A and 1B

Tables 1A and 1B contain two data sets for each school. The figures on the left, under "Actual October 1, 2014", show the difference between the current enrollment and the relevant resident student population for each school *under the main 2015-16 school assignments*. Carlmont in Table 1A, for instance, had 2,185 enrolled students on October 1, 2014, which is 336 more than the SUHSD-enrolled resident total (for the pending main Carlmont area) of 1,849.[3] This difference is identified by the "336" in the top row of the column titled "Attend Adjust" (short for net attending adjustments between resident and enrollment amounts). In Table 1B, however, this adjustment amount is valid only for the exclusive area to each school, such as the "-84" for Carlmont from the "Carlmont Only Part".

The second set of data, on the right side of the tables, covers the projected resident amounts in specific years. These are not projected enrollments. They do indicate, however, the extent to which the current attending adjustments (for the pending boundaries) can continue. The resident total in Table 1A in the pending Carlmont region, for example, rises from 1,849 this year to 2,382 in 2020, which is a 533-student increase. That much higher total may alter the extent to which intra- and inter-district enrollment, currently a net +336, can continue. It should be noted that some of the latter figure is students from the East Palo Alto area that is in the Carlmont region this year, but will be assigned to M-A with a possible Carlmont option in 2015. Table 1B extrapolates the current option area percentages for ninth graders into resident ratios for each school in all grades. Again using Carlmont as an example, the projected resident total in 2020, if those percentages continue, is 2,573. This includes some students who will attend Redwood High instead. It also is prior to allowing any other non-option-area-related and non-Tinsley-related intra- and inter-district attendance.

For Carlmont alone, due to the amount of growth being projected, we also show in Table 1B what the totals would be, such as 2,356 in 2020, if just all of the Carlmont Only area students and 83% of the students in Carlmont with Sequoia Option area attend Carlmont. That 2,356 total could be reduced by 84 students in Carlmont attendance if no other incoming adjustments are allowed. The resident figures for the other schools, however, would be higher if this restriction (no secondary option area or Tinsley attendance) is implemented for Carlmont by 2020.

Key Findings Related to the Data in Table 1A: Current Resident-to-Attending Differences at Carlmont and M-A

As might be expected with these pending boundary changes and the current ninth graders who are enrolled as if those boundaries already exist, there are some significant net adjustment amounts. In particular, the pending Carlmont area has a current net gain of 336 and Menlo-Atherton has a net reduction by 395. The majority of those amounts are related to the pending "M-A with Carlmont Option" area that is now assigned to Carlmont, but from which this year's ninth graders were allowed to choose M-A instead. Once that school becomes the main assignment for all students from the Ravenswood CSD region, more of those students are likely to attend Menlo-Atherton. This should significantly reduce the net adjustment amounts for Carlmont and M-A accordingly.

[3] All current and forecast figures exclude high school NPS (non public school) and charter school students included in some State reports as part of the SUHSD enrollment. These have been removed at the request of the SUHSD. A small number of Independent Study students are included in these regular school enrollment and resident counts.

Key Findings Related to the Data in Table 1A: Projected Changes Overall and in the Main Attendance Areas

The total SUHSD enrollment (in grades 9-12, excluding NPS and charter school students) is projected to rise by 973 in six years, as is shown in the bottom right corner of Table 1A. The result is a forecast of 9,574 students in 2020. That compares to a current total of 8,601.

While there should be some growth in every year during that period, a faster rate of increase is forecast after 2016. The expected gain for next year is a relatively modest 101 additional students. Another 131 (232 total) are projected in 2016. The average during the following four years is by a more significant 185 additional students annually. This is due to some large student body classes now in the elementary districts that will be graduating into the SUHSD between 2016 and 2020.

Our previous forecast had an even higher total for 2020. There are several reasons for this 482-student difference, including (1) a moderately lower than expected SUHSD enrollment this year (i.e., less growth), (2) a declining enrollment in the Redwood City School District, which is the largest "feeder" district to the SUHSD, and (3) removal of NPS and Community Day students from the projections. Those 80+ students were included in the last forecast. We discuss each of these and the other key trend factors later in this report.

Despite this lower amount of projected growth, many of the resident change findings by the pending "main" attendance areas (with potential options ignored in the resident numbers) are in the same largest-to-smallest order as in our last study. For example, the M-A attendance area, despite significant changes to that region and the total number of resident students, still has the largest projected increase to 2016. Resident growth by 131 is forecast there in the next two years. The pending Carlmont region has the second highest gain with a rise by 103 students over the current count. The revised Sequoia and Woodside regions, by contrast, still have the smallest expected changes, with resident totals that stay within 40 of their present amounts for 2015 and 2016.

Table 1A: Actual SUHSD-Enrolled Resident and Attending Amounts in October 2014
and Projected Resident SUHSD-Enrolled Students (grades 9-12) for Totals in the Pending High School Attendance Areas*

	Actual October 1, 2014			Projected SUHSD-Enrolled October Resident Students								
	Resident	Attend	Attending	Total Resident Students					Change from 2014			
School	Students	Adjust**	Enrollment	2015	2016	2018	2020	2024	2015	2016	2018	2020
Carlmont	**1,849**	**336**	2,185	1,889	1,952	2,154	**2,382**	2,464	**40**	**103**	**305**	**533**
Sequoia	**2,202**	**-59**	2,143	2,188	2,238	2,272	**2,303**	2,027	**-14**	**36**	**70**	**101**
Woodside	**1,928**	**-113**	1,815	1,910	1,892	1,967	**2,022**	1,769	**-18**	**-36**	**39**	**94**
Menlo-Atherton	**2,556**	**-395**	2,161	2,651	2,687	2,745	**2,796**	2,692	**95**	**131**	**189**	**240**
Redwood	(NA)	297	297					NA				
SUHSD Total	8,535	66	8,601	8,638	8,769	9,138	9,503	8,952	103	234	603	968
Incoming Inter-District Attend.	66	-66	(NA)	64	64	72	71	72	-2	-2	6	5
All Areas	**8,601**			**8,702**	**8,833**	**9,210**	**9,574**	9,024	**101**	**232**	**609**	**973**

* All resident figures are for next year's primary assigned school of each in-district address (i.e., ignoring possible options). These totals include SDC, Redwood High and Independent Study students but exclude NPS students, students enrolled in charter high schools, eighth graders taking SUHSD classes and adult education. (Previous forecast numbers included NPS and Community Day School students.) Small numbers of current elementary feeder district students who are listed at unlocatable addresses are included in the counts for the closest relevant high school once they reach the high school grades. The actual October 1, 2014, counts are based on student records provided to EPC by the SUHSD, *but are for the attendance areas effective at the start of the 2015-16 school year.*

** Net attending adjustments include intra-district and incoming inter-district students as if next year's attendance areas already existed.

Note: The projections contain hidden fractional amounts, so the rounded totals shown here may not exactly match those in other tables.

Table 1B: Actual SUHSD-Enrolled Resident and Attending Amounts in October 2014 and Projected Resident SUHSD-Enrolled Students (grades 9-12) for All Sections of the Pending High School Attendance Areas

School (with Pro-Rated Share between Two Relevant Schools for Attending Ninth Graders)	Actual October 1, 2014: Res. 9-12 Stu. at % Shown	Attend Adjust	Attending Enrollment (100% #s)	Projected 9-12 Students in Oct. of (incl. SDC; excl. NPS and chaters) Total Students at Percentages Shown: 2015	2016	2018	2020	2024
Carlmont								
Carlmont Only Part 100%	*1,697*	*-84*	*1,613*	*1,737*	*1,795*	*1,995*	*2,232*	*2,307*
Carlmont with Sequoia Option Part 83%	*126*		*116*	*126*	*130*	*132*	*124*	*130*
Total for Automatic Carlmont Attendance	**1,823**			**1,863**	**1,925**	**2,127**	**2,356**	**2,437**
MA with Carlmont Option Part 33%	*195*		*214*	*199*	*194*	*194*	*185*	*177*
MA Only Part of Ravenswood CSD 3%	*15*		*14*	*15*	*15*	*14*	*14*	*14*
MA with Woodside Option Part of Ravens. CSD 6%	*16*		*14*	*17*	*17*	*18*	*18*	*16*
Total with Options for All Schools Continuing	**2,050**			**2,094**	**2,152**	**2,352**	**2,573**	**2,645**
Attend Carlmont from All Other Locations			*214*					
Sequoia								
Sequoia Only Part 100%	*1,741*	*-437*	*1,304*	*1,715*	*1,759*	*1,798*	*1,819*	*1,576*
Sequoia with MA Option Part 36%	*166*		*124*	*166*	*167*	*167*	*172*	*161*
Carlmont with Sequoia Option Part 17%	*26*		*32*	*26*	*27*	*27*	*25*	*27*
MA with Sequoia Option Part 33%	*17*		*8*	*16*	*13*	*8*	*9*	*8*
Woodside with Sequoia Option Part 71%	*258*		*230*	*249*	*226*	*220*	*234*	*194*
MA with Carlmont Option Part 7%	*41*		*51*	*42*	*41*	*41*	*39*	*37*
MA Only Part of Ravenswood CSD 7%	*37*		*32*	*37*	*37*	*34*	*34*	*35*
MA with Woodside Option Part of Ravens. CSD 2%	*4*		*14*	*4*	*4*	*5*	*5*	*4*
Total with Options for All Schools Continuing	**2,290**			**2,255**	**2,274**	**2,299**	**2,337**	**2,042**
Attend Sequoia from All Other Locations			*348*					
Woodside								
Woodside Only Part 100%	*1,565*	*-442*	*1,123*	*1,560*	*1,574*	*1,658*	*1,693*	*1,496*
Woodside with Sequoia Option Part 29%	*105*		*94*	*102*	*92*	*90*	*95*	*79*
MA with Woodside Option Part Las Lom. SD 50%	*12*		*5*	*12*	*15*	*18*	*19*	*17*
MA with Woodside Option Part Ravens. CSD 59%	*154*		*147*	*159*	*163*	*169*	*169*	*149*
MA with Carlmont Option Part 13%	*77*		*79*	*79*	*77*	*77*	*73*	*70*
MA Only Part of Ravenswood CSD 4%	*23*		*24*	*23*	*23*	*21*	*21*	*22*
Total with Options for All Schools Continuing	**1,936**			**1,934**	**1,944**	**2,032**	**2,071**	**1,833**
Attend Woodside from All Other Locations			*343*					
Menlo-Atherton (MA)								
MA Only Part 100%	*1,085*	*-36*	*1,049*	*1,165*	*1,213*	*1,317*	*1,381*	*1,331*
MA Only Part of Ravenswood CSD 86%	*464*		*432*	*464*	*462*	*425*	*430*	*441*
MA with Carlmont Option Part 47%	*282*		*187*	*287*	*280*	*279*	*267*	*255*
MA with Sequoia Option Part 67%	*35*		*42*	*33*	*27*	*16*	*17*	*15*
MA with Woodside Option Part Ravens. CSD 33%	*85*		*59*	*88*	*90*	*93*	*93*	*82*
MA with Woodside Option Part Las Lom. SD 50%	*13*		*22*	*12*	*16*	*18*	*20*	*18*
Sequoia with MA Option 64%	*295*			*295*	*298*	*296*	*306*	*286*
Total with Options for All Schools Continuing	**2,259**			**2,344**	**2,385**	**2,445**	**2,515**	**2,429**
Attend MA from All Other Locations			*370*					
Redwood	(NA)	297	297	(NA)	(NA)	(NA)	(NA)	(NA)
SUHSD Total	8,535	66	8,601	8,626	8,755	9,128	9,495	8,948
Incoming Inter-District Attendance and Unlocatable	66	-66	(NA)	76	78	82	79	76
All Areas	**8,601**			**8,702**	**8,833**	**9,210**	**9,574**	9,024

Note: See footnotes to Table 1A for explanation of this data and figures in Appendix A1 related to the percentages shown in this table.

After 2016, however, the subsequent growth shifts overwhelmingly into the Carlmont area. That region is forecast to add 430 SUHSD students between 2016 and 2020, to a total that is 533 above the current figure. The result is a forecast of nearly 2,400 students there. The M-A region, by contrast, adds only 109 more (240 total compared to the current count), but that nonetheless does create the largest resident total for any school, with nearly 2,800 students. Intra-district enrollment gain and losses for those two regions, while presumably becoming less significant, nonetheless could give those schools comparable total enrollments in 2020. While the Woodside region does add 130 during this period, that is after a projected decline by 36 to 2016, so the net six-year change is only 94 more students, to around 2,000. The Sequoia area has the smallest rise between 2016 and 2020, with 65 added (for 101 total from 2014), to essentially 2,300 students.

The final items deserving mention in Table 1A are the resident differences from 2020 to 2024. Numbers that far into the future should be considered only as general estimates, but it still is evident that Carlmont's region could have modest further growth while the other attendance areas should all have fewer resident students after 2020. These changes are based on the current counts and trends in the lowest elementary grades in each location.

Key Findings Related to the Data in Table 1B: Projected Pro-rated Resident Changes including the Option Areas

Table 1B is a more complex table than 1A, but it also could provide a better representation of how the resident numbers could evolve. This is because the figures in Table 1A, while much easier to comprehend, do not factor in how the pending option areas could impact the resident totals.

It is difficult to determine how those impacts will evolve, but we can get a good sense from the selections that the current ninth graders made. This is the first student body class that essentially had many of the option area choices available, especially for M-A. Table 1B shows what the resident results would be if the proportions of the ninth graders that choose to attend the schools in each option area this year evolves into similar shares in 9-12.[4]

If these current distribution patterns in ninth do represent the choices that will occur in 2020, then the proportionate resident numbers for M-A drop while those for the other schools increase. Carlmont could have the largest modified resident number that year, with 2,573 students. Menlo-Atherton's modified projected 2020 total is 2,515, or 281 less than the amount in Table 1A. Sequoia and Woodside have 34 and 49 more resident students, respectively, than in 1A. These figures are if all option- and Tinsley-related choices (at the current ratios in ninth) are permitted, but no other intra-district and incoming inter-district amounts are included (through open enrollment). Attendance at Redwood High will lower these amounts somewhat for the school enrollments.

Underlying Factors to the Projections: Recent Student Population Evolution

The student trends have shifted in many locations since 2010. In most of the SUHSD's feeder district regions, these adjustments were in one of the following three manners: (1) the degree of student increase slowed, (2) a swing from growth to decline or (3) a more rapid rate of reduction. All three of these differences had the same result of lower current student numbers than the trends prior to 2013 had suggested. These adjustments are shown in Table 2 on pages 8-10.

Understanding the Data in Table 2

Table 2 contains the resident counts in the six largest feeder districts (in total enrollments) for the students who were enrolled in any of those districts or the SUHSD in the last four years. The Portola Valley and Woodside SD regions are excluded because we do not have sufficient student data by home address from those districts, but

[4] To convert these proportions into resident shares for just the two schools relevant to each option area, we had to pro-rate those percentages (i.e., the students can be resident to only the two schools involved in each case). Appendix A1 shows the actual student numbers, percentages and pro-rating of those percentages that resulted in the percentages shown in Table 1B.

these areas are relatively modest contributors to the SUHSD enrollment. Totals are shown in the four-grade groups of 1-4 (first through fourth), 5-8 and 9-12, along with by individual grades in fifth through ninth. Those grade groupings allow a comparison between the amounts that are currently in the SUHSD grades and what will be graduating into those grades for four and eight years hence. They also indicate the degree that those groups will become larger or smaller as they graduate upward. In the case of the Belmont – Redwood Shores School District (BRSSD) area, for example, the 1,519 students in grades 1-4 in 2010 evolved into 1,600 students in 5-8 this year (a gain of 81; see the top section on the first page of Table 2). That also resulted in over 300 more students in 5-8 today (that 1,600 total) than in 2010 (1,296). This suggests that there could be 300 more high school students in four years, compared to the current amount (1,339), if the same rate of growth occurs in the graduation from 5-8 to 9-12.

Also shown in Table 2 is how the average annual rate of change between 2010 and 2013 compares to what happened between just 2013 and 2014. Again using the BRRSD region as an example, the rate of increase in the 1-4 group eased from 64 annually, on average, to 33 in the last year. Nonetheless, that continued the growth of recent years, which we had projected would be ending (as is shown in the bottom row of the BRSSD section, with 27 more students than projected[5]).

These grade-group changes also correspond to differences in the sizes of the incoming and outgoing classes in each group, but the advancement ("graduation into") rates deal with the same student body classes, so those can be a better indicator of true gains and losses. We focus in this table on those advancement changes from fifth to sixth and eighth to ninth because those are the grade-level changes in most districts, when the biggest population shifts often occur. In the BRSSD region, the number of public school eighth graders in one year had averaged an increase by eight students enrolled in ninth in the SUHSD a year later. This year, however, there was instead a net loss of 15 students in that advancement. This 23-student difference was the main reason that the forecast was high by 19 students in that grade.

Key Findings Related to the Data in Table 2

Three locations had noteworthy shifts in the latest years, compared to the trends over the previous years. One of these is the sudden drop-off for growth at the high school level in the BRSSD region. As is discussed in the following main (bolder header) section, that region had some unusually high grade-to-grade "advancement" rates (a.k.a., "cohort survival" rates) into and through grades 9-12. Applying such previous rates to the larger classes graduating into the SUHSD, versus those graduating out, had justified projecting a much larger current 9-12 total in the BRSSD area. Those rates eased in 2014, which caused the 9-12 forecast to be high by 45 this year, which was the main divergence at the high school level. We had projected those rates would come down, but not this quickly. The new averaged rates, including the last year of change, thus are more realistic to be ongoing and we have applied them to the updated forecast. This 9-12 trend shift in the BRSSD area thus is not a concern to us.

The second notable shift occurred in the grades 1-4 group in the San Carlos SD region. That area added 134 students in these grades between 2010 and 2011 and much smaller amounts in the next two years, but there was still growth occurring. Instead of rising by another 15 students, as had been projected, the current 1-4 total fell by 37, for a significant 52-student difference. Otherwise the forecast in this area, for the remaining grades, was statistically accurate, so this lowest-grades drop is a factor for the high school forecast only after 2018. The 9-12 projections in 2020 are now moderately lower accordingly.

The third location with significant trend adjustments is in the Redwood City SD area. These are both the most consequential differences for the forecast and the least understood. The counts in grades 1-4 rose by 108 from 2010 to 2011, which continued a growth trend from prior years (not shown in this table), but fell by 367 since then.

[5] The projected amounts shown in Table 2 are after removing NPS and Community Day students from the original forecast numbers. The former is being removed from the data this year at the request of the District. The latter program has been shifted to the San Mateo County Office of Education.

Table 2: Comparisons of Actual and Projected Enrollments from All Relevant Districts except the PVSD and WSD*

Elementary Feeder District Region and Enrollment Subject	Early Oct.	Enrolled Students in SUHSD and Six Largest Feeder ESDs 1-4	5	6	7	8	9	10-12	5-8 Total	9-12 Total
Belmont - Redwood Shores SD										
Actual Students	**2010**	1,519	349	345	304	298	273	797	1,296	1,070
	2011	1,593	334	374	351	302	302	827	1,361	1,129
	2012	1,689	364	362	377	349	317	876	1,452	1,193
	2013	1,710	401	372	359	383	355	922	1,515	1,277
	2014	1,743	446	415	382	357	368	971	1,600	1,339
Actual Difference, either within Grade Group or for Graduation into this Grade:										
Annual Average, 2010 to 2013		*64*		*20*			*8*		*73*	*69*
2013 to 2014		*33*		*14*			*-15*		*85*	*62*
Projected from 2013-14**	2014	1,716	448	424	373	357	387	997	1,602	1,384
2014 Difference, Actual-to-Projected		**27**	**-2**	**-9**	**9**	**0**	**-19**	**-26**	**-2**	**-45**
San Carlos SD										
Actual Students	**2010**	1,176	252	268	261	264	189	603	1,045	792
	2011	1,310	252	263	269	271	230	637	1,055	867
	2012	1,317	304	243	267	269	236	670	1,083	906
	2013	1,330	289	296	239	262	220	651	1,086	871
	2014	1,293	347	294	307	238	236	667	1,186	903
Actual Difference, either within Grade Group or for Graduation into this Grade:										
Annual Average, 2010 to 2013		*51*		*-2*			*-39*		*14*	*26*
2013 to 2014		*-37*		*5*			*-26*		*100*	*32*
Projected from 2013-14**	2014	1,345	343	288	299	240	228	682	1,170	910
2014 Difference, Actual-to-Projected		**-52**	**4**	**6**	**8**	**-2**	**8**	**-15**	**16**	**-7**
Redwood City SD										
Actual Students	**2010**	4,174	1,005	928	910	878	868	2,597	3,721	3,465
	2011	4,282	966	1,001	928	898	880	2,622	3,793	3,502
	2012	4,258	1,003	941	988	932	856	2,730	3,864	3,586
	2013	4,090	1,050	939	916	969	846	2,757	3,874	3,603
	2014	3,915	1,039	985	908	910	862	2,743	3,842	3,605
Actual Difference, either within Grade Group or for Graduation into this Grade:										
Annual Average, 2010 to 2013		*-28*		*-31*			*-42*		*51*	*46*
2013 to 2014		*-175*		*-65*			*-107*		*-32*	*2*
Projected from 2013-14**	2014	3,971	1,057	1,021	933	912	934	2,702	3,923	3,636
2014 Difference, Actual-to-Projected		**-56**	**-18**	**-36**	**-25**	**-2**	**-72**	**41**	**-81**	**-31**

Table 2, page 1 of 3, with footnotes at the bottom of the final page

Table 2: Comparisons of Actual and Projected Enrollments from All Relevant Districts except the PVSD and WSD*

Elementary Feeder District Region and Enrollment Subject	Early Oct.	Enrolled Students in SUHSD and Six Largest Feeder ESDs 1-4	5	6	7	8	9	10-12	5-8 Total	9-12 Total
Ravenswood CSD***										
Actual Students	**2010**	1,833	420	443	420	387	349	1,155	1,670	1,504
	2011	1,794	430	433	428	418	319	1,162	1,709	1,481
	2012	1,797	436	407	398	425	348	1,086	1,666	1,434
	2013	1,770	448	388	407	392	344	1,111	1,635	1,455
	2014	1,798	419	415	378	398	340	1,057	1,610	1,397
Actual Difference, either within Grade Group or for Graduation into this Grade:										
Annual Average, 2010 to 2013		*-21*		*-19*			*-73*		*-12*	*-16*
2013 to 2014		*28*		*-33*			*-52*		*-25*	*-58*
Projected from 2013-14**	2014	1,799	418	411	372	405	327	1,078	1,606	1,405
2014 Difference, Actual-to-Projected		**-1**	**1**	**4**	**6**	**-7**	**13**	**-21**	**4**	**-8**
Menlo Park CSD										
Actual Students	**2010**	1,191	292	219	204	221	174	461	936	635
	2011	1,209	309	270	216	207	161	488	1,002	649
	2012	1,243	266	274	272	209	165	470	1,021	635
	2013	1,265	290	252	284	273	177	489	1,099	666
	2014	1,255	324	282	254	288	218	505	1,148	723
Actual Difference, either within Grade Group or for Graduation into this Grade:										
Annual Average, 2010 to 2013		*25*		*-24*			*-45*		*54*	*10*
2013 to 2014		*-10*		*-8*			*-55*		*49*	*57*
Projected from 2013-14**	2014	1,267	327	271	256	283	224	497	1,137	721
2014 Difference, Actual-to-Projected		**-12**	**-3**	**11**	**-2**	**5**	**-6**	**8**	**11**	**2**
Las Lomitas SD										
Actual Students	**2010**	589	139	124	117	121	72	219	501	291
	2011	601	140	125	128	112	86	225	505	311
	2012	621	147	141	132	123	89	241	543	330
	2013	614	149	128	138	127	109	249	542	358
	2014	593	155	137	123	133	82	286	548	368
Actual Difference, either within Grade Group or for Graduation into this Grade:										
Annual Average, 2010 to 2013		*8*		*-11*			*-24*		*14*	*22*
2013 to 2014		*-21*		*-12*			*-45*		*6*	*10*
Projected from 2013-14**	2014	579	158	139	131	135	104	285	563	389
2014 Difference, Actual-to-Projected		**14**	**-3**	**-2**	**-8**	**-2**	**-22**	**1**	**-15**	**-21**

Table 2, page 2 of 3, with footnotes at the bottom of the final page

Table 2: Comparisons of Actual and Projected Enrollments from All Relevant Districts except the PVSD and WSD*

Elementary Feeder District Region and Enrollment Subject	Early Oct.	Enrolled Students in SUHSD and Six Largest Feeder ESDs 1-4	5	6	7	8	9	10-12	5-8 Total	9-12 Total
Total in Six Largest ESD Regions										
Actual Students	**2010**	**10,482**	2,457	2,327	2,216	2,169	1,925	5,832	**9,169**	**7,757**
	2011	10,789	2,431	2,466	2,320	2,208	1,978	5,961	9,425	7,939
	2012	10,925	2,520	2,368	2,434	2,307	2,011	6,073	9,629	8,084
	2013	10,779	2,627	2,375	2,343	2,406	2,051	6,179	9,751	8,230
	2014	**10,597**	2,730	2,528	2,352	2,324	2,106	6,229	**9,934**	**8,335**
Actual Difference, either within Grade Group or for Graduation into this Grade:										
Annual Average, 2010 to 2013		***99***		***-66***			***-215***		***194***	***158***
2013 to 2014		***-182***		***-99***			***-300***		***183***	***105***
Projected from 2013-14**	2014	10,677	2,751	2,554	2,364	2,332	2,204	6,241	10,001	8,445
2014 Difference, Actual-to-Projected		**-80**	**-21**	**-26**	**-12**	**-8**	**-98**	**-12**	**-67**	**-110**

* Figures cover all students in the grades shown, other than SUHSD charter and NPS students, enrolled in the SUHSD and six largest elementary feeder districts (all but Portola Valley and Woodside districts, for which insufficient student home address data is available).

** Projected figures from 2013-14 are after removing SUHSD NPS and Community Day School students from the 2013-14 base data.

*** All Ravenswood CSD region figures, including projected amounts, are after removing students attending PVSD and WSD schools.

Table 2, page 3 of 3

The loss in the last year in grades 1-4 was especially significant, at -175 students. Equally concerning are the large reductions in the classes graduating into sixth and ninth. The previous average in the classes advancing from fifth to sixth was a net decline by 31, but more than twice that amount, or -65, left that region in 2014. The average advancement from eighth to ninth had been a drop by 42, but there are 107 fewer for the current ninth. That is two-and-a-half times as much. These are huge statistical shifts that were the most problematic sources of the deviation between the projected and actual 2014 amounts in the SUHSD region.

Table 3 below shows how severely the overall direction changed here for all students enrolled in the Redwood City SD. After three years of significant growth (from 2008 to 2011), there was a drop by 69 in 2012 and then much larger reductions by 185 and 160 (345 total) in the last two years.

The three remaining largest feeder regions, in student numbers, generally were accurately projected for this year, other than the inevitable offsetting nuances in a few grades. The Ravenswood City SD region, including "Tinsley" students attending the other districts listed, deviated by only three students in the 1-8 total and eight students in 9-12. Both the Menlo Park City and Las Lomitas SD regions have within one student of the projected 1-8 totals. Only the greater-than-expected drop entering ninth in the latter is a meaningful difference for the SUHSD, as continuing that, which is only partially projected, would have a larger cumulative impact on all of grades 9-12.

Table 3: Redwood City School District Total Enrollment by School in the Student Files Provided

Total October TK-8 Enrollment 2008	2009	2010	2011	2012	2013	2014	Enrollment Difference in One Year to October of 2009	2010	2011	2012	2013	2014
							201	72	162	-69	-185	-160

Notes: Figures cover all Redwood City SD TK-8 students in the files provided. Decline since 2012 would be slightly larger without NPS.

Average Student Grade-to-Grade Advancement Rates

The following explanation is mostly repeated from our last report. Readers who already understand how to interpret advancement rates can go to the subsection titled *“Key Findings Related to the Data in Table 4”* (below).

Grade-to-grade “advancement” rates are calculations of the change in the number of students in each grade as they graduate into the next grade. Usually such rates are averaged over the last several years within each single-grade advancement to avoid giving too much influence to nuances that may have occurred in any one year. These rates are then evaluated for their likelihood to continue, by degree, through the forecast period.

For this study, varying levels of rate determination again have occurred. The most in-depth rate refinements by housing situation are in the BRSSD, MPCSD and LLSD regions.[6] Some housing-situation refinement also has been made for these calculations within the Redwood CSD region. Simpler aggregations have been made in the remaining feeder district parts of the SUHSD.

Understanding the Data in Table 4

The latest average advancement rates entering each high school grade are shown on the right side of Table 4 on pages 12 and 13. In the “Modest, Moderate and Hillside Mixed Value” SFD (single family detached) housing group in the BRSSD region, for instance, the "1.04” rate entering ninth grade for “This Study” means that, on average since 2011, a net of 104% of the eighth grade population in one year became ninth graders a year later from the same neighborhoods. That is a nominal reduction from the 1.05 rate determined in our last study.

The cumulative rates shown in the middle section of Table 4 are the result of a compounding of the individual grade-to-grade rates from kindergarten to eighth. These figures show what the net aggregate change would be, if these rates continue, as each group of kindergartners graduates upward through all of the elementary grades. Again using the “Modest, Moderate and Hillside Mixed Value” SFD group within the BRSSD as an example, the “1.23” for the latest period (2011 to 2014) means that 100 students in kindergarten in one year would become 123 students eight years later in eighth grade (i.e., a 23% increase). These cumulative figures are a good indication of the net effect that (1) families moving in and out of the districts and (2) students transferring between regular, charter and private schools are having on the K-8 enrollments and the subsequent high school populations.

We have boxed in the table the rates that changed by at least 5% since the last calculation, which is significant, especially in larger student numbers (800+), when one realizes that two-thirds of the current and prior calculations cover the same years of change (i.e., from 2011 to 2012 and 2012 to 2013). The purpose of this boxing is to highlight situations where the student population trends changed the most dramatically in the latest calculation.

Also applied, in the version of this report printed in color, is color highlighting for those rate shifts by at least 5% since our last study. Yellow represents gains of at least 5% in the cumulative rates and/or the rates into ninth, while orange represents losses of at least 5% in those rates.

While these rates can seem statistically abstract, they are a critical forecast component.

Key Findings Related to the Data in Table 4

To repeat from our past reports: There are huge differences in these rates, with big student gains occurring in some locations and major losses, especially entering ninth, happening in other situations. All but one of the cumulative rates shown in Carlmont’s BRSSD and SCSD regions are above 1.00 and that is on top of having had

[6] The elementary data shown for those districts in Table 4, however, covers students from most of the SUHSD region (i.e., those enrolled in the BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD and LLSD) for each location listed. This creates modest differences from the totals shown for the same situations in our reports for those feeder districts.

Table 4: Summary of Resident Student Grade-to-Grade Advancement Rate Findings

(with color highlighting applied to rate shifts by at least 0.05 since the last study; orange for down and yellow for up)

Region	Housing Subject and/or Location*	Current Resident K-12 Students*	Cumulative Net Advancement Rate from K-8** 2009 to 2012	2010 to 2013	**2011 to 2014**	Three-Year Average Rate at which the Net Number of Stu. Advanced from Prior Grade to this Grade in Oct. of Each Year: 2010 to 2013 9th	2011 to 2014 (This Study) 9th	10th	11th	12th
BRSSD	**SFD: Modest, Moderate and Hillside Mixed Value**	1,435	1.04	1.06	**1.23**	1.05	**1.04**	0.99	1.01	1.03
	SFD: Middle to High Income - West of 101	1,107	1.21	1.21	**1.32**	1.05	**1.01**	1.00	1.01	1.02
	SFD: Middle to High Income - East of 101	876	1.06	0.94	**0.91**	0.84	**0.90**	0.95	1.02	1.02
	ATT: Relatively Affordable	911	1.17	1.18	**1.17**	1.07	**1.05**	1.00	1.07	0.98
	ATT: Modest to High Amenity* **	710	1.27	1.03	**1.13**	1.17	**1.11**	0.94	1.04	1.03
SCSD	**Pending Carlmont part********	1,912	1.13	1.15	**1.04**	0.90	**0.91**	1.01	0.99	0.98
	Pending Sequoia part	1,769	0.99	0.90	**0.90**	0.80	**0.81**	0.98	0.97	1.01
Redwd. CSD	**SFD: Modest and Mix Modest to Middle Income**	2,822	0.81	0.80	**0.72**	0.94	**0.91**	1.08	1.03	1.08
	SFD: Mix Middle to Upper Income	1,891	0.95	0.92	**0.87**	1.01	**0.97**	0.99	1.04	1.04
	ATT: Relatively Affordable	1,306	0.99	0.83	**0.78**	0.97	**0.95**	1.05	1.02	1.09
	MIX: Affordable to Modest	3,731	0.92	0.83	**0.74**	0.87	**0.83**	1.00	1.00	1.12
	MIX: Moderate to Middle Income	2,118	0.83	0.80	**0.85**	1.09	**1.04**	1.06	0.99	1.03
	MHP* **	354	1.34	1.50	**1.37**	0.94	**0.76**	1.06	1.01	1.26
MPCSD	**SFD: Moderate**	1,228	0.91	0.98	**1.02**	0.87	**0.90**	1.03	1.02	1.02
	SFD: Middle Income	929	0.89	0.86	**0.97**	0.77	**0.78**	0.97	0.99	0.94
	SFD: High Income* **	593	0.79	0.79	**0.98**	0.72	**0.73**	0.99	0.96	1.05
	ATT* **	586	1.17	1.12	**0.84**	0.81	**0.80**	0.93	0.99	0.92

Table 4, page 1 of 2, with footnotes at the bottom of the final page

Table 4: Summary of Resident Student Grade-to-Grade Advancement Rate Findings
(with color highlighting applied to rate shifts by at least 0.05 since the last study; orange for down and yellow for up)

Region	Housing Subject and/or Location*	Cumulative Net Advancement Rate from K-8** 2009 to	2010 to 2012	2011 to 2014		Three-Year Average Rate at which the Net Number of Stu. Advanced from Prior Grade to this Grade in Oct. of Each Year 2010 to 2013	2011 to 2014 (This Study) 10th	11th	12th	
LLSD	**SFD**		1.03	0.91			1.00	1.04	1.03	
	ATT* **		1.86	**1.20**		0.88		0.93	1.02	
Ravens. CSD	**All (in district area)**		NA	**0.78**			1.00	1.00	1.19	
PVSD+ WSD	**All (in district areas)**	NA	NA	NA	NA	NA	**0.48**	1.09	1.07	1.02

* Students listed at addresses in the relevant locations and attending any BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD or SUHSD school, except that (1) SUHSD NPS students are excluded, (2) charters in all but Redwood CSD are excluded and (3) the rate entering ninth grade for the combined PVSD and WSD students is available from 2013 to 2014 only. 100% (1.00) rates were applied in the lower grades in these two regions. "SFD" covers single-family detached homes and "ATT" is for attached units (apartments, condos, townhouses and plexes). "Mix" is for areas with a mix of SFD and ATT.

** These cumulative rates are the cumulative impact from kindergarten to eighth grade of the individual grade-to-grade net "advancement rates" (a.k.a. "cohort survival rates") averaged over the relevant three-year period. The LLSD's SFD homes, for example, collectively had net average grade-to-grade advancement rates between Oct. 2011 and Oct. 2014 that combine into a 0.91 cumulative rate. This means that, if these rates continue, there eventually would be 91% as many eighth graders (i.e., a 9% reduction) from these same housing units as there had been kindergartners eight years earlier.

*** These categories have fewer than 800 students (K-12), for which such small numbers allow greater rate swings.

**** Totals for the pending Carlmont portion of the SCSD includes the "Carlmont with Sequoia Option" areas.

Notes: (1) Figures exclude both inter-district students from outside the SUHSD region and a small number of students listed at home addresses (or no address) that could not be assigned. (2) Advancement rates shown are the actual calculated rates. These have been modified where warranted in the forecast. (3) See Appendix B for more information.

Table 4, page 2 of 2

some large kindergarten populations (i.e., the numbers are higher in kindergarten and then getting even larger as each of those student body classes graduates upward). There is a further student increase as each class entered ninth in most of these categories.

What is different in the BRSSD region in this update, compared to our previous calculations, is that while three of the cumulative rates rose by statistically huge degrees, many of the rates into and through the high school grades fell. Four of the five housing categories there, including those with the three largest student populations, have lower rates entering ninth this year than last. While all four of those categories still have advancement rates into ninth that are above 1.00 (100%), these are not by as great an extent as before. Only the one category that had a rate into ninth that was well below 1.00 bucked this trend, and that is in a relatively small student population (876 K-12 students). Not shown in this table is that some of the over-1.00 rates through the high school grades also came down. The rates entering twelfth in the two BRSSD categories with the largest student counts, for example, had been 1.05. They now are 1.03 and 1.02. And the rate entering eleventh from “Relatively Affordable” ATT units (with ATT being the abbreviation for attached, which covers apartments, condos, townhouses and plexes) had been an unsustainable 1.14 (i.e., a short-term anomaly) that dropped to 1.07 in this update. All of these updated high school rates in the BRSSD region are more realistic to be approximately ongoing over the next decade. The degrees that many of the cumulative rates in this area exceed 1.00, by contrast, are unlikely to be maintained. Some of the underlying grade-to-grade rates have been moderated accordingly, including via the alternative four-year averages shown in Appendix B2.

Partly offsetting these higher cumulative rates, in terms of the subsequent impact on Carlmont, was a meaningful reduction in the cumulative rate from the SCSD part of Carlmont's attendance area. That figure declined from 1.15 to 1.04 in a significant student population (1,912 in K-12).

The region with the most problematic shifts, for the forecast, is the Redwood City SD. Other than some aberrant figures in the very small MHP student population (just 354 students), all of these cumulative rates are well under 1.00. For the general housing categories with the two largest populations (3,731 and 2,822 students), the rates fell by 9% and 8%, to just 0.74 and 0.72. Those are huge statistical reductions in such large student numbers, with the latest cumulative rates being far below the norm. These housing categories also now have lower rates entering ninth, at 0.83 and 0.91. The former, in particular, is in a lower cost dwelling group that should not be having significant percentages going to private high schools, so having one in every six students, in net, not graduate into the SUHSD in ninth does not make sense.

We do not have a good understanding of why the trends in this region, unlike the other feeder district areas with a broad range of housing values, have shifted so severely in the latest years. The jump in local housing rents and prices probably factors into this, but why that would be so much more evident here than in the BRRSD, SCSD, Ravenswood City SD or MPCSD regions is unknown. We have modified some of these rates in the Redwood CSD region accordingly in the forecast, including via the alternative four-year averages shown in Appendix B4. There is, nonetheless, a wide range in how the student numbers could evolve in the Redwood CSD area.

Not changing significantly are the low rates entering ninth from the southeastern and southernmost parts of the SUHSD. To repeat from our last report, we do not recall having calculated such declines entering ninth from sufficiently large student populations in any other district. This finding overwhelms everything else being determined in these sections of the SUHSD. The three largest housing categories in the MPCSD region have updated rates entering ninth of 0.90, 0.78 and, in the more expensive SFD places, just 0.73, for a net 27% loss. The SFD homes in the LLSD region have a 0.77 rate entering ninth, for a net 23% loss. These effectively are all in the current Menlo-Atherton attendance region.

The concern for the forecast is that these particular rates entering ninth, most of which have risen since our first SUHSD study, have the potential to become much higher (i.e., not as far below 1.00). That would give M-A and even larger 2020 resident total than we currently can justify projecting.

The final rate that should be discussed is the 0.84 figure entering ninth in the Ravenswood CSD region. That is well under 1.00 because many students there attend the East Palo Alto (Aspire) Academy, which is not included in these student counts and rates.

Concluding Commentary

There is no assurance that the current school choices of ninth graders in the pending option areas will translate into similar ratios in the future, but that is the best "call" we can make today. In those areas, higher ratios of this year's ninth graders choose the currently assigned schools than we had expected, particularly from East Palo Alto. Nonetheless, large numbers of students in the pending option areas selected the future main schools rather than the current officially assigned schools. We believe this was the District's intent in creating the option areas, with some students going to each of the available choices. Having this pattern continue with future ninth graders will help maintain diversity at all four regular high schools.

Appendix A1: Current SUHSD Ninth Grade Enrollment Distribution by High School Attendance Area Sections*

	School Attended by Ninth Graders on October 1, 2014 (including SDC but excluding NPS and charter high school students)												
	Students at Carlmont			Students at Sequoia			Students Woodside			Students at Menlo-Atherton			SUHSD
Attendance Area Section	Number in 9th	True % of Total	Pro-Rated %	Number in 9th	True % of Total	Pro-Rated %	Number in 9th	True % of Total	Pro-Rated %	Number in 9th	True % of Total	Pro-Rated %	Total in 9th
Carlmont Only	450	98%	100%	7	2%	NA	1	0%	NA	1	0%	NA	459
Carlmont with Sequoia Option	29	83%	83%	6	17%	17%	0	0%	NA	0	0%	NA	35
Sequoia Only	33	8%	NA	343	81%	100%	46	11%	NA	3	1%	NA	425
Sequoia with M-A Option	1	1%	NA	33	28%	36%	23	20%	NA	59	51%	64%	116
Woodside Only	3	1%	NA	59	16%	NA	299	80%	100%	11	3%	NA	372
Woodside with Sequoia Option	3	3%	NA	62	69%	71%	25	28%	29%	0	0%	NA	90
Menlo-Atherton (M-A) Only Main	1	0%	NA	2	1%	NA	7	2%	NA	290	97%	100%	300
Menlo-Atherton Only Rav. CSD*	4	3%	NA	10	7%	NA	6	4%	NA	124	86%	NA	144
M-A with Carlmont Option*	43	33%	NA	9	7%	NA	17	13%	NA	62	47%	NA	131
M-A with Woodside Option EPA*	4	6%	NA	1	2%	NA	38	59%	NA	21	33%	NA	64
M-A with Woodside Option LLSD	0	0%	NA	0	0%	NA	3	50%	50%	3	50%	50%	6
M-A with Sequoia Option	0	0%	NA	4	33%	33%	0	0%	NA	8	67%	67%	12
Total for SUHSD Region	571	27%	NA	536	25%	NA	465	22%	NA	582	27%	NA	2,154
Incoming Inter-District and Unassignable Addresses	1	17%	NA	3	50%	NA	0	0%	NA	2	33%	NA	6

* This data is not pro-rated because of the potential Tinsley contribution; "Rav. CSD" is the abbreviation for the Menlo-Atherton (City of Menlo Park) portion of the Ravenswood CSD.

Appendix B1: Recent Resident Student Population Trends by High School Attendance Area Sections*

HS Region	Section	Data Subject	Oct. of	Resident Students by Grade Group 1-4	5-8	9-12	1-8	9-12
Carlmont	**BRSSD (all)**	Resident Students enrolled	2010	1,519	1,296	1,070		
		in SUHSD and all feeder	2011	1,593	1,361	1,129		
		elementary districts other	2012	1,689	1,452	1,193		
		than PVSD and WSD	2013	1,710	1,515	1,277		
			2014	1,743	1,600	1,339		
		4-Year Change Within Grade Group		224			**528**	**269**
		4-Year % Change Within Grade Group					***19%***	***25%***
		4-Year Change from Prior Grade Group			81	43		
	SCSD (CHS part) *(incl. CHS with SHS option)*	Resident Students enrolled	2010	569	542	444		
		in SUHSD and all feeder	2011	628	557	493		
		elementary districts other	2012	617	558	532		
		than PVSD and WSD	2013	639	565	512		
			2014	642	606	510		
		4-Year Change Within Grade Group		73			**137**	**66**
		4-Year % Change Within Grade Group					***12%***	***15%***
		4-Year Change from Prior Grade Group			37	-32		
	Total for Primary Areas	Resident Students enrolled	2010	2,088	1,838	1,514		
		in SUHSD and all feeder	2011	2,221	1,918	1,622		
		elementary districts other	2012	2,306	2,010	1,725		
		than PVSD and WSD	2013	2,349	2,080	1,789		
			2014	2,385	2,206	1,849		
		4-Year Change Within Grade Group		297			**665**	**335**
		4-Year % Change Within Grade Group					***17%***	***22%***
		4-Year Change from Prior Grade Group			118	11		
Sequoia	**SCSD (SHS part)** *(excl. CHS with SHS option)*	Resident Students enrolled	2010	607	503	348		
		in SUHSD and all feeder	2011	682	498	374		
		elementary districts other	2012	700	525	374		
		than PVSD and WSD	2013	691	521	359		
			2014	651	580	393		
		4-Year Change Within Grade Group		44			**121**	**45**
		4-Year % Change Within Grade Group					***11%***	***13%***
		4-Year Change from Prior Grade Group			-27	-110		
	Redwood CSD ***part only to SHS***	Resident Students enrolled	2010	1,543	1,398	1,269		
		in SUHSD and all feeder	2011	1,550	1,406	1,316		
		elementary districts other	2012	1,528	1,456	1,296		
		than PVSD and WSD	2013	1,449	1,434	1,328		
			2014	1,404	1,446	1,348		
		4-Year Change Within Grade Group		**-139**			**-91**	**79**
		4-Year % Change Within Grade Group					***-3%***	***6%***
		4-Year Change from Prior Grade Group			-97	-50		
	Redwood CSD ***part with option to M-A***	Resident Students enrolled	2010	588	528	474		
		in SUHSD and all feeder	2011	609	556	468		
		elementary districts other	2012	573	571	501		
		than PVSD and WSD	2013	565	537	493		
			2014	570	485	461		
		4-Year Change Within Grade Group		**-18**			**-61**	**-13**
		4-Year % Change Within Grade Group					***-5%***	***-3%***
		4-Year Change from Prior Grade Group			-103	-67		

Appendix B1, page 1 of 4, with footnotes provided at the bottom of the final page

Appendix B1: Recent Resident Student Population Trends by High School Attendance Area Sections*

HS Region	Section	Data Subject	Oct. of	Resident Students by Grade Group 1-4	5-8	9-12	1-8	9-12
Sequoia (continued)	**Total for Primary Areas**	Resident Students enrolled	2010	2,738	2,429	2,091		
		in SUHSD and all feeder	2011	2,841	2,460	2,158		
		elementary districts other	2012	2,801	2,552	2,171		
		than PVSD and WSD	2013	2,705	2,492	2,180		
			2014	2,625	2,511	2,202		
		4-Year Change Within Grade Group		-113			**-31**	**111**
		4-Year % Change Within Grade Group					***-1%***	***5%***
		4-Year Change from Prior Grade Group			-227	-227		
Woodside	**Redwood CSD (WHS part)** *(incl. WHS with SHS option)*	Resident Students enrolled	2010	2,001	1,762	1,653		
		in SUHSD and all feeder	2011	2,078	1,803	1,654		
		elementary districts other	2012	2,106	1,806	1,712		
		than PVSD and WSD	2013	2,028	1,866	1,712		
			2014	1,904	1,873	1,728		
		4-Year Change Within Grade Group		**-97**			**14**	**75**
		4-Year % Change Within Grade Group					***0%***	***5%***
		4-Year Change from Prior Grade Group			-128	-34		
	PVSD (all)	Resident Students enrolled	2010	*N/A*		106		
		in the SUHSD and PVSD	2011	*N/A*		115		
		(excl. Tinsley at PVSD)	2012	*N/A*		121		
			2013	296	292	126		
			2014	289	281	134		
		4-Year Change Within Grade Group						**28**
		4-Year % Change Within Grade Group						***26%***
	WSD (all)	Resident Students enrolled	2010	*N/A*		59		
		in the SUHSD and WSD	2011	*N/A*		63		
		(excl. Tinsley at WSD)	2012	*N/A*		70		
			2013	198	190	65		
			2014	*N/A*		66		
		4-Year Change Within Grade Group						**7**
		4-Year % Change Within Grade Group						***12%***
	Total for Primary Areas	Resident Students enrolled	2010	*N/A*		1,818		
		in the SUHSD only except	2011	*N/A*		1,832		
		for 2013, with PVSD and	2012	*N/A*		1,903		
		WSD students included	2013	2,522	2,348	1,903		
			2014	*N/A*		1,928		
		4-Year Change Within Grade Group						**110**
		4-Year % Change Within Grade Group						***6%***
Menlo-Atherton	**Redwood CSD (M-A part)** *(incl. M-A with SHS option)* *(excl. SHS with M-A option)*	Resident Students enrolled	2010	42	33	69		
		in SUHSD and all feeder	2011	45	28	64		
		elementary districts other	2012	51	31	77		
		than PVSD and WSD	2013	48	37	70		
			2014	37	38	68		
		4-Year Change Within Grade Group		**-5**			**0**	**-1**
		4-Year % Change Within Grade Group					***0%***	***-1%***
		4-Year Change from Prior Grade Group			-4	35		

Appendix B1, page 2 of 4, with footnotes provided at the bottom of the final page

Appendix B1: Recent Resident Student Population Trends by High School Attendance Area Sections*

HS Region	Section	Data Subject	Oct. of	1-4	5-8	9-12	1-8	9-12
Menlo-Atherton (continued)	**MPCSD (all)**	Resident Students enrolled	2010	1,191	936	635		
		in SUHSD and all feeder	2011	1,209	1,002	649		
		elementary districts other	2012	1,243	1,021	635		
		than PVSD and WSD	2013	1,265	1,099	666		
			2014	1,255	1,148	723		
		4-Year Change Within Grade Group		64			**276**	**88**
		4-Year % Change Within Grade Group					***13%***	***14%***
		4-Year Change from Prior Grade Group			-43	-213		
	LLSD (all) *(incl. M-A with WHS option)*	Resident Students enrolled	2010	589	501	291		
		in SUHSD and all feeder	2011	601	505	311		
		elementary districts other	2012	621	543	330		
		than PVSD and WSD	2013	614	542	358		
			2014	593	548	368		
		4-Year Change Within Grade Group		4			**51**	**77**
		4-Year % Change Within Grade Group					***5%***	***26%***
		4-Year Change from Prior Grade Group			-41	-133		
	Ravenswood CSD ***part only to M-A HS***	Resident Students enrolled	2010	694	627	575		
		in SUHSD and all feeder	2011	718	639	588		
		elementary districts other	2012	702	627	592		
		than PVSD and WSD	2013	687	623	558		
			2014	701	584	539		
		4-Year Change Within Grade Group		7			**-36**	**-36**
		4-Year % Change Within Grade Group					***-3%***	***-6%***
		4-Year Change from Prior Grade Group			-110	-88		
	Ravenswood CSD ***part in CHS option area***	Resident Students enrolled	2010	748	699	651		
		in SUHSD and all feeder	2011	735	727	611		
		elementary districts other	2012	712	693	587		
		than PVSD and WSD	2013	692	678	625		
			2014	725	689	596		
		4-Year Change Within Grade Group		-23			**-33**	**-55**
		4-Year % Change Within Grade Group					***-2%***	***-8%***
		4-Year Change from Prior Grade Group			-59	-103		
	Ravenswood CSD ***part in WHS option area***	Resident Students enrolled	2010	355	316	269		
		in SUHSD and all feeder	2011	338	335	276		
		elementary districts other	2012	374	339	250		
		than PVSD and WSD	2013	377	321	270		
			2014	361	332	259		
		4-Year Change Within Grade Group		6			**22**	**-10**
		4-Year % Change Within Grade Group					***3%***	***-4%***
		4-Year Change from Prior Grade Group			-23	-57		
	Total for Primary Areas	Resident Students enrolled	2010	3,619	3,112	2,490		
		in SUHSD and all feeder	2011	3,646	3,236	2,499		
		elementary districts other	2012	3,703	3,254	2,471		
		than PVSD and WSD	2013	3,683	3,300	2,547		
			2014	3,672	3,339	2,553		
		4-Year Change Within Grade Group		53			**280**	**63**
		4-Year % Change Within Grade Group					***4%***	***3%***
		4-Year Change from Prior Grade Group			-280	-559		

Columns 1-4 through 9-12 are under the heading **Resident Students by Grade Group**.

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Appendix B1: Recent Resident Student Population Trends by High School Attendance Area Sections*

HS Region	Section	Data Subject	Oct. of	Resident Students by Grade Group 1-4	5-8	9-12	1-8	9-12
All but PVSD and WSD (in SUHSD)	**All but PVSD and WSD**	Resident Students enrolled in SUHSD and all feeder elementary districts other than PVSD and WSD	2010	10,446	9,141	7,748		
			2011	10,786	9,417	7,933		
			2012	10,916	9,622	8,079		
			2013	10,765	9,738	8,228		
			2014	10,586	9,929	8,332		
		4-Year Change Within Grade Group		140			**928**	**584**
		4-Year % Change Within Grade Group					***5%***	***8%***
		4-Year Change from Prior Grade Group			-517	-809		
All SUHSD	**All**	Resident Students enrolled in SUHSD and all feeder elementary districts	2010	*N/A*		7,913		
			2011	*N/A*		8,111		
			2012	*N/A*		8,270		
			2013	11,259	10,220	8,419		
			2014	*N/A*		8,532		
		4-Year Change Within Grade Group						**619**
		4-Year % Change Within Grade Group						***8%***
All non-SUHSD (inter-district to SUHSD)	**All but PVSD and WSD**	Resident Students enrolled in SUHSD and all feeder elementary districts other than PVSD and WSD	2010	113	105	125		
			2011	75	87	95		
			2012	81	90	73		
			2013	70	74	54		
			2014	61	76	58		
		4-Year Change Within Grade Group		-52			**-81**	**-67**
		4-Year % Change Within Grade Group					***-37%***	***-54%***
		4-Year Change from Prior Grade Group			-37	-47		

* Resident students are those listed at home addresses within the specified area, regardless of the school they attend (among the school districts listed). The only charter school students included are from the charters in the Redwood City SD.

Notes: (1) Changes are over four years for groupings of four grades, with 1-4 compared to the prior 1-4, 5-8 to the prior 1-4, 9-12 to the prior 5-8 and 1-12 to the prior 1-12. (2) Transitional Kindergarten (TK) and Kindergarten (K) are excluded from this data. (3) Totals by elementary district regions may differ slightly between this and other tables because some student addresses could not be precisely located, such as by a housing type, but were assignable by larger areas such as high school attendance areas. (4) Totals do not add up to aggregate 1-12 enrollments of all relevant districts because a few completely unassignable addresses are excluded from this data.

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Appendix B2: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in BRSSD Region

Housing Type and Relative Value	Subject	Oct. of	K	1	2	3	4	5	6	7	8	9	10	11	12	K-8 Total & Cum. Rate	9-12 Total
			Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade														
SFD: Modest,	Resident Students	2010	114	148	119	96	91	99	100	78	98	78	90	86	75	943	329
Moderate and		2011	105	116	141	118	89	86	105	94	71	97	73	89	90	925	349
Hillside Mixed		2012	119	107	123	144	121	90	103	110	94	84	95	77	90	1,011	346
Value - *All Areas*		2013	104	118	110	122	150	119	97	103	105	92	84	96	84	1,028	356
(excludes high value hills)		2014	123	114	109	115	127	150	127	104	99	100	90	81	96	1,068	367
	3-Yr. Rate of Change from Prior Grade			1.04	1.00	1.02	1.04	1.00	1.11	1.04	0.97	**1.04**	0.99	1.01	1.03	**1.23**	
	4-Yr. Rate of Change from Prior Grade			1.04	0.98	1.02	1.01	0.99	1.10	1.02	0.96	**1.02**	0.97	1.00	1.03	**1.11**	
SFD: Middle to	Resident Students	2010	74	79	88	77	71	71	72	73	59	58	69	45	75	664	247
High Income -		2011	88	67	87	89	82	71	86	76	76	64	67	69	49	722	249
West of US 101		2012	83	88	70	84	85	82	78	86	72	72	64	66	72	728	274
(includes high		2013	78	79	96	69	89	89	83	76	92	81	72	65	67	751	285
value hills)		2014	87	83	89	95	79	91	106	86	83	87	82	74	65	799	308
	3-Yr. Rate of Change from Prior Grade			1.01	1.09	0.98	1.05	1.02	1.10	1.00	1.04	**1.01**	1.00	1.01	1.02	**1.32**	
	4-Yr. Rate of Change from Prior Grade			0.99	1.09	0.99	1.07	1.02	1.14	1.02	1.04	**1.02**	1.04	1.01	1.03	**1.40**	
SFD: Middle to	Resident Students	2010	88	72	72	82	72	64	78	62	48	34	39	30	31	638	134
High Income -		2011	78	89	75	71	79	71	62	76	66	35	34	41	30	667	140
East of US 101		2012	86	74	86	75	74	82	77	62	75	60	33	36	41	691	170
		2013	70	79	76	86	69	73	74	74	64	64	56	34	38	665	192
		2014	71	76	80	75	86	69	66	71	72	60	62	54	34	666	210
	3-Yr. Rate of Change from Prior Grade			0.98	1.00	1.00	0.99	1.01	0.96	0.97	1.00	**0.90**	0.95	1.02	1.02	**0.91**	
	4-Yr. Rate of Change from Prior Grade			1.00	1.01	0.99	0.98	1.00	0.96	0.97	1.01	**0.87**	0.96	1.02	1.01	**0.93**	
ATT:	Resident Students	2010	82	83	60	53	61	66	60	51	62	70	51	56	63	578	240
Most Affordable		2011	66	71	68	63	58	63	71	72	50	64	76	59	52	582	251
and Affordable		2012	64	80	76	72	54	57	63	68	72	60	60	73	61	606	254
(incl. one MHP)		2013	80	66	76	61	71	70	63	64	73	71	65	75	70	624	281
		2014	77	77	73	82	63	72	64	66	61	70	70	64	72	635	276
	3-Yr. Rate of Change from Prior Grade			1.07	1.04	0.98	0.96	1.10	1.01	1.01	1.01	**1.05**	1.00	1.07	0.98	**1.17**	
	4-Yr. Rate of Change from Prior Grade			1.01	1.00	1.01	1.00	1.07	1.01	1.05	1.00	**1.03**	1.02	1.08	0.97	**1.16**	
ATT: Modest to	Resident Students	2010	53	57	47	50	36	48	34	38	31	33	26	28	23	394	110
High Amenity		2011	67	54	57	42	50	40	48	32	38	38	34	25	29	428	126
(K-12 totals <500		2012	72	76	54	60	49	50	36	48	34	38	36	35	24	479	133
can create much		2013	68	68	73	57	56	45	51	37	46	44	35	38	37	501	154
larger rate shifts)		2014	74	68	73	81	56	56	47	51	38	47	42	36	41	544	166
	3-Yr. Rate of Change from Prior Grade			1.03	1.01	1.07	1.03	0.97	0.99	1.01	1.02	**1.11**	0.94	1.04	1.03	**1.13**	
	4-Yr. Rate of Change from Prior Grade			1.02	1.02	1.04	1.02	1.01	1.00	0.99	1.01	**1.12**	0.96	1.02	1.04	**1.10**	

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD and SUHSD files. Students enrolled in PVSD and WSD are excluded. NPS students are excluded from SUHSD counts. (2) Final year weighted 150% in four-year change rates. (3) BRSSD K counts incl. TK in 2012 only.

Appendix B3: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in SCSD Region

2014-15 SUHSD Attendance Area Section	Subject	Oct. of	Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade													K-8 Total & Cum. Rate	9-12 Total
			K	1	2	3	4	5	6	7	8	9	10	11	12		
Carlmont part (including option)	Resident Students	2010	162	145	142	148	134	117	136	148	141	117	124	100	103	1,273	444
		2011	149	166	150	158	154	134	128	140	155	129	128	128	108	1,334	493
		2012	161	151	162	151	153	149	133	134	142	143	132	127	130	1,336	532
		2013	164	166	160	158	155	153	147	134	131	121	139	128	124	1,368	512
		2014	154	151	171	160	160	155	164	153	134	126	125	139	120	1,402	510
	3-Yr. Rate of Change from Prior Grade			0.99	1.02	0.99	1.00	0.99	1.02	1.03	1.00	**0.91**	1.01	0.99	0.98	**1.04**	
	4-Yr. Rate of Change from Prior Grade			0.99	1.03	1.02	1.01	0.99	1.04	1.03	1.01	**0.92**	1.03	1.00	1.00	**1.13**	
Sequoia part	Resident Students	2010	178	190	140	159	118	135	132	113	123	72	107	79	90	1,288	348
		2011	175	186	195	141	160	118	135	129	116	101	75	111	87	1,355	374
		2012	161	175	183	197	145	155	110	133	127	93	100	71	110	1,386	374
		2013	187	157	164	174	196	136	149	105	131	99	90	95	75	1,399	359
		2014	145	161	155	161	174	192	130	154	104	110	97	92	94	1,376	393
	3-Yr. Rate of Change from Prior Grade			0.95	0.97	0.98	1.01	0.96	0.95	0.99	0.99	**0.81**	0.98	0.97	1.01	**0.81**	
	4-Yr. Rate of Change from Prior Grade			0.96	0.98	0.99	1.01	0.97	0.96	0.99	1.00	**0.81**	0.99	0.99	1.03	**0.87**	

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD and SUHSD files. Students enrolled in PVSD and WSD are excluded. NPS students excluded from SUHSD counts. (2) Final year weighted 150% in four-year change rates. (3) SCSD K counts incl. TK in 2012 and 2013.

Appendix B4: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in Redwood CSD Region

Housing Type and Relative Value	Subject	Oct. of	Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade													TK-8 Total & Cum. Rate	9-12 Total
			TK+K	1	2	3	4	5	6	7	8	9	10	11	12		
SFD: Modest	Resident Students	2010	168	165	174	163	155	166	150	148	139	152	124	110	133	1,428	519
		2011	176	173	169	168	164	145	168	154	144	128	141	126	118	1,461	513
		2012	197	161	168	153	162	164	135	162	148	123	129	152	133	1,450	537
		2013	179	178	144	167	161	168	139	124	159	121	129	134	170	1,419	554
		2014	143	155	173	143	180	142	145	127	118	124	137	125	149	1,326	535
	3-Yr. Rate of Change from Prior Grade			0.89	0.95	0.96	1.03	0.97	0.88	0.93	0.96	**0.82**	1.06	1.03	1.10	**0.65**	
	4-Yr. Rate of Change from Prior Grade			0.92	0.97	0.97	1.03	0.95	0.91	0.95	0.97	**0.84**	1.04	1.02	1.09	**0.71**	
SFD: Mix Modest to Middle Income	Resident Students	2010	83	75	65	71	76	76	77	67	84	79	66	77	89	674	311
		2011	75	85	76	60	70	75	71	71	69	85	81	68	80	652	314
		2012	60	70	73	76	61	71	68	69	67	75	93	89	73	615	330
		2013	72	60	64	81	80	68	63	70	74	80	87	94	93	632	354
		2014	67	61	56	67	78	77	64	62	74	76	87	84	100	606	347
	3-Yr. Rate of Change from Prior Grade			0.93	0.90	1.05	1.01	1.03	0.91	1.00	1.02	**1.10**	1.11	1.03	1.06	**0.85**	
	4-Yr. Rate of Change from Prior Grade			0.94	0.93	1.02	1.00	1.01	0.92	0.98	1.03	**1.07**	1.09	1.02	1.06	**0.84**	
SFD: Combined Modest and Mix Modest to Middle	Resident Students	2010	251	240	239	234	231	242	227	215	223	231	190	187	222	2,102	830
		2011	251	258	245	228	234	220	239	225	213	213	222	194	198	2,113	827
		2012	257	231	241	229	223	235	203	231	215	198	222	241	206	2,065	867
		2013	251	238	208	248	241	236	202	194	233	201	216	228	263	2,051	908
		2014	210	216	229	210	258	219	209	189	192	200	224	209	249	1,932	882
	3-Yr. Rate of Change from Prior Grade			0.90	0.93	0.99	1.02	0.99	0.89	0.95	0.98	**0.91**	1.08	1.03	1.08	**0.71**	
	4-Yr. Rate of Change from Prior Grade			0.93	0.96	0.98	1.02	0.97	0.91	0.96	0.99	**0.91**	1.06	1.02	1.08	**0.74**	
SFD: Mix Middle to Upper Income	Resident Students	2010	154	183	165	150	151	150	149	144	112	120	137	125	149	1,358	531
		2011	154	146	185	169	149	147	155	152	143	114	130	139	135	1,400	518
		2012	159	151	149	178	162	150	142	157	147	142	112	138	147	1,395	539
		2013	138	160	148	154	171	160	148	135	152	144	141	113	136	1,366	534
		2014	144	130	160	145	154	165	154	144	133	147	143	149	122	1,329	561
	3-Yr. Rate of Change from Prior Grade			0.98	1.00	0.99	0.97	0.99	0.97	0.98	0.97	**0.98**	0.99	1.04	1.04	**0.86**	
	4-Yr. Rate of Change from Prior Grade			0.97	1.00	1.00	0.98	0.98	0.98	0.99	0.98	**0.99**	1.01	1.04	1.05	**0.88**	

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Appendix B4: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in Redwood CSD Region

Housing Type and Relative Value	Subject	Oct. of	Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade: TK+K	1	2	3	4	5	6	7	8	9	10	11	12	TK-8 Total & Cum. Rate	9-12 Total
ATT: Affordable	Resident Students	2010	124	119	110	119	106	105	80	90	68	78	84	88	71	921	321
		2011	141	121	123	113	118	104	108	80	90	63	77	81	81	998	302
		2012	105	137	117	125	116	115	114	104	89	87	70	79	91	1,022	327
		2013	122	97	132	106	117	105	95	100	101	89	86	81	89	975	345
		2014	113	107	94	131	101	123	91	106	98	89	93	76	82	964	340
	3-Yr. Rate of Change from Prior Grade			0.92	0.97	0.97	0.97	0.98	0.93	0.99	1.02	**0.95**	1.05	1.02	1.09	**0.77**	
	4-Yr. Rate of Change from Prior Grade			0.93	0.98	0.99	0.97	0.99	0.94	1.00	1.01	**0.94**	1.03	0.99	1.04	**0.83**	
MIX: Affordable to Modest	Resident Students	2010	363	355	331	322	305	295	297	280	284	253	234	255	258	2,832	1,000
		2011	367	364	345	335	318	307	294	288	280	266	257	231	278	2,898	1,032
		2012	325	350	328	349	336	310	300	286	304	240	273	258	268	2,888	1,039
		2013	345	276	343	321	340	332	298	296	273	242	244	257	278	2,824	1021
		2014	303	297	270	331	306	329	321	276	290	227	233	259	289	2,723	1008
	3-Yr. Rate of Change from Prior Grade			0.89	0.95	0.99	0.98	0.98	0.97	0.96	1.00	**0.83**	1.00	1.00	1.12	**0.74**	
	4-Yr. Rate of Change from Prior Grade			0.91	0.96	0.99	0.98	0.98	0.97	0.96	1.00	**0.85**	1.00	1.01	1.11	**0.77**	
MIX: Moderate to Middle Income	Resident Students	2010	192	171	194	168	160	177	146	143	166	151	165	160	162	1,517	638
		2011	181	180	166	189	163	160	170	154	137	189	154	174	164	1,500	681
		2012	168	178	163	169	179	157	153	170	144	153	187	155	171	1,481	666
		2013	151	152	163	173	156	174	157	156	172	141	158	188	168	1,454	655
		2014	153	144	144	171	172	168	174	151	163	174	163	151	190	1,440	678
	3-Yr. Rate of Change from Prior Grade			0.95	0.92	1.04	0.95	1.00	0.99	0.99	1.00	**1.04**	1.06	0.99	1.03	**0.85**	
	4-Yr. Rate of Change from Prior Grade			0.95	0.94	1.03	0.96	1.01	0.98	1.00	0.99	**1.06**	1.06	1.00	1.02	**0.87**	
MHP	Resident Students	2010	28	27	25	23	20	31	23	32	22	26	18	30	20	231	94
(K-12 totals <500		2011	26	25	28	26	25	22	30	24	29	21	25	16	29	235	91
can create much		2012	34	28	22	31	28	26	25	34	28	23	23	25	26	256	97
larger rate shifts)		2013	29	31	25	27	33	31	31	29	35	26	24	22	28	271	100
		2014	29	27	34	27	29	28	24	30	30	20	27	26	23	258	96
	3-Yr. Rate of Change from Prior Grade			0.97	0.96	1.14	1.07	1.00	1.03	1.09	1.08	**0.76**	1.06	1.01	1.26	**1.37**	
	4-Yr. Rate of Change from Prior Grade			0.95	0.99	1.11	1.08	1.00	0.99	1.06	1.03	**0.79**	1.04	0.99	1.17	**1.23**	

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD and SUHSD files in all years, with PVSD and WSD files included in 2013 and 2014. NPS excluded from SUHSD counts. (2) Final year weighted 150% in four-year change rates. (3) These K counts incl. TK in 2012 and 2013.

Appendix B4, page 2 of 2

Appendix B5: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in MPCSD Region

Housing Type and Relative Value	Subject	Oct. of	K	1	2	3	4	5	6	7	8	9	10	11	12	K-8 Total & Cum. Rate	9-12 Total
			Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade														
SFD: Moderate	Resident Students	2010	128	108	106	78	116	84	69	61	70	48	55	50	38	820	191
		2011	109	133	109	106	79	115	82	67	61	53	50	53	51	861	207
		2012	114	106	135	107	100	83	112	86	69	54	56	48	54	912	212
		2013	102	106	107	129	107	98	87	116	84	65	52	60	47	936	224
		2014	102	107	116	105	128	110	99	82	117	74	70	54	64	966	262
	3-Yr. Rate of Change from Prior Grade		0.98	1.04	0.97	0.98	1.02	1.01	1.01	1.01	**0.90**	1.03	1.02	1.02		**1.02**	
	4-Yr. Rate of Change from Prior Grade		1.00	1.04	0.98	0.99	1.01	1.00	0.99	1.00	**0.87**	1.04	1.01	1.03		**1.02**	
SFD: Middle	Resident Students	2010	77	100	83	84	91	79	68	68	56	55	26	46	35	706	162
		2011	79	74	103	82	84	87	69	67	70	40	55	28	45	715	168
		2012	83	77	77	104	83	90	68	69	63	54	39	54	28	714	175
		2013	83	91	78	79	102	80	79	68	72	47	52	38	49	732	186
		2014	67	88	89	78	79	107	80	79	69	60	46	52	35	736	193
	3-Yr. Rate of Change from Prior Grade		1.04	1.01	1.01	1.00	1.03	0.89	1.00	1.00	**0.78**	0.97	0.99	0.94		**0.97**	
	4-Yr. Rate of Change from Prior Grade		1.03	1.01	1.01	1.00	1.01	0.90	1.00	1.01	**0.77**	0.98	1.01	0.95		**0.95**	
SFD: High	Resident Students	2010	46	55	53	54	68	76	49	43	59	42	34	44	48	503	168
(K-12 totals <500		2011	49	48	61	53	52	67	67	44	43	41	43	33	47	484	164
can create much		2012	45	47	44	61	54	50	55	63	41	30	41	40	31	460	142
larger rate shifts)		2013	37	44	48	48	54	55	45	55	63	31	29	37	43	449	140
		2014	36	43	46	51	57	50	49	52	60	46	31	30	42	444	149
	3-Yr. Rate of Change from Prior Grade		1.03	0.99	1.05	1.03	0.97	0.87	1.03	1.01	**0.73**	0.99	0.96	1.05		**0.98**	
	4-Yr. Rate of Change from Prior Grade		1.05	1.03	1.04	1.03	0.97	0.88	1.02	1.02	**0.72**	1.00	0.97	1.06		**1.01**	
Attached*	Resident Students	2010	57	47	53	37	35	48	29	31	35	28	29	19	30	372	106
(K-12 totals <500		2011	56	55	50	53	39	36	48	34	31	25	28	31	18	402	102
can create much		2012	77	65	48	50	54	36	33	49	31	23	21	28	25	443	97
larger rate shifts)		2013	67	73	71	45	51	53	37	39	50	29	25	23	28	486	105
		2014	76	62	71	59	43	46	51	37	36	36	25	22	22	481	105
	3-Yr. Rate of Change from Prior Grade		1.01	0.98	0.92	1.00	0.94	0.97	1.07	0.95	**0.80**	0.93	0.99	0.92		**0.84**	
	4-Yr. Rate of Change from Prior Grade		0.99	1.00	0.93	1.01	0.95	0.98	1.08	0.96	**0.77**	0.94	1.00	0.93		**0.89**	

*All Attached counts in the MPCSD include any students from the 25 townhouses in the "Pacific Parc" complex that was transferred from the Ravenswood CSD on 7/1/12.
Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD and SUHSD files. Students enrolled in PVSD and WSD are excluded. NPS students are excluded from SUHSD counts. (2) Final year weighted 150% in four-year change rates. (3) No MPCSD K counts incl. TK.

Appendix B6: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in LLSD Region

Housing Type	Subject	Oct. of	K	1	2	3	4	5	6	7	8	9	10	11	12	K-8 Total & Cum. Rate	9-12 Total
			Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade														
SFD	Students	2010	129	131	125	113	121	113	106	93	104	58	74	68	52	1,035	252
		2011	126	133	127	128	119	119	104	110	94	71	59	72	68	1,060	270
		2012	128	122	137	121	125	122	117	112	108	74	73	66	73	1,092	286
		2013	103	126	126	134	124	123	109	114	110	96	72	72	67	1,069	307
		2014	100	106	121	133	125	123	109	111	115	71	96	74	77	1,043	318
	3-Yr. Rate of Change from Prior Grade			0.99	1.01	1.00	0.98	1.00	0.92	1.02	0.99	**0.77**	1.00	1.04	1.03	**0.91**	
	4-Yr. Rate of Change from Prior Grade			1.01	0.99	1.01	0.99	1.00	0.92	1.03	1.00	**0.74**	1.00	1.03	1.03	**0.93**	
ATT (incl. a few Webb Ranch stu.) *(K-12 totals <500 can create much larger rate shifts)*	Students	2010	20	33	18	20	28	25	18	23	17	13	5	10	10	202	38
		2011	31	24	32	20	18	21	21	17	18	15	12	5	9	202	41
		2012	24	33	24	35	24	25	24	20	14	15	14	9	6	223	44
		2013	15	22	28	23	32	26	19	24	19	13	14	15	9	208	51
		2014	24	26	22	27	34	32	28	12	19	11	12	14	13	224	50
	3-Yr. Rate of Change from Prior Grade			1.24	0.95	1.01	1.20	1.16	0.99	0.86	0.86	**0.78**	0.93	0.94	1.02	**1.20**	
	4-Yr. Rate of Change from Prior Grade			1.28	0.96	1.02	1.16	1.05	0.97	0.85	0.83	**0.78**	0.93	0.96	0.98	**1.06**	

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD and SUHSD files. Students enrolled in PVSD and WSD are excluded. NPS students are excluded from SUHSD counts. (2) Final year weighted 150% in four-year change rates. (3) The LLSD does not have a TK program.

Appendix B7: More Info on Student Populations and Grade-to-Grade Advancement Rates in Ravenswood CSD, Combined PVSD-WSD and Non-SUHSD Regions

Category	Subject	Oct. of	K*	1	2	3	4	5	6	7	8	9	10	11	12	K-8 Total & Cum. Rate	9-12 Total
			Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade														
Ravenswood	Resident Students	2010	446	469	475	455	434	420	443	420	387	349	341	407	407	3,949	1,504
CSD Region*	enrolled in SUHSD	2011	483	433	452	467	442	430	433	428	418	319	356	347	459	3,986	1,481
	and all feeder ESDs	2012	502	478	429	432	458	436	407	398	425	348	321	351	414	3,965	1,434
	except PVSD and	2013	481	458	466	418	428	448	388	407	392	344	343	334	434	3,886	1,455
	WSD	2014	416	472	454	455	417	419	415	378	398	340	345	334	378	3,824	1,397
	3-Yr. Rate of Change from Prior Grade			0.96	0.99	0.97	0.99	0.98	0.92	0.96	0.99	**0.84**	1.00	1.00	1.19	**0.78**	
	4-Yr. Rate of Change from Prior Grade			0.97	0.98	0.97	0.99	0.98	0.95	0.97	0.99	**0.84**	1.00	1.00	1.17	**0.81**	
Merged PVSD-	Student Counts	2010										37	57	38	33		165
WSD Region**		2011										38	40	58	42		178
(combination of		2012										41	49	41	60		191
PVSD and WSD		2013	92	112	97	114	111	137	96	101	100	56	39	53	43	960	191
students available		2014										48	58	43	51		200
from solely 2013)																	
	1-Yr. Rate of Change from Prior Grade											**0.48**					
	3-Yr. Rate of Change from Prior Grade												1.09	1.07	1.02		
	4-Yr. Rate of Change from Prior Grade												1.08	1.06	1.03		
Outside SUHSD	Resident Students	2010	27	26	31	27	29	24	29	24	28	21	33	34	37	245	125
Region	enrolled in SUHSD	2011	20	16	18	21	20	24	17	26	20	15	17	30	33	182	95
(K-12 totals <500	and all feeder ESDs	2012	15	20	23	15	23	18	25	18	29	8	17	12	36	186	73
can create much	except PVSD and	2013	12	13	14	21	22	17	15	23	19	6	12	16	20	156	54
larger rate shifts)	WSD	2014	11	15	8	18	20	16	17	15	28	5	12	18	23	148	58
	3-Yr. Rate of Change from Prior Grade			1.04	0.92	1.01	1.17	0.79	0.96	0.99	1.13	**0.29**	1.54	1.05	1.43	**0.96**	
	4-Yr. Rate of Change from Prior Grade			0.96	0.83	0.97	1.05	0.79	0.91	0.97	1.07	**0.34**	1.43	1.07	1.33	**0.61**	

* All Ravenswood CSD regional counts exclude any students from the 25 townhouses in the "Pacific Parc" complex that was transferred to the MPCSD on 7/1/12. Projected numbers from this region include estimates of the PVSD- and WSD-enrolled contributions.

** PVSD enrollment in Oct. 2012 contained 46 Tinsley students in a total of 672 students. Combined PVSD and WSD enrollment in Oct. 2013 contained 89 Tinsley students. PVSD enrollment in Oct. 2014 had 55 Tinsley students in a total of 623 students. No other Tinsley components of those school districts' enrollments were determined.

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD and SUHSD files (other than in the merged PVSD-WSD region, within which the counts are from only those districts and the SUHSD). (2) Final year of change is weighted by 150% in the four-year change rates.

DRAFT REVISED Table 1A: Actual SUHSD-Enrolled Resident and Attending Amounts in October 2014 and Projected Resident SUHSD-Enrolled Students (grades 9-12) for Totals in the Pending High School Attendance Areas*

	Actual October 1, 2014			Projected SUHSD-Enrolled October Resident Students								
				Total Resident Students					Change from 2014			
School	Resident Students	Attend Adjust**	Attending Enrollment	2015	2016	2018	**2020**	2024	**2015**	**2016**	**2018**	**2020**
Carlmont	**1,849**	**336**	2,185	1,889	1,952	2,154	**2,382**	2,464	**40**	**103**	**305**	**533**
Sequoia	**2,202**	**-59**	2,143	2,188	2,238	2,272	**2,303**	2,027	**-14**	**36**	**70**	**101**
Woodside	**1,928**	**-113**	1,815	1,910	1,892	1,967	**2,022**	1,769	**-18**	**-36**	**39**	**94**
Menlo-Atherton	**2,556**	**-395**	2,161	2,651	2,687	2,745	**2,796**	2,692	**95**	**131**	**189**	**240**
Redwood	(NA)	297	297					NA				
SUHSD Total	8,535	66	8,601	8,638	8,769	9,138	9,503	8,952	103	234	603	968
Incoming Inter-District Attend.	66	-66	(NA)	64	64	72	71	72	-2	-2	6	5
All Areas	**8,601**			**8,702**	**8,833**	**9,210**	**9,574**	9,024	**101**	**232**	**609**	**973**

Low Point in Range of Equally Possible Totals in 2020 (essentially -2%) *9,380*
High Point in Range of Equally Possible Totals in 2020 (essentially +2%) *9,770*

*Realistic Maximum Potential Lower Total in 2020 (essentially -5% over six years)**** *9,100*
*Realistic Maximum Potential Higher Total in 2020 (essentially +5% over six years)**** *10,050*

* All resident figures are for next year's primary assigned school of each in-district address (i.e., ignoring possible options). These totals include SDC, Redwood High and Independent Study students but exclude NPS students, students enrolled in charter high schools, eighth graders taking SUHSD classes and adult education. (Previous forecast numbers included NPS and Community Day School students.) Small numbers of current elementary feeder district students who are listed at unlocatable addresses are included in the counts for the closest relevant high school once they reach the high school grades. The actual October 1, 2014, counts are based on student records provided to EPC by the SUHSD, *but are for the attendance areas effective at the start of the 2015-16 school year.*

** Net attending adjustments include intra-district and incoming inter-district students as if next year's attendance areas already existed.

*** These realistic maximum potential range numbers are for currently operating facilities and programs (including at local charter and private schools), with the range covering essentially an 80% probability. Under these assumptions, there are approximately 10% possibilities for each of even lower or higher numbers than the range shown. Socio-economic shifts factor into these possibilities.

Note: The projections contain hidden fractional amounts, so the rounded totals shown here may not exactly match those in other tables.

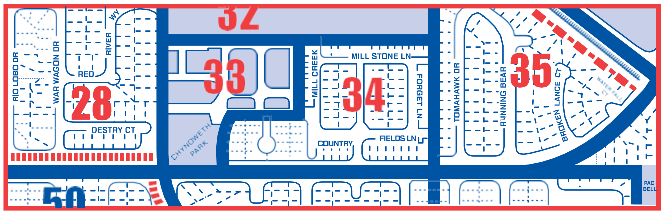
ENROLLMENT PROJECTION CONSULTANTS

Providing School Districts with Accurate Enrollment Forecasts by Location

Area 32
Older Mobile Home Park
450 units, 90 K-8 students, 0.20 SGR

Area 28
Recent Upper-Income Det. Homes
218 units, 85 K-8 students, 0.39 SGR

Area 33
Recent Upscale Townhouses
82 units, 9 K-8 students, 0.11 SGR



Area 34
Recent Middle-Income Det. Homes
94 units, 33 K-8 students, 0.35 SGR

Area 35
Older Middle-income Det. Homes
89 units, 57 K-8 students, 0.64 SGR

Elementary and Middle School
Attendance Boundaries

Superintendent and Board Members
Sequoia Union High School District
480 James Avenue
Redwood City, CA 94062-1098

December 3, 2013

Dear Superintendent and Board Members:

This is the concluding documentation to the enrollment forecast update. The sections below provide a summary of the findings and some background information. Subsequent sections follow the order of the tables, starting with the projected enrollments in Table 1 and then the underlying factors to those numbers in Tables 2 and 3. The appendices provide additional details for those who want to delve further into the data.

<u>Projections Summary</u>

Enrollment in the Sequoia Union High School District (SUHSD), aside from that in adult ed. and charter schools, is forecast to rise by over 1,500 students in the next seven years. This includes a gain of 273 students from the "current" (October 2013) 8,521 students to 8,794 for October 2014. The annual rate of projected increase slows slightly in the following 24 months, but another 309 are still added, to a total that exceeds today's figure by 582. The pace then accelerates from 2016 to 2020, with growth by nearly 1,000 more, to an enrollment above 10,000. That would be greater than 1,500 above the current count.[1]

This increase will be concentrated in the Carlmont High attendance area, but all four regular high schools should have resident (home school) student growth occur in their current attendance areas. The projected Carlmont resident population (grades 9-12) adds 85 next year and essentially 600 to 2020, to a total in the upper 2,800s. Nearly 600 of those are forecast from the East Palo Alto portion of that attendance area, but it should be noted that 58% of the current students from that area do not attend Carlmont. The next largest projected increase occurs in the current Menlo-Atherton attendance area, with 80 more resident students in 2014 and a cumulative rise by nearly 400 to 2020. The result would be a resident total above 2,500. Also forecast to reach the 2,500 vicinity, with a gain of close to 300, is the 2020 resident figure for Sequoia High. The lowest amount of growth is projected in the current Woodside High region, with only 35 added in 2014 and 238 to 2020, when the resident count could be close to 2,100.

There is significant intra-district (across attendance boundaries) enrollment in the SUHSD, along with to special schools such as Redwood. Continuing that will create enrollments that differ from the projected resident counts.

Due to nuances now occurring in the lowest grades of the elementary "feeder" districts to the SUHSD, the projected 2020 total of 10,056 SUHSD students could be the maximum achieved in the next decade.

[1] "Today" and "current" refer to the enrollment as of October 2, 2013, in the student file provided to EPC by the SUHSD. This file included enrollment in special schools such as Redwood and Community Day but excluded adult ed. and independent charter schools listed in some State reports as part of the SUHSD enrollment. The projections have been generated in grades 9-12 for those same non-charter populations. It also should be noted that whenever just a year is stated in the text, such as 2020, the reference is for October of that year.

Background Information

Our methodology is based on the use of numerous “planning areas”. In our original study for most client districts, we will drive every street to learn the community and divide it into suitable areas for trend analysis purposes. Each of those areas usually represents a single dominant housing type (wherever feasible) by subjective price ranges and average home and parcel sizes. We have found that even subtle differences in residential type and value can generate divergent enrollment trends in some districts.

This process was applied to varying degrees in the SUHSD region. Our first study for the SUHSD occurred in the 2011-12 school year. As with this study, the goal was neither short-term staffing decisions nor determining the enrollment impacts of potential new housing. Those goals require more refined projections with corresponding cost, especially in terms of the fieldwork required to establish numerous housing-category-specific planning areas. The SUHSD instead requested a lower cost, more generalized trend study suitable for evaluating the high school attendance areas and basic facility capacity needs. We already, however, had provided more in-depth studies for the Menlo Park City (MPCSD), Los Lomitas (LLSD) and Belmont – Redwood Shores (BRSSD) school districts with more refined planned areas and those were used for these SUHSD studies. We also provided some housing situation refinements in 2011-12 in the Redwood City (Redwood CSD) region because that was needed for sufficiently accurate projections in a crucial section of the SUHSD. The impacts of new housing developments such as that proposed next to Seaport Blvd. in Redwood City were not included.

Projected SUHSD Students in Current Attendance Areas

This forecast is based on analyses of where the students live (the resident population[2]) rather than the schools they happen to attend (the attending enrollment). Such analyses are important due to both across-attendance-boundary enrollment, including to special schools such as Redwood, and incoming students from outside the SUHSD region. These intra- and inter-district contributions have blurred the ability to see many of the population shifts that are occurring in different sections of the community. By coding all of the student addresses from the current and several preceding school years to planning areas that represent various housing types and locations, we have been able to identify and evaluate how the student population is evolving in each situation. We flip back-and-forth between these "resident" and "enrollment" amounts in the text below and it is important to remember the distinction between these two types.

Table 1, on page 3, provides summaries of both (1) the current resident and enrollment differences and (2) the projected resident numbers. The following subsection describes how to read these figures.

Understanding the Data in Table 1

Table 1 contains two data sets for each school. The figures on the left, under “Actual October 2, 2013”, show the difference between the current enrollment and the relevant resident student population for each school. Carlmont High, for instance, had 2,200 enrolled students on October 2, 2013, which is 70 less than the SUHSD-enrolled resident population (in 9-12) of 2,270 students. This difference is identified by the “-70” in the top row of the column titled “Attend Adjust” (short for net attending adjustments between resident and enrollment amounts).

The second set of data, on the right side of the table, covers the projected resident amounts in specific years. These are not projected enrollments. They do indicate, however, the extent to which the current attendance areas might continue to be suitable without any revisions. The resident total in the current Carlmont region, for example, rises from 2,270 this year to 2,869 in 2020, which is a 599-student increase. This is shown in the far right column of the table.

[2] “Resident” throughout this report means physical resident, not legal resident.

Table 1: Actual SUHSD-Enrolled Resident and Attending Amounts in October 2013 and Projected Resident SUHSD-Enrolled Students (grades 9-12) for Current High School Attendance Areas

School	Actual October 2, 2013* Resident Students	Attend Adjust**	Attending Enrollment	Projected SUHSD-Enrolled 9-12 October Resident Students (including SDC and NPS; excluding charter school enrollments) Total Students 2014	2016	2018	2020	Change from 2013 2014	2016	2018	2020
Carlmont	**2,270**	**-70**	2,200	**2,355**	**2,449**	**2,660**	**2,869**	**85**	**179**	**390**	**599**
core area	*1,641*	*-89*	*1,552*	*1,756*	*1,865*	*2,074*	*2,295*	*115*	*224*	*433*	*654*
*EPA area****	*629*	*-363*	*266*	*599*	*584*	*586*	*574*	*-30*	*-45*	*-43*	*-55*
*Non-CHS*****	*(NA)*	*382*	*382*								
Sequoia	**2,188**	**-159**	2,029	**2,256**	**2,313**	**2,412**	**2,493**	**68**	**125**	**224**	**305**
Woodside	**1,871**	**-89**	1,782	**1,906**	**1,949**	**2,040**	**2,109**	**35**	**78**	**169**	**238**
core area	*1,600*	*-528*	*1,072*	*1,636*	*1,667*	*1,755*	*1,815*	*36*	*67*	*155*	*215*
*EPA area****	*271*	*-104*	*167*	*270*	*282*	*285*	*294*	*-1*	*11*	*14*	*23*
*Non-WHS******	*(NA)*	*543*	*543*								
Menlo-Atherton	**2,137**	**-60**	2,077	**2,217**	**2,332**	**2,414**	**2,525**	**80**	**195**	**277**	**388**
Redwood	(NA)	311	311								
Community	(NA)	43	43								
Ind. Study	(NA)	40	40								
NPS	(NA)	39	39								
SUHSD Total	8,466	55	8,521	8,734	9,043	9,526	9,996	268	577	1,060	1,530
Incoming Inter-District Attend.	55	-55	(NA)	60	60	60	60	5	5	5	5
All Areas	**8,521**			**8,794**	**9,103**	**9,586**	**10,056**	**273**	**582**	**1,065**	**1,535**

* The actual student counts in grades 9-12 are based on student records provided to EPC by SUHSD (including SDC and NPS but excl. those enrolled in the Aspire EPA Phoenix Academy, Summit Preparatory, Everest and Stanford New charter schools).

** Net attending adjustments include intra-district and incoming inter-district students.

*** Some (non-charter) students in East Palo Alto parts of Carlmont and Woodside High attendance areas currently attend M-A.

**** CHS currently enrolls 278 from SHS region, 66 from WHS region, 24 from MAHS region and 14 inter-district/unlocatable.

***** WHS currently enrolls 296 from SHS region, 130 from MAHS region, 98 from CHS region and 19 inter-district/unlocatable.

Notes: (1) Small numbers of students listed at unlocatable addresses are included in the counts for the closest relevant high school. (2) All resident figures include NPS and Independent Study students and the students enrolled in any special schools other than charters. (3) Enrollments could be stable or slightly declining for several years after 2020 due to shifts occuring in the kindergarten eligibility birthdate cutoff (evolving from December 2 to September 1) which results in three adjacent student body classes containing essentially only eleven months of births. Those classes start to reach the high school grades in 2021-22.

Key Findings Related to the Data in Table 1: Current Resident-to-Attending Differences

The current attendance areas do not correlate closely to actual attendance in some situations. This is particularly true for the East Palo Alto (EPA) areas that are assigned to Carlmont and Woodside, as well as for Woodside in general. Carlmont's "EPA area" has 629 SUHSD students, but only 266 (42%) currently attend that school. The Woodside High "EPA area" has only 167 out of 271 (62%) attending the home school. The rest of the Woodside attendance area, which we refer to as the "core area" because it surrounds that campus, also has little to do with attendance. Of the 1,600 resident students in that "core area", only 1,072 (67%) attend Woodside. The other 528 are enrolled elsewhere in the SUHSD, but those are almost perfectly offset by 543 enrolled at Woodside (30% of the total enrollment there) from outside of that attendance area.

It is important to remember these resident-to-attending differences as the District considers any attendance area shifts (to deal with the projected student increase). Some shifts could follow what is now occurring in attendance, with the majority of the students in those neighborhoods already attending the newly assigned school. Other shifts may not move many students from the school intended to be relieved unless attendance area enrollment is more firmly enforced (i.e., future students in the shifted neighborhoods generally would not be allowed to attend the former home school).

Also realize that all resident totals will at least slightly overstate the probable future enrollments, even with strict attendance area enforcement. The reason is that some of those resident students will be enrolled in the special schools of Redwood, Community, Independent Study and "NPS" (for non-public-school students, but with some connection to the SUHSD for enrollment tracking purposes).

Key Findings Related to the Data in Table 1: Projected Resident Changes in the Existing Attendance Areas

The SUHSD enrollment should rise at a significant rate over the next seven years, resulting in a projected gain of more than 1,500 additional students to 2020. This includes an increase by 273 in 2014. A slower growth rate is expected for the SUHSD enrollment in the following two years, but that 582-student increase during the next 36 months still raises the district total to essentially 9,100 in 2016. The current enrollment, by comparison, is 8,521.[3]

Due to both (1) the current resident student distributions through all of the grades (TK-12, with TK explained later) and (2) improved graduation rates into ninth from the relevant districts, the largest increase to 2016 (in 9-12) should occur in the current Menlo-Atherton region. That attendance area is projected to have 195 more resident students in three years. The current Carlmont region is a close second with 179 additional resident students projected. The current Sequoia and Woodside areas are forecast for only 125 and 78 more resident students, respectively, to 2016.

The resident growth after then, however, should be concentrated in the Carlmont region. That attendance area is projected to add over 400 more students between 2016 and 2020; none of the other school totals rise by even an additional 200 during that time.[4] The resultant projected resident totals in 2020 are in the upper 2,800s for Carlmont, close to 2,500 for both Sequoia and Menlo-Atherton and only around 2,100 for Woodside.

We should note, however, that intra-district enrollment patterns will alter these resident numbers. The SUHSD has just adopted a new policy specifically allowing any EPA students to attend Menlo-Atherton, if space permits, even if they reside in the Woodside- or Carlmont-assigned sections of that community. This should create more intra-attendance into Menlo-Atherton and out of Carlmont and Woodside. The extent of those transfers could depend, in part, on factors such as (1) the degree that busing continues to conveniently occur to the latter schools and (2) any differences in the perceived educational quality at the various facilities (such as from "API" scores). Nonetheless, Menlo-Atherton could have a higher enrollment than Carlmont in 2020 (for the current attendance areas) with this new policy, especially if combined with other limits placed on intra-district attendance at Carlmont.

The total enrollment is projected to reach 10,056 in seven years, or 1,535 above the current figure, to what could be the maximum reached in the next decade. There are nuances in the lowest feeder district grades today that suggest a slight SUHSD enrollment decline after 2020 (as is discussed on page 10).

Underlying Factors to the Projections: Recent Student Population Evolution

The short-term enrollment trends determined in the previous study had two key issues. The first came from four of the elementary districts, namely the BRSSD, San Carlos (SCSD), MPCSD and LLSD, having had dramatic enrollment growth. As we noted in that study's report, your feeder districts, in aggregate, added more than 1,800

[3] These SUHSD totals are shown in the bottom row of Table 1 on page 3.

[4] All current attendance areas are projected to add more than 200 resident SUHSD-enrolled students between 2013 and 2020. These smaller amounts are for the portions of the growth occurring after 2016.

resident students (K-8) in the preceding three years, with most of that growth occurring in those four districts. The SUHSD total had risen by only slightly over 200 during that time. It was evident that the SUHSD's total would increase more rapidly once those larger by-grade totals in the feeder districts started graduating into ninth; the first key issue thus was by how much. Partly counteracting that finding was the second key issue of low net graduation rates from eighth to ninth in several situations. This had occurred to significant degrees in the Ravenswood City (Ravenswood CSD), MPCSD, LLSD, Woodside (WSD) and Portola Valley (PVSD) regions. The combination of these two key findings was a clear indication that the subsequent SUHSD enrollment growth would be most significant in the current Carlmont High attendance area, but there also was significant upside potential for the Menlo-Atherton and Woodside High resident numbers if those graduation rates into ninth became much higher. Our main concern then was that the limited period for which the student home-address trend data was available (by just three years of change for most districts and only one year of change for the Ravenswood CSD) might be exaggerating these findings.

We now know, with two additional years of student data by their home address locations, that most of those findings were not anomalies specific to that 2008-to-2011 period. The BRSSD, in particular, has continued to have tremendous student growth. As expected, some of those larger resident numbers have started to graduate into Carlmont. Student gains elsewhere in the elementary grades generally have slowed and in a few cases, such as in the Ravenswood CSD, there instead has been ongoing (modest) enrollment decline. Some of the unusually low rates entering ninth have risen moderately, but others have had minimal or no change. The result is that these updated projection numbers are higher for the current Carlmont attendance area but otherwise are close to the previous forecast estimates.

These latest locational trend differences are summarized in Table 2 (see page 6). As is shown in the far right column of that table, the previously mentioned Carlmont "core area" (labeled "All but Ravenswood CSD part" in Table 2) added 525 resident elementary (TK-8) and 279 resident SUHSD students since 2010. These amounts are over 50% of the total increase in those grade levels for the entire SUHSD region. The next highest gains were in the non-Ravenswood-CSD part of the Menlo-Atherton attendance area, with 299 more in TK-8 and 122 more in 9-12. The Sequoia, Woodside and Ravenswood CSD areas, by contrast, had little change in those resident totals, with each being within 100 students of the prior counts.

There also is now a significant range in the TK-8 totals for the four current SUHSD attendance areas. Menlo-Atherton has the most, with 6,748. Woodside has the least with 5,486, or 19% fewer students in TK-8. Both of those attendance areas have sections with notable resident student reductions in the graduation from eighth to ninth (as is discussed later), while the Carlmont region generally has the opposite, with gains entering ninth. The result is that the Carlmont region's 6,230 in TK-8, with additional growth projected, is more consequential for the future resident 9-12 numbers than Menlo-Atherton's higher resident TK-8 count is, but the difference is not huge. Applying those losses into ninth to the already low Woodside High TK-8 resident total, by contrast, suggests even greater divergence for the future 9-12 amounts.

Average Student Grade-to-Grade Advancement Rates

Grade-to-grade "advancement" rates are calculations of the change in the number of students in each grade as they graduate into the next grade. Usually such rates are averaged over the last several years within each single-grade advancement to avoid giving too much influence to nuances that may have occurred in any year. These rates are then evaluated for their likelihood to continue, by degree, through the forecast period.

For this study, varying levels of rate determination again have occurred. The most in-depth rate refinements by housing situation are in the BRSSD, MPCSD and LLSD regions.[5] Some housing-situation refinement also has

[5] The TK-8 data shown for those districts in Table 3, however, covers students from much of the SUHSD region (i.e., students enrolled in the BRSSD, SCSD, Redwood CSD, MPCSD and LLSD) for each location listed. This creates modest differences from the totals shown for the same situations in our reports for those feeder districts.

Table 2: Summary of Resident Student Populations by High School Attendance Area*

High School	Section	October 2013 Resident Student Population* TK-2	3-5	6-8	9-11	TK-8	9-12	Res. Stu. Change since Oct. 2010 TK-8	9-12
								525	**279**
	Ravenswood CSD part	586	537	498	439	1,621	629	-42	-24
	All	2,232	2,108	1,890	1,699	**6,230**	**2,270**		
Sequoia	**All**	2,006	2,075	1,829	1,625	**5,910**	**2,188**	**23**	**93**
Woodside**	**All but Ravenswd. CSD part**	1,573	1,665	1,444	1,185			**-20**	**59**
	Ravenswood CSD part	289	277	238	195	804	271	39	1
	All	1,862	1,942	1,682	1,380	**5,486**	**1,871**		
Menlo-Atherton	**All but Ravenswd. CSD part**	1,795	1,817	1,583	1,161	5,195	1,566	**299**	**122**
	Ravenswood CSD part	569	511	473	394	1,553	564	-57	-22
	All	2,364	2,328	2,056	1,555	**6,748**	**2,130**		
All SUHSD	**All but Ravenswd. CSD part**	7,020	7,128	6,248	5,231	20,396	6,995	**827**	**553**
	Ravenswood CSD part	1,444	1,325	1,209	1,028	3,978	1,464	**-60**	**-45**
	All	8,464	8,453	7,457	6,259	**24,374**	**8,459**	**767**	**508**

* Resident students are those listed at home addresses within the specified area, regardless of the school they attend (among BRSSD, SCSD, Redwood CSD, Ravenswood CSD, MPCSD, LLSD, PVSD, WSD and SUHSD). The only charter school students included are from the charters in the Redwood City SD.

** Portola Valley SD and Woodside SD counts are from student address lists in 2013, with "Tinsley" students from Ravenswood CSD (89) identified accordingly. The student counts for those districts in 2010, however, did not have the "Tinsley" portion identified, so estimated adjustments were made in the 2010 comparison for amounts equal to the current "Tinsley" figures.

Notes: (1) **Students at addresses outside the SUHSD (down from 373 in 2010 to 231 in 2013)** are excluded from these figures. (2) Aspire EPA Academy contributed to the 9-12 drop in Ravenswood CSD area. (3) The grade "TK" refers to the new "transitional kindergarten" program. (4) See Appendix A for additional details to these figures.

been made for these calculations within the Redwood CSD region. Simpler aggregations have been made in the remaining feeder district parts of the SUHSD.

Understanding the Data in Table 3

The latest average advancement rates entering each high school grade are shown on the right side of Table 3 on pages 7 and 8. In the "Modest, Moderate and Hillside Mixed Value" SFD (single family detached) housing group in the BRSSD region, for instance, the "1.05" rate entering ninth grade for "This Study" means that, on average since 2010, a net of 105% of the eighth grade population in one year became ninth graders a year later from the same neighborhoods. That is a modest rise from the 1.02 rate determined in our first (2011-12) SUHSD study.

The cumulative rates shown in the middle section of Table 3 are the result of a compounding of the individual grade-to-grade rates from kindergarten to eighth. These figures show what the net aggregate change would be, if these rates continue, as each group of kindergartners graduates upward through all of the elementary grades. Again using the "Modest, Moderate and Hillside Mixed Value" SFD group within the BRSSD as an example, the "1.06" for the latest period (2010 to 2013) means that 100 students in kindergarten in one year would become 106

Table 3: Summary of Resident Student Grade-to-Grade Advancement Rate Findings in Existing Housing
(with color highlighting applied to rate shifts by at least 0.05 since the 2011-12 study; pink for down and yellow for up)

Region	Housing Subject and/or Location*	Current Resident TK-12 Students*	Cumulative Net Advancement Rate from K-8** 2008 to 2011	2009 to 2012	2010 to 2013	Three-Year Average Rate at which the Net Number of Stu. Advanced from Prior Grade to this Grade in Oct. of Each Year: 2008 to 2011 9th	2010 to 2013 (This Study) 9th	10th	11th	12th
BRSSD	SFD: Modest, Moderate and Hillside Mixed Value	1,392	0.96	1.04	1.06	1.02	1.05	0.98	1.02	1.05
	SFD: Middle to High Income - West of 101	1,045	1.34	1.21	1.21	0.95	1.05	1.05	1.00	1.05
	SFD: Middle to High Income - East of 101	866	1.10	1.06	0.94	0.77	0.84	0.96	1.05	1.02
	ATT: Relatively Affordable	956	1.10	1.17	1.18	1.03		1.04	1.14	0.99
	ATT: Modest to High Amenity***	663	1.40	1.27	1.03	1.17	1.17	0.97	1.02	1.02
SCSD	Current Carlmont HS part	1,278	1.25	1.09	1.16	0.89		1.02	1.02	1.03
	Current Sequoia HS part	2,353	1.02	1.04	0.95	0.81	0.79	1.02	0.97	1.05
Redwd. CSD	SFD: Modest and Mix Modest to Middle Income	2,963	0.94	0.81	0.80	0.95		1.03	1.05	1.08
	SFD: Mix Middle to Upper Income	1,906	1.00	0.95	0.92	0.94	1.01	1.02	1.03	1.05
	ATT: Relatively Affordable	1,318	0.93	0.99	0.83	0.90	0.97	1.03	1.05	1.06
	MIX: Affordable to Modest	3,836	0.99	0.92	0.83	0.92	0.87	1.02	0.98	1.11
	MIX: Moderate to Middle Income	2,111	0.98	0.83	0.80	1.10	1.09	1.01	1.02	1.03
	MHP***	364	0.98	1.34	1.50	1.12	0.94	1.03	0.95	1.24
MPCSD	SFD: Moderate	1,166	0.91	0.91	0.98	0.80	0.87	1.03		
	SFD: Middle Income	949	0.88	0.89	0.86	0.73	0.77	0.97	1.00	0.97
	SFD: High Income***	593	0.97	0.79	0.79	0.63	0.72	1.00	0.93	1.03
	ATT***	606	1.23	1.17	1.12	1.08	0.81	0.98	1.02	0.94

Table 3, page 1 of 2, with footnotes at the bottom of the final page

Table 3: Summary of Resident Student Grade-to-Grade Advancement Rate Findings in Existing Housing
(with color highlighting applied to rate shifts by at least 0.05 since the 2011-12 study; pink for down and yellow for up)

Region	Housing Subject and/or Location*	Current Resident TK-12 Students*	Cumulative Net Advancement Rate from K-8** 2008 to 2011	2009 to 2012	**2010 to 2013**	Three-Year Average Rate at which the Net Number of Stu. Advanced from Prior Grade to this Grade in Oct. of Each Year 2008 to 2011 9th	2010 to 2013 (This Study) **9th**	**10th**	**11th**	**12th**
LLSD	**SFD**	1,376	1.02	1.03	0.95	0.71	**0.79**	1.01	1.03	1.01
	ATT***	259	1.11	1.86	**0.85**	0.84	0.88	0.93	0.94	1.03
Ravns. CSD****	**All (of district area)**	5,353	NA	NA	**0.80**	NA	**0.82**	1.00	1.02	**1.19**
PVSD+ WSD	**PVSD and WSD enrolled plus all other resident*******	1,275	0.89	0.84	**0.85**	0.36	**0.37**	**1.11**	1.04	1.08

* Students listed at addresses in the relevant locations and attending any BRSSD, SCSD, Redwood CSD, MPCSD, LLSD or SUHSD school, except that (1) charters in all but the Redwood CSD are excluded, (2) Ravenswood CSD figures include that district's students as well and (3) PVSD and WSD counts are from combination of those schools' CDE DataQuest enrollments (which includes some "Tinsley" students from the Ravenswood CSD region) and resident students of those regions attending any of the aforementioned included schools. "SFD" covers single-family detached homes and "ATT" represents attached units (i.e., apartments, condos, townhouses and plexes). "Mix" is for planning areas with a thorough mix of SFD and ATT.

** These cumulative rates are the cumulative impact from kindergarten to eighth grade of the individual grade-to-grade net "advancement rates" (a.k.a. "cohort survival rates") averaged over the relevant three-year period, except that Ravenswood CSD rates are provided only for the 2010 to 2013 period (due to a lack of satisfactory earlier data). The LLSD's SFD homes, for example, collectively had net average grade-to-grade advancement rates between Oct. 2010 and Oct. 2013 that combine into a 0.95 cumulative rate. This means that, if these rates continue, there eventually would be 95% as many eighth graders (i.e., a 5% reduction) from these same housing units as there had been kindergartners eight years earlier. **The current cumulative rates and advancement rates that deviate by 10% - 15% from 1.00 (100% advancement) have regular boxing, while those that deviate by over 15% are boxed in bold, for all categories that have 700+ students (in TK-12).**

***** These categories have under 700 students (TK-12), for which such small numbers allow greater rate swings, so the regular boxing is applied to current deviations from 1.00 by 15% to 20% and bold boxing to deviations of over 20%.**

**** The 0.82 advancement rate entering ninth grade in the Ravenswood CSD has only regular (not bold) boxing because much of that reduction is assumed due to students attending Aspire EPA Academy (charter) school.

***** The "other resident" students are attending other feeder districts to the SUHSD (in TK-8) and the SUHSD (in 9-12).

Notes: (1) Figures exclude both inter-district students from outside the SUHSD region (currently 190 in TK-12) and a small number of students listed at home addresses (or no address) that could not be assigned. (2) Figures for all districts but the Ravenswood CSD exclude students enrolled in the Ravenswood CSD (due to data issues). (3) Advancement rates shown are actual calculated rates. These have been modified where warranted in the forecast. (4) See Appendix B for more information.

students eight years later in eighth grade (i.e., a 6% increase). These cumulative figures are a good indication of the net effect that (1) families moving in and out of the districts and (2) students transferring between regular, charter and private schools are having on the K-8 enrollments and the subsequent high school populations.

We have boxed in the table the rates that deviate significantly from 1.00 (100% advancement). Regular boxing has been applied in most cases where the difference is between 10% and 15% plus or minus (i.e., 0.85 to 0.90 for the minus or 1.10 to 1.15 for the gain). More severe differences of over 15% generally are boxed-in-bold. The main exception is in some small-population categories, which can be prone to greater rate swings in such short time periods (i.e., three years). Those generally have regular boxing for 15% to 20% plus or minus and bold boxing for over 20%. The purpose of this boxing is to highlight the situations with the greatest population adjustments occurring (in percentage terms) as the students graduate through the grades.

Also applied, in the version of this report printed in color, is color highlighting for the rate shifts by at least 5% since our original study. Yellow represents gains of at least 5% in the cumulative rates and/or the rates into ninth, while rose represents losses of at least 5% in those rates.

While these rates can seem statistically abstract, they are a critical forecast component.

Key Findings Related to the Data in Table 3

To repeat from the first report: There are huge differences in these rates, with big student gains occurring in some locations and major losses, especially entering ninth, happening in other situations. All but one of the cumulative rates shown in Carlmont's BRSSD and SCSD regions are above 1.00 and that is on top of having had some large kindergarten populations (i.e., the numbers are higher in kindergarten and then getting even larger as each of those student body classes graduates upward). While there was notable fluctuation both ways in these cumulative rates since the 2011-12 study, the collective difference from these rates essentially is the same as in that prior study for the Carlmont region; student growth has been ongoing in the TK-8 population. Adding to that, for the SUHSD-enrolled students, has been a virtual across-the-board jump in the rates entering ninth. The average rate from the more expensive SFD neighborhoods west of 101 in the BRSSD, for example, rose from 0.95 two years ago (from the 2008 to 2011 period) to 1.05 in this study (from the 2010 to 2013 period). That is a 10% increase in the net number of students graduating from eighth to ninth, with corresponding impact on the Carlmont student population (in 9-12). We did not foresee the scope of the rate increases entering ninth in this area, which is a key reason why the updated forecast numbers are higher for Carlmont.

Most of the cumulative and into-ninth rates in the Redwood CSD region are consequentially lower than before. These mainly are from dwellings in the Sequoia and Woodside High attendance areas.[6] We have discounted the more severe shifts in those cumulative rates as being partly nuances of the latest trend period. Now that the local economy is improving, fewer net student losses are expected from housing turnover. The underlying grade-to-grade rates have been adjusted accordingly in the forecast, especially with alternative four-year averages shown in Appendix B. This admittedly is a major judgment call; lower future SUHSD numbers are possible in these two attendance areas.

To also repeat from our original report: One of the biggest issues in the Table 3 data is the low rates entering ninth from the southeastern and southernmost parts of the SUHSD. We do not recall having calculated such declines entering ninth from sufficiently large student populations in any other district. This finding overwhelms everything else being determined in these sections of the SUHSD. The three largest housing categories in the MPCSD region have updated rates entering ninth of 0.87, 0.77 and, in the more expensive SFD places, just 0.72. Those are reductions by 13% to 28%. And the SFD homes in the LLSD region have a 0.79 rate entering ninth, for a net 21% loss. These effectively are all in the current Menlo-Atherton attendance region.

The difference in this update is that these SFD rates entering ninth, as low as they are in the MPCSD and LLSD, all have risen markedly since the original study. This suggests that more families are opting for your public high schools over private alternatives for their children. Since most of those homeowners (in a high-priced housing area) probably can afford private school tuitions, this upward trend indicates improving perceptions of Menlo-Atherton. This could be a double-edged sword, however, because if those rates entering ninth continue to rise as a result, and/or the cumulative rates in the same homes rebound to the previous levels, then the projected totals for Menlo-Atherton could be too low. This is the other major judgment call, in applying these latest calculated rates in the forecast.

[6] The southeast and southern edges of the Redwood CSD are in the Menlo-Atherton area, but those have much smaller student totals than the Sequoia and Woodside sections.

The combined PVSD and WSD enrollment data, which includes some “Tinsley” students from the Ravenswood CSD region, provides only a 0.37 rate entering ninth. Even after adjusting for that “Tinsley” factor, it is clear that the majority of students graduating from eighth grade in those districts are not enrolled in the SUHSD schools in the following year. This impacts the projected Woodside High resident (9-12) total.

The Ravenswood CSD region has a low 0.82 rate entering ninth, which is principally due to students attending charter high schools in that community. Both this rate and the cumulative rate there are reasonable to continue.

SUHSD Enrollment Issues after 2020

There is a nuance occurring in the lowest elementary grades that will impact the SUHSD enrollment after 2020. The birthdate cutoff for kindergarten eligibility is evolving from December 2 to September 1. This is being phased in over three years, with the current school year being the second of those three years. The net effect is that there will be three adjacent student body classes that officially cover only 11-month birth periods. The State also has created a new program called “transitional kindergarten” (TK) for those children who previously would have been eligible for kindergarten each year. This is expanding from covering a single birth month in 2012-13 (essentially November 2007) to two months this year (October and November 2008) and three months in all future years. Most districts are operating these TK programs with those students to be enrolled in kindergarten in the following year. There thus is still a six-year birth period for the current TK-5 enrollment, just as in the past, but with one fewer month in each of kindergarten and first, with two months in TK.[7] Next year will have kindergarten, first and second covering 11-month birth periods and TK covering three months of births. Those three student body classes containing 11-month birth periods will start graduating into ninth in 2021-22 and be fully in the SUHSD grades in 2023-24 and 2024-25.

A few districts, however, did not have much of a drop in kindergarten and/or first despite this 11-month eligibility period. This includes the BRSSD and SCSD, with corresponding 2021 and 2022 impacts especially on Carlmont. That school’s resident total could go slightly higher in those years. Thereafter relatively low birth totals in the economic recession (2009 to 2011) should cause the resident numbers in all four SUHSD regions to decline.

Concluding Commentary

The State’s educational scores for each school and district continue to be an enrollment issue. Although a different evaluation method is about to occur, the relative determinations are unlikely to dramatically shift. Having the public perceive that one of your schools is meaningfully superior, due to such web-posted ratings, could have a snowballing effect, with more high scoring students finding ways to get into that school and out of the other schools. How you adjust your attendance areas and/or your intra-district enrollment policies will have an impact on those decisions and the resultant school enrollments.

Sincerely,

{Signature not provided with electronic PDF version}

Thomas R. Williams, principal demographer for Enrollment Projection Consultants

[7] The current TK+K totals in Appendix B cover a 13-month birth period (11 for K and two for TK) accordingly, which can make those amounts look deceptively higher than those in some other grades.

Appendix A: Recent Resident Student Population Trends by High School Attendance Area Sections*

HS Region	Section	Data Subject	Oct. of	TK-2	3-5	6-8	9-11	TK-8	9-12
				Resident Student Population					
Carlmont	**BRSSD (all)**	Resident Students enrolled	2008	1,059	931	845	764	2,835	1,036
	(2008 had a large	in BRSSD, SCSD, Redwd.	2009	1,159	995	870	759	3,024	974
	12th grade class)	CSD, MPCSD, LLSD and	2010	1,244	1,040	947	804	3,231	1,074
		SUHSD	2011	1,251	1,085	1,027	880	3,363	1,132
			2012	1,291	1,199	1,088	900	3,578	1,197
			2013	1,319	1,247	1,114	984	3,680	1,282
		3-Year Change Within Grade Group		75				**449**	**208**
		3-Year % Change Within Grade Group						***14%***	***19%***
		3-Year Change from Prior Grade Group			3	74	37		
	SCSD (part of)	Resident Students enrolled	2008	283	251	260	205	794	287
	(2008 had a large	in BRSSD, SCSD, Redwd.	2009	288	260	276	204	824	262
	12th grade class)	CSD, MPCSD, LLSD and	2010	302	268	283	223	853	288
		SUHSD	2011	317	300	281	260	898	335
			2012	321	298	266	290	885	374
			2013	327	323	278	276	928	359
		3-Year Change Within Grade Group		25				**75**	**71**
		3-Year % Change Within Grade Group						***9%***	***25%***
		3-Year Change from Prior Grade Group			21	10	-7		
	Combination of	Resident Students enrolled	2008	1,342	1,182	1,105	969	3,629	1,323
	Above Sections	in BRSSD, SCSD, Redwd.	2009	1,447	1,255	1,146	963	3,848	1,236
	("Core" subtotal)	CSD, MPCSD, LLSD and	2010	1,546	1,308	1,230	1,027	4,084	1,362
	(2008 had a large	SUHSD	2011	1,568	1,385	1,308	1,140	4,261	1,467
	12th grade class)		2012	1,612	1,497	1,354	1,190	4,463	1,571
			2013	1,646	1,570	1,392	1,260	4,608	1,641
		3-Year Change Within Grade Group		100				**524**	**279**
		3-Year % Change Within Grade Group						***13%***	***20%***
		3-Year Change from Prior Grade Group			24	84	30		
	Ravenswood CSD	Resident Students enrolled	2008	*data unavailable*			518		700
	(part of)**	in BRSSD, SCSD, Redwd.	2009	*data unavailable*			500		656
	("EPA" subtotal)	CSD, Rav. CSD, MPCSD,	2010	547	540	525	465	1,612	653
		LLSD and SUHSD	2011	537	569	549	414	1,655	612
			2012	535	538	523	415	1,596	587
			2013	586	537	498	439	1,621	629
		3-Year Change Within Grade Group		39				**9**	**-24**
		3-Year % Change Within Grade Group						***1%***	***-4%***
		3-Year Change from Prior Grade Group			-10	-42	-86		
Sequoia	**SCSD (part of)**	Resident Students enrolled	2008	558	516	498	336	1,572	462
		in BRSSD, SCSD, Redwd.	2009	633	510	469	382	1,612	482
		CSD, MPCSD, LLSD and	2010	654	543	510	376	1,707	506
		SUHSD	2011	703	565	522	413	1,790	534
			2012	671	652	513	377	1,836	534
			2013	670	648	519	398	1,837	516
		3-Year Change Within Grade Group		16				**130**	**10**
		3-Year % Change Within Grade Group						***8%***	***2%***
		3-Year Change from Prior Grade Group			-6	-24	-112		
	Redwood CSD	Resident Students enrolled	2008	1,432	1,302	1,283	1,255	4,017	1,674
	(part of)	in BRSSD, SCSD, Redwd.	2009	1,485	1,357	1,295	1,191	4,137	1,596
		CSD, MPCSD, LLSD and	2010	1,508	1,372	1,285	1,172	4,165	1,589
		SUHSD	2011	1,472	1,383	1,282	1,221	4,137	1,634
			2012	1,398	1,403	1,312	1,233	4,113	1,652
			2013	1,331	1,419	1,305	1,227	4,055	1,672
		3-Year Change Within Grade Group		-177				**-110**	**83**
		3-Year % Change Within Grade Group						***-3%***	***5%***
		3-Year Change from Prior Grade Group			-89	-67	-58		

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Appendix A: Recent Resident Student Population Trends by High School Attendance Area Sections*

HS Region	Section	Data Subject	Oct. of	K-2	3-5	6-8	9-11	K-8	9-12
Sequoia (continued)	**Combination of Above Sections** ***(total)***	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	1,990	1,818	1,781	1,591	5,589	2,136
			2009	2,118	1,867	1,764	1,573	5,749	2,078
			2010	2,162	1,915	1,795	1,548	5,872	2,095
			2011	2,175	1,948	1,804	1,634	5,927	2,168
			2012	2,069	2,055	1,825	1,610	5,949	2,186
			2013	2,001	2,067	1,824	1,625	5,892	2,188
		3-Year Change Within Grade Group		-161				**20**	**93**
		3-Year % Change Within Grade Group						***0%***	***4%***
		3-Year Change from Prior Grade Group			-95	-91	-170		
Woodside	**Redwood CSD (part of)**	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	1,169	1,069	979	976	3,217	1,330
			2009	1,271	1,106	977	1,005	3,354	1,311
			2010	1,302	1,154	1,026	988	3,482	1,341
			2011	1,346	1,197	1,103	986	3,646	1,343
			2012	1,272	1,262	1,101	1,019	3,635	1,369
			2013	1,227	1,255	1,105	1,017	3,587	1,380
		3-Year Change Within Grade Group		-75				**105**	**39**
		3-Year % Change Within Grade Group						***3%***	***3%***
		3-Year Change from Prior Grade Group			-47	-49	-9		
	Combined PVSD and WSD (all)	Resident Students enrolled elsewhere in the SUHSD region plus all Enrolled Stu. in WSD and PVSD**	2008	411	423	366	120	1,200	159
			2009	409	425	369	125	1,203	173
			2010	395	401	372	133	1,168	167
			2011	359	427	373	137	1,159	180
			2012	364	409	354	131	1,127	193
			2013	349	401	339	148	1,089	191
		3-Year Change Within Grade Group		-46				**-79**	**24**
		3-Year % Change Within Grade Group						***-7%***	***14%***
		3-Year Change from Prior Grade Group			6	-62	-224		
	LLSD (part of)	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	42	44	50	20	136	30
			2009	50	42	39	24	131	29
			2010	54	48	33	26	135	33
			2011	43	53	34	31	130	36
			2012	41	53	34	27	128	38
			2013	42	43	36	20	121	29
		3-Year Change Within Grade Group		-12				**-14**	**-4**
		3-Year % Change Within Grade Group						***-10%***	***-12%***
		3-Year Change from Prior Grade Group			-11	-12	-13		
	Combination of Above Sections ***("Core" subtotal)***	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	1,622	1,536	1,395	1,116	4,553	1,519
			2009	1,730	1,573	1,385	1,154	4,688	1,513
			2010	1,751	1,603	1,431	1,147	4,785	1,541
			2011	1,748	1,677	1,510	1,154	4,935	1,559
			2012	1,677	1,724	1,489	1,177	4,890	1,600
			2013	1,618	1,699	1,480	1,185	4,797	1,600
		3-Year Change Within Grade Group		-133				**12**	**59**
		3-Year % Change Within Grade Group						***0%***	***4%***
		3-Year Change from Prior Grade Group			-52	-123	-246		
	Ravenswood CSD (part of)** ***("EPA" subtotal)***	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, Rav. CSD, MPCSD, LLSD and SUHSD	2008	*data unavailable*			262		355
			2009	*data unavailable*			201		280
			2010	255	260	236	194	751	270
			2011	266	264	245	187	775	279
			2012	290	271	246	176	807	251
			2013	289	277	238	195	804	271
		3-Year Change Within Grade Group		34				**53**	**1**
		3-Year % Change Within Grade Group						***7%***	***0%***
		3-Year Change from Prior Grade Group			22	-22	-41		

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Appendix A: Recent Resident Student Population Trends by High School Attendance Area Sections*

HS Region	Section	Data Subject	Oct. of	K-2	3-5	6-8	9-11	K-8	9-12
Menlo-Atherton	**Redwood CSD (part of)**	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	492	457	413	420	1,362	568
			2009	483	480	394	381	1,357	515
			2010	473	470	397	415	1,340	548
			2011	508	462	435	401	1,405	536
			2012	489	467	435	419	1,391	582
			2013	461	469	410	398	1,340	567
		3-Year Change Within Grade Group		-12				**0**	**19**
		3-Year % Change Within Grade Group						***0%***	***3%***
		3-Year Change from Prior Grade Group			-4	-60	1		
	MPCSD (all)	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	866	747	619	487	2,232	639
			2009	888	833	633	451	2,354	598
			2010	935	861	642	482	2,438	638
			2011	948	869	690	488	2,507	654
			2012	940	893	753	498	2,586	640
			2013	952	923	808	501	2,683	670
		3-Year Change Within Grade Group		17				**245**	**32**
		3-Year % Change Within Grade Group						***10%***	***5%***
		3-Year Change from Prior Grade Group			-12	-53	-141		
	LLSD (part of)	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	363	321	280	193	964	249
			2009	376	347	285	194	1,008	243
			2010	402	373	329	203	1,104	258
			2011	430	372	331	203	1,133	275
			2012	427	399	362	224	1,188	292
			2013	378	419	359	262	1,156	329
		3-Year Change Within Grade Group		-24				**52**	**71**
		3-Year % Change Within Grade Group						***5%***	***28%***
		3-Year Change from Prior Grade Group			17	-14	-67		
	Combination of Above Sections *("Main" subtotal)*	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, MPCSD, LLSD and SUHSD	2008	1,721	1,525	1,312	1,100	4,558	1,456
			2009	1,747	1,660	1,312	1,026	4,719	1,356
			2010	1,810	1,704	1,368	1,100	4,882	1,444
			2011	1,886	1,703	1,456	1,092	5,045	1,465
			2012	1,856	1,759	1,550	1,141	5,165	1,514
			2013	1,791	1,811	1,577	1,161	5,179	1,566
		3-Year Change Within Grade Group		-19				**297**	**122**
		3-Year % Change Within Grade Group						***6%***	***8%***
		3-Year Change from Prior Grade Group			1	-127	-207		
	Ravenswood CSD (part of)** ***("East" subtotal)***	Resident Students enrolled in BRSSD, SCSD, Redwd. CSD, Rav. CSD, MPCSD, LLSD and SUHSD	2008	*data unavailable*			422		562
			2009	*data unavailable*			427		560
			2010	588	509	489	442	1,586	586
			2011	565	506	485	424	1,556	598
			2012	584	517	461	431	1,562	599
			2013	569	511	473	394	1,553	564
		3-Year Change Within Grade Group		-19				**-33**	**-22**
		3-Year % Change Within Grade Group						***-2%***	***-4%***
		3-Year Change from Prior Grade Group			-77	-36	-95		

(Columns K-2 through 9-12 are under the heading "Resident Student Population".)

* Resident students are those listed at home addresses within the specified area, regardless of the school they attend (among the school districts listed). The only charter school students included are from the charters in the Redwood City SD.

** Portola Valley SD and Woodside SD counts are from the DataQuest section of the CDE website prior to 2013, which includes "Tinsley" students from Ravenswood CSD area. To be consistent, the 2013 counts were comparably made in this table only.

Notes: (1) Changes are over three years for groupings of three grades, with TK-2 compared to the prior K-2, 3-5 to the prior K-2, 6-8 to the prior 3-5, 9-11 to the prior 6-8, TK-8 to the prior K-8 and TK-12 to the prior K-12. (2) Totals by elementary SD regions may differ slightly between this and other tables because some student addresses could not be precisely located, such as by a housing type, but were assignable by larger areas such as high school attendance areas. (3) Totals do not add up to aggregate enrollments of all relevant districts because both addresses outside the SUHSD region and completely unassignable addresses are excluded from these totals.

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Appendix B1: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in BRSSD Region

Housing Type and Relative Value	Subject	Oct. of	TK+K	1	2	3	4	5	6	7	8	9	10	11	12	TK-8 Total & Cum. Rate	9-12 Total
			Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade														
SFD: Modest,	Resident Students	2008	114	99	94	95	84	73	93	83	86	83	95	65	104	821	347
Moderate and		2009	151	113	102	95	96	86	76	90	83	82	76	81	59	892	298
Hillside Mixed		2010	114	148	119	96	91	99	100	78	98	78	90	86	76	943	330
Value - *All Areas*		2011	105	116	141	118	89	86	105	94	71	97	73	89	90	925	349
(excludes high		2012	119	107	123	144	121	90	103	110	94	84	96	77	90	1,011	347
value hills)		2013	110	118	110	122	150	119	97	103	105	93	84	97	84	1,034	358
	3-Yr. Rate of Change from Prior Grade			1.01	1.01	1.00	1.00	0.98	1.11	1.00	0.95	**1.05**	0.98	1.02	1.05	**1.06**	
	4-Yr. Rate of Change from Prior Grade			1.00	1.02	0.99	0.99	0.99	1.12	1.00	0.98	**1.02**	1.01	1.04	1.03	**1.10**	
SFD: Middle to	Resident Students	2008	80	76	64	70	57	72	54	75	67	46	83	59	68	615	256
High Income -		2009	83	88	72	70	72	60	74	58	74	66	45	77	56	651	244
West of US 101		2010	74	79	88	77	71	71	72	73	59	58	69	45	75	664	247
(includes high		2011	88	67	87	89	82	71	86	76	76	64	67	69	49	722	249
value hills)		2012	83	88	70	84	85	82	78	86	72	72	64	66	72	728	274
		2013	87	79	96	69	89	89	83	76	92	81	72	65	67	760	285
	3-Yr. Rate of Change from Prior Grade			0.95	1.08	0.99	1.03	1.02	1.11	1.01	1.02	**1.05**	1.05	1.00	1.05	**1.21**	
	4-Yr. Rate of Change from Prior Grade			0.95	1.06	1.01	1.03	1.01	1.12	1.00	1.02	**1.00**	1.04	1.00	1.03	**1.21**	
SFD: Middle to	Resident Students	2008	71	76	70	68	71	61	49	37	57	31	37	32	30	560	130
High Income -		2009	63	69	81	75	64	75	65	50	37	37	29	33	31	579	130
East of US 101		2010	88	72	72	82	72	64	78	62	48	34	39	30	31	638	134
		2011	78	89	75	71	79	71	62	76	66	35	34	41	30	667	140
		2012	86	74	86	75	74	82	77	62	75	61	33	36	41	691	171
		2013	78	79	76	86	69	73	74	74	64	64	57	34	38	673	193
	3-Yr. Rate of Change from Prior Grade			0.96	1.01	1.00	0.98	1.00	0.99	0.98	1.03	**0.84**	0.96	1.05	1.02	**0.94**	
	4-Yr. Rate of Change from Prior Grade			1.00	1.02	1.00	0.97	1.00	0.99	0.97	1.01	**0.86**	0.98	1.04	1.01	**0.95**	
ATT:	Resident Students	2008	65	48	67	68	57	55	57	57	50	58	55	48	44	524	205
Most Affordable		2009	78	54	57	67	61	55	48	63	63	46	48	59	48	546	201
and Affordable		2010	82	83	60	53	61	66	60	51	62	71	49	56	64	578	240
(incl. one MHP)		2011	66	71	68	63	58	63	71	72	50	64	77	59	53	582	253
		2012	64	80	76	72	54	57	63	68	72	60	60	74	62	606	256
		2013	93	66	76	61	71	70	63	64	73	71	65	75	72	637	283
	3-Yr. Rate of Change from Prior Grade			1.04	0.95	0.97	0.98	1.10	1.06	1.06	1.02	**1.07**	1.04	1.14	0.99	**1.18**	
	4-Yr. Rate of Change from Prior Grade			1.04	0.98	0.94	0.96	1.12	1.07	1.05	1.02	**1.08**	1.05	1.16	1.01	**1.20**	
ATT: Modest to	Resident Students	2008	42	47	40	45	22	30	27	23	27	24	23	18	24	303	89
High Amenity		2009	54	46	44	37	49	29	33	32	23	23	27	22	16	347	88
(K-12 totals <500		2010	53	57	47	50	36	48	34	38	31	33	26	28	23	394	110
can create much		2011	67	54	57	42	50	40	48	32	38	38	34	25	29	428	126
larger rate shifts)		2012	72	76	54	60	49	50	36	48	34	38	36	35	24	479	133
		2013	76	68	73	57	56	45	51	37	46	44	35	38	37	509	154
	3-Yr. Rate of Change from Prior Grade			1.03	0.99	1.00	1.03	1.01	0.97	0.99	1.01	**1.17**	0.97	1.02	1.02	**1.03**	
	4-Yr. Rate of Change from Prior Grade			1.03	0.99	1.04	1.01	0.99	1.02	1.03	0.99	**1.24**	1.00	1.02	1.03	**1.11**	

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, MPCSD, LLSD and SUHSD files. (2) Final year weighted 150% in four-year change rates.

Appendix B2: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in SCSD Region

SUHSD Attendance Area Section	Subject	Oct. of	TK+K	1	2	3	4	5	6	7	8	9	10	11	12	TK-8 Total & Cum. Rate	9-12 Total
			Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade														
Carlmont part	Resident Students	2008	105	94	84	77	79	95	96	79	85	71	67	67	82	794	287
		2009	93	102	93	86	84	90	96	96	84	68	71	65	58	824	262
		2010	114	89	99	97	90	81	84	99	100	77	76	70	65	853	288
		2011	106	117	94	110	101	89	92	84	105	96	83	81	75	898	335
		2012	106	101	114	90	111	97	86	96	84	107	98	85	84	885	374
		2013	110	108	109	113	95	115	98	89	91	78	103	95	83	928	359
	3-Yr. Rate of Change from Prior Grade			1.00	1.04	1.02	1.04	1.00	1.04	1.03	1.00	**0.97**	1.02	1.02	1.03	**1.16**	
	4-Yr. Rate of Change from Prior Grade			0.99	1.03	1.02	1.04	0.99	1.01	1.03	1.01	**0.95**	1.04	1.01	1.02	**1.12**	
Sequoia part*	Resident Students	2008	174	219	165	173	174	169	168	141	189	106	122	107	125	1,572	460
		2009	245	176	212	160	171	179	169	168	132	145	107	126	100	1,612	478
		2010	225	246	183	210	162	171	184	162	164	111	155	107	128	1,707	501
		2011	218	234	251	189	213	163	171	185	166	134	119	158	118	1,790	529
		2012	216	225	230	258	187	207	157	171	185	129	135	113	157	1,836	534
		2013	240	215	215	218	256	174	198	150	171	142	127	129	118	1,837	516
	3-Yr. Rate of Change from Prior Grade			1.02	0.99	1.00	1.00	0.97	0.97	0.99	1.01	**0.79**	1.02	0.97	1.05	**0.95**	
	4-Yr. Rate of Change from Prior Grade			1.02	0.99	0.99	1.00	0.97	0.98	0.98	1.00	**0.80**	1.03	0.98	1.04	**0.94**	

* Student counts for a portion of the Sequoia High attendance area that is in the San Carlos SD region were incorrectly included in figures from the Redwood City SD region in last year's study. This has been fixed for the counts in all years in the current update. The aggregate historic counts for the Sequoia High region are the same as before.

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, MPCSD, LLSD and SUHSD files. (2) Final year weighted 150% in four-year change rates.

Appendix B3: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in Redwood CSD Region

Housing Type and Relative Value	Subject	Oct. of	Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade													TK-8 Total & Cum. Rate	9-12 Total
			TK+K	1	2	3	4	5	6	7	8	9	10	11	12		
SFD: Modest	Resident Students	2008	176	171	150	172	155	141	141	155	154	137	138	140	166	1,415	581
		2009	173	174	171	156	173	157	145	145	163	126	111	114	136	1,457	487
		2010	168	164	174	163	155	166	150	148	139	154	124	110	135	1,427	523
		2011	176	173	168	168	164	145	168	154	144	128	142	126	120	1,460	516
		2012	197	161	168	152	162	164	135	161	148	123	129	153	135	1,448	540
		2013	179	177	144	168	160	169	139	125	158	122	129	134	171	1,419	556
	3-Yr. Rate of Change from Prior Grade			0.95	0.96	0.96	1.01	0.99	0.93	0.97	0.97	**0.87**	0.99	1.04	1.09	**0.77**	
	4-Yr. Rate of Change from Prior Grade			0.94	0.96	0.96	1.01	0.99	0.93	0.98	0.97	**0.88**	1.00	1.03	1.12	**0.77**	
SFD: Mix Modest to Middle Income	Resident Students	2008	68	75	78	77	82	71	89	69	58	78	90	74	94	667	336
		2009	70	68	75	80	76	76	66	85	72	68	80	92	81	668	321
		2010	83	75	65	70	76	76	77	67	84	79	66	78	89	673	312
		2011	75	85	76	60	69	75	71	71	69	85	81	68	80	651	314
		2012	60	70	73	75	61	70	68	69	67	75	93	89	73	613	330
		2013	71	60	64	81	80	68	63	70	76	80	87	95	93	633	355
	3-Yr. Rate of Change from Prior Grade			0.99	0.93	1.01	1.02	1.04	0.91	0.97	1.02	**1.10**	1.09	1.05	1.05	**0.89**	
	4-Yr. Rate of Change from Prior Grade			1.01	0.93	1.00	1.01	1.04	0.93	0.99	1.03	**1.11**	1.07	1.03	1.03	**0.94**	
SFD: Combined Modest and Mix Modest to Middle	Resident Students	2008	244	246	228	249	237	212	230	224	212	215	228	214	260	2,082	917
		2009	243	242	246	236	249	233	211	230	235	194	191	206	217	2,125	808
		2010	251	239	239	233	231	242	227	215	223	233	190	188	224	2,100	835
		2011	251	258	244	228	233	220	239	225	213	213	223	194	200	2,111	830
		2012	257	231	241	227	223	234	203	230	215	198	222	242	208	2,061	870
		2013	250	237	208	249	240	237	202	195	234	202	216	229	264	2,052	911
	3-Yr. Rate of Change from Prior Grade			0.96	0.95	0.97	1.01	1.01	0.92	0.97	0.99	**0.94**	1.03	1.05	1.08	**0.80**	
	4-Yr. Rate of Change from Prior Grade			0.96	0.95	0.97	1.01	1.01	0.93	0.98	0.99	**0.95**	1.03	1.03	1.08	**0.81**	
SFD: Mix Middle to Upper Income	Resident Students	2008	169	137	148	149	154	145	119	132	146	130	141	140	160	1,299	571
		2009	182	169	141	151	153	152	139	118	133	130	126	141	136	1,338	533
		2010	154	183	165	150	151	150	149	144	112	120	137	125	151	1,358	533
		2011	154	146	185	169	149	147	155	152	143	115	131	139	137	1,400	522
		2012	159	151	149	178	162	150	142	157	147	144	113	139	149	1,395	545
		2013	138	160	148	154	171	160	148	135	155	145	142	113	137	1,369	537
	3-Yr. Rate of Change from Prior Grade			0.98	1.00	1.01	0.97	0.99	1.00	0.99	0.98	**1.01**	1.02	1.03	1.05	**0.92**	
	4-Yr. Rate of Change from Prior Grade			0.99	1.00	1.02	0.98	0.99	0.99	1.00	0.98	**0.98**	1.02	1.02	1.05	**0.93**	

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Appendix B3: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in Redwood CSD Region

Housing Type and Relative Value	Subject	Oct. of	Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade													TK-8 Total & Cum. Rate	9-12 Total
			TK+K	1	2	3	4	5	6	7	8	9	10	11	12		
ATT: Affordable	Resident Students	2008	113	127	115	99	85	90	71	93	89	93	76	65	61	882	295
		2009	120	115	122	111	100	85	89	69	94	83	88	75	54	905	300
		2010	124	119	110	119	106	104	80	90	68	78	84	88	72	920	322
		2011	141	121	122	113	118	104	107	79	90	63	77	81	81	995	302
		2012	105	137	115	124	115	113	114	103	88	87	70	79	91	1,014	327
		2013	122	97	131	106	116	104	95	100	101	90	86	81	89	972	346
	3-Yr. Rate of Change from Prior Grade			0.96	0.98	0.99	0.98	0.95	0.99	0.94	1.03	**0.97**	1.03	1.05	1.06	**0.83**	
	4-Yr. Rate of Change from Prior Grade			0.96	0.97	0.98	0.97	0.96	0.96	0.95	1.02	**0.95**	1.02	1.05	1.04	**0.79**	
MIX: Affordable to Modest	Resident Students	2008	342	321	300	298	300	262	283	266	275	281	268	236	248	2,647	1,033
		2009	358	342	326	305	298	295	268	281	267	239	259	257	228	2,740	983
		2010	363	354	330	320	305	294	295	280	283	254	235	255	260	2,824	1,004
		2011	367	364	345	335	317	307	293	287	280	268	258	232	278	2,895	1,036
		2012	323	349	327	348	333	309	300	284	302	243	275	259	268	2,875	1,045
		2013	345	273	342	319	339	329	297	295	271	244	245	258	279	2,810	1026
	3-Yr. Rate of Change from Prior Grade			0.93	0.95	1.00	0.99	0.99	0.98	0.98	1.00	**0.87**	1.02	0.98	1.11	**0.83**	
	4-Yr. Rate of Change from Prior Grade			0.94	0.96	0.99	0.99	0.99	0.98	0.99	1.00	**0.88**	1.01	0.97	1.08	**0.84**	
MIX: Moderate to Middle Income	Resident Students	2008	203	163	153	171	144	137	168	136	153	150	151	169	167	1,428	637
		2009	173	204	170	159	179	152	135	172	140	162	162	161	174	1,484	659
		2010	189	170	194	168	159	177	146	143	164	151	164	160	163	1,510	638
		2011	181	179	166	189	163	160	170	154	137	189	154	174	164	1,499	681
		2012	168	178	162	169	179	157	153	170	144	153	187	155	171	1,480	666
		2013	152	152	163	172	156	174	157	156	172	143	158	188	168	1,454	657
	3-Yr. Rate of Change from Prior Grade			0.95	0.93	1.02	0.95	0.98	0.97	1.02	0.97	**1.09**	1.01	1.02	1.03	**0.80**	
	4-Yr. Rate of Change from Prior Grade			0.95	0.93	1.02	0.96	0.98	0.97	1.03	0.97	**1.07**	1.02	1.01	1.03	**0.82**	
MHP *(K-12 totals <500 can create much larger rate shifts)*	Resident Students	2008	27	22	19	28	21	32	22	18	18	27	19	22	14	207	82
		2009	24	25	19	17	31	20	31	22	17	16	30	18	24	206	88
		2010	28	26	25	21	18	31	20	32	22	26	18	30	20	223	94
		2011	26	24	27	26	22	20	30	21	29	21	25	16	29	225	91
		2012	33	28	22	29	28	23	22	34	25	24	23	25	26	244	98
		2013	29	30	25	26	31	31	29	27	35	26	25	22	28	263	101
	3-Yr. Rate of Change from Prior Grade			0.95	0.95	1.10	1.06	1.09	1.11	1.14	1.04	**0.94**	1.03	0.95	1.24	**1.50**	
	4-Yr. Rate of Change from Prior Grade			0.97	0.95	1.11	1.06	1.07	1.10	1.12	1.03	**1.08**	1.05	0.96	1.20	**1.50**	

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, MPCSD, LLSD and SUHSD files. (2) Final year weighted 150% in four-year change rates.

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Appendix B4: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in MPCSD Region

Housing Type and Relative Value	Subject	Oct. of	Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade													TK-8 Total & Cum. Rate	9-12 Total
			TK+K	1	2	3	4	5	6	7	8	9	10	11	12		
SFD: Moderate	Resident Students	2008	104	92	122	78	78	64	66	55	70	53	51	57	46	729	207
		2009	112	109	89	119	81	77	61	68	56	54	49	41	56	772	200
		2010	128	106	106	78	115	83	69	61	69	48	55	50	39	815	192
		2011	109	133	108	106	79	115	81	66	61	53	50	53	52	858	208
		2012	114	106	135	106	100	83	112	85	68	54	57	48	55	909	214
		2013	109	106	107	129	106	98	87	116	83	65	52	61	47	941	225
	3-Yr. Rate of Change from Prior Grade			0.98	1.01	0.98	0.99	1.01	1.00	1.01	1.00	**0.87**	1.03	1.00	1.02	**0.98**	
	4-Yr. Rate of Change from Prior Grade			0.97	1.00	0.95	0.98	1.01	0.98	1.01	1.00	**0.88**	1.02	1.01	1.00	**0.92**	
SFD: Middle	Resident Students	2008	85	98	73	86	77	74	59	71	44	43	39	46	42	667	170
		2009	106	83	93	79	83	76	70	57	68	28	45	34	44	715	151
		2010	86	106	84	89	90	83	71	67	57	55	27	47	37	733	166
		2011	80	79	109	84	90	86	72	70	69	42	55	29	47	739	173
		2012	85	79	83	111	83	96	70	73	67	56	41	53	29	747	179
		2013	86	90	79	85	109	81	81	70	75	51	53	40	49	756	193
	3-Yr. Rate of Change from Prior Grade			0.99	1.03	1.01	0.99	1.00	0.84	1.00	1.00	**0.77**	0.97	1.00	0.97	**0.86**	
	4-Yr. Rate of Change from Prior Grade			1.00	1.02	1.00	1.02	1.00	0.86	0.99	1.01	**0.78**	0.97	1.01	0.99	**0.90**	
SFD: High *(K-12 totals <500 can create much larger rate shifts)*	Resident Students	2008	47	46	64	73	55	60	53	61	65	48	47	28	43	524	166
		2009	55	50	53	71	74	56	48	55	61	33	41	49	28	523	151
		2010	46	55	53	54	68	76	49	43	59	42	34	44	48	503	168
		2011	49	48	61	53	52	67	67	44	43	41	43	33	47	484	164
		2012	45	47	44	61	54	50	55	63	41	30	41	40	31	460	142
		2013	40	44	48	48	54	55	45	55	63	32	29	37	43	452	141
	3-Yr. Rate of Change from Prior Grade			0.99	1.02	1.03	0.96	0.99	0.87	0.95	0.98	**0.72**	1.00	0.93	1.03	**0.79**	
	4-Yr. Rate of Change from Prior Grade			0.99	1.03	1.03	0.95	1.00	0.87	0.94	1.00	**0.72**	1.00	0.96	1.02	**0.82**	
Attached* *(K-12 totals <500 can create much larger rate shifts)*	Resident Students	2008	60	31	40	40	29	30	32	19	23	22	29	20	20	304	91
		2009	52	55	28	38	44	28	29	34	21	27	17	29	17	329	90
		2010	56	48	54	37	35	47	29	30	35	28	29	19	31	371	107
		2011	58	55	51	54	39	37	48	34	31	26	28	31	19	407	104
		2012	78	67	48	51	55	36	33	49	31	23	22	28	25	448	98
		2013	78	74	74	45	53	53	37	39	49	29	25	22	28	502	104
	3-Yr. Rate of Change from Prior Grade			1.03	1.01	0.98	1.04	0.98	0.98	1.13	0.98	**0.81**	0.98	1.02	0.94	**1.12**	
	4-Yr. Rate of Change from Prior Grade			1.00	1.02	1.05	1.01	1.00	1.00	1.11	0.99	**0.94**	1.01	1.04	0.97	**1.19**	

*All Attached counts in the MPCSD include any students from the 25 townhouses in the "Pacific Parc" complex that was transferred from the Ravenswood CSD on 7/1/12.

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, MPCSD, LLSD and SUHSD files. (2) Final year weighted 150% in four-year change rates.

Appendix B5: Additional Information on Student Populations and Average Grade-to-Grade Advancement Rates in LLSD Region

Housing Type	Subject	Oct. of	TK+K	1	2	3	4	5	6	7	8	9	10	11	12	TK-8 Total & Cum. Rate	9-12 Total
			Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade														
SFD	Students	2008	124	107	111	104	103	99	114	79	94	74	58	60	56	935	248
		2009	139	120	108	116	107	107	98	103	79	68	70	54	51	977	243
		2010	130	131	125	113	121	113	106	93	104	58	74	68	52	1,036	252
		2011	126	133	127	128	119	119	104	110	94	71	59	72	68	1,060	270
		2012	128	122	137	121	125	122	117	112	108	74	73	66	73	1,092	286
		2013	103	126	126	134	124	123	109	114	110	96	72	72	67	1,069	307
	3-Yr. Rate of Change from Prior Grade		0.99	1.01	0.98	1.02	1.00	0.93	1.03	0.99	**0.79**	1.01	1.03	1.01	**0.95**	
	4-Yr. Rate of Change from Prior Grade		0.98	1.02	1.00	1.02	1.01	0.94	1.01	0.99	**0.79**	1.02	1.01	1.00	**0.97**	
ATT (incl. a few Webb Ranch stu.) *(K-12 totals <500 can create much larger rate shifts)*	Students	2008	21	20	21	22	19	16	15	16	11	8	8	4	10	161	30
		2009	28	16	15	19	24	15	15	17	12	6	10	10	3	161	29
		2010	20	33	18	20	28	25	18	23	17	13	5	10	10	202	38
		2011	31	24	32	20	18	21	21	17	18	15	12	5	9	202	41
		2012	24	33	24	35	24	25	24	20	14	15	14	9	6	223	44
		2013	15	22	28	23	32	26	19	24	19	13	14	15	9	208	51
	3-Yr. Rate of Change from Prior Grade		1.06	0.94	1.05	1.00	1.07	0.91	0.97	0.85	**0.88**	0.93	0.94	1.03	**0.85**	
	4-Yr. Rate of Change from Prior Grade		1.07	0.97	1.11	1.10	1.07	0.96	1.10	0.90	**0.93**	0.91	0.97	1.02	**1.27**	

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, MPCSD, LLSD and SUHSD files. (2) Final year weighted 150% in four-year change rates.

Appendix B6: Additional Info on Student Populations and Avg. Grade-to-Grade Advancement Rates in Ravenswood CSD, Combined PVSD-WSD and Non-SUHSD Regions

Category	Subject	Oct. of	Number of Resident District-Enrolled Students by Grade and Resultant Net Avg. Advancement Rates Entering Each Grade													TK-8 Total & Cum. Rate	9-12 Total
			TK+K	1	2	3	4	5	6	7	8	9	10	11	12		
Ravenswood	Resident Students	2008	*N/A*									451	393	358	415		1,617
CSD Region*	enrolled in Rav. CSD	2009	*N/A*									347	430	351	368		1,496
incl. Ravenswood	(no K-8 data<2010),	2010	446	469	475	455	434	420	443	420	387	350	342	409	408	3,949	1,509
CSD students	BRSSD, SCSD,	2011	483	433	452	467	442	430	433	428	418	321	357	347	464	3,986	1,489
	Rdwd. CSD, MPCSD	2012	502	478	429	432	458	436	407	398	425	348	323	351	415	3,965	1437
	and LLSD	2013	484	458	466	418	428	448	388	407	392	345	344	339	436	3,889	1464
	3-Yr. Rate of Change from Prior Grade			0.96	0.98	0.97	0.98	0.99	0.96	0.96	0.99	**0.82**	1.00	1.02	1.19	0.80	
	4-Yr. Rate of Change from Prior Grade												1.00	1.01	1.19		
Merged PVSD-	Student Counts	2008	143	132	136	145	141	137	128	118	120	33	33	54	39	1,200	159
WSD Counts on		2009	127	147	135	138	143	144	130	130	109	54	36	35	48	1,203	173
CDE DataQuest		2010	112	135	148	128	131	142	119	130	123	37	58	38	34	1,168	167
(2012 and 2013		2011	117	113	129	155	135	137	122	119	132	38	40	59	43	1,159	180
from dist. data)		2012**	127	110	127	134	155	120	115	123	116	41	49	41	62	1,127	193
plus all other stu.		2013**	108	121	120	130	123	146	107	111	118	56	39	53	43	1,084	191
resident to the																	
PVSD-WSD Area	3-Yr. Rate of Change from Prior Grade			0.97	1.06	1.04	0.99	0.96	0.86	0.99	0.98	**0.37**	1.11	1.04	1.08	0.85	
	4-Yr. Rate of Change from Prior Grade			0.99	1.05	1.02	0.97	0.96	0.86	0.99	0.97	**0.37**	1.08	1.05	1.05	0.82	
Outside SUHSD	Resident Students	2008	24	18	23	20	34	23	23	27	23	16	29	16	27	215	88
Region	enrolled in BRSSD,	2009	21	21	21	19	20	30	22	20	27	29	32	31	39	201	131
(K-12 totals <500	SCSD, Rdwd. CSD,	2010	22	21	22	24	19	22	25	22	23	21	33	34	40	200	128
can create much	MPCSD, LLSD and	2011	19	13	15	15	17	16	16	22	19	15	17	30	36	152	98
larger rate shifts)	SUHSD	2012	7	16	14	11	18	13	17	15	23	8	17	12	38	134	75
		2013	13	8	17	12	17	15	14	18	21	6	12	16	21	135	55
	3-Yr. Rate of Change from Prior Grade			0.86	0.95	0.76	1.15	0.81	0.96	0.96	1.10	**0.44**	1.15	0.85	1.36	**0.59**	
	4-Yr. Rate of Change from Prior Grade			0.92	0.99	0.85	1.16	0.88	0.94	0.98	1.15	**0.50**	1.18	0.91	1.39	**0.84**	
Outside SUHSD	Resident Students	2010	5	5	9	3	10	2	4	2	5					45	
only Rav. CSD stu	enrolled in Rav. CSD	2011	1	3	3	6	3	8	1	4	1					30	
		2012	8	4	9	4	5	5	8	3	6					52	
		2013	4	7	2	10	6	2	4	6	0					41	
All SUHSD Areas	Resident Students	2010	5	6	1	7	4	4	5	2	4					38	
except Rav. CSD	enrolled in Rav. CSD	2011	0	3	4	0	9	2	3	6	2					29	
only Rav. CSD stu		2012	3	1	6	7	4	8	3	5	7					44	
		2013	4	5	3	7	7	4	6	3	5					44	

*All Ravenswood CSD regional counts exclude any students from the 25 townhouses in the "Pacific Parc" complex that was transferred to the MPCSD on 7/1/12.

** PVSD enrollment in Oct. 2012 contained 46 Tinsley students in a total of 672 students. Combined PVSD and WSD enrollment in Oct. 2013 contained 89 Tinsley students. No other Tinsley components of those two school districts' enrollments were determined.

Notes: (1) Student counts are from combination of BRSSD, SCSD, Redwood CSD, MPCSD, LLSD and SUHSD files. (2) Final year weighted 150% in four-year change rates.

SCHOOL DATA

Established:	1951
Classrooms:	95
Building Area:	233,214 sq. ft.
Site Area:	37.55 acres
Students in 2014:	2,167
Students in 2020 (Projected):	2,603

MENLO-ATHERTON HIGH SCHOOL
Strength in Diversity
SINCE 1952

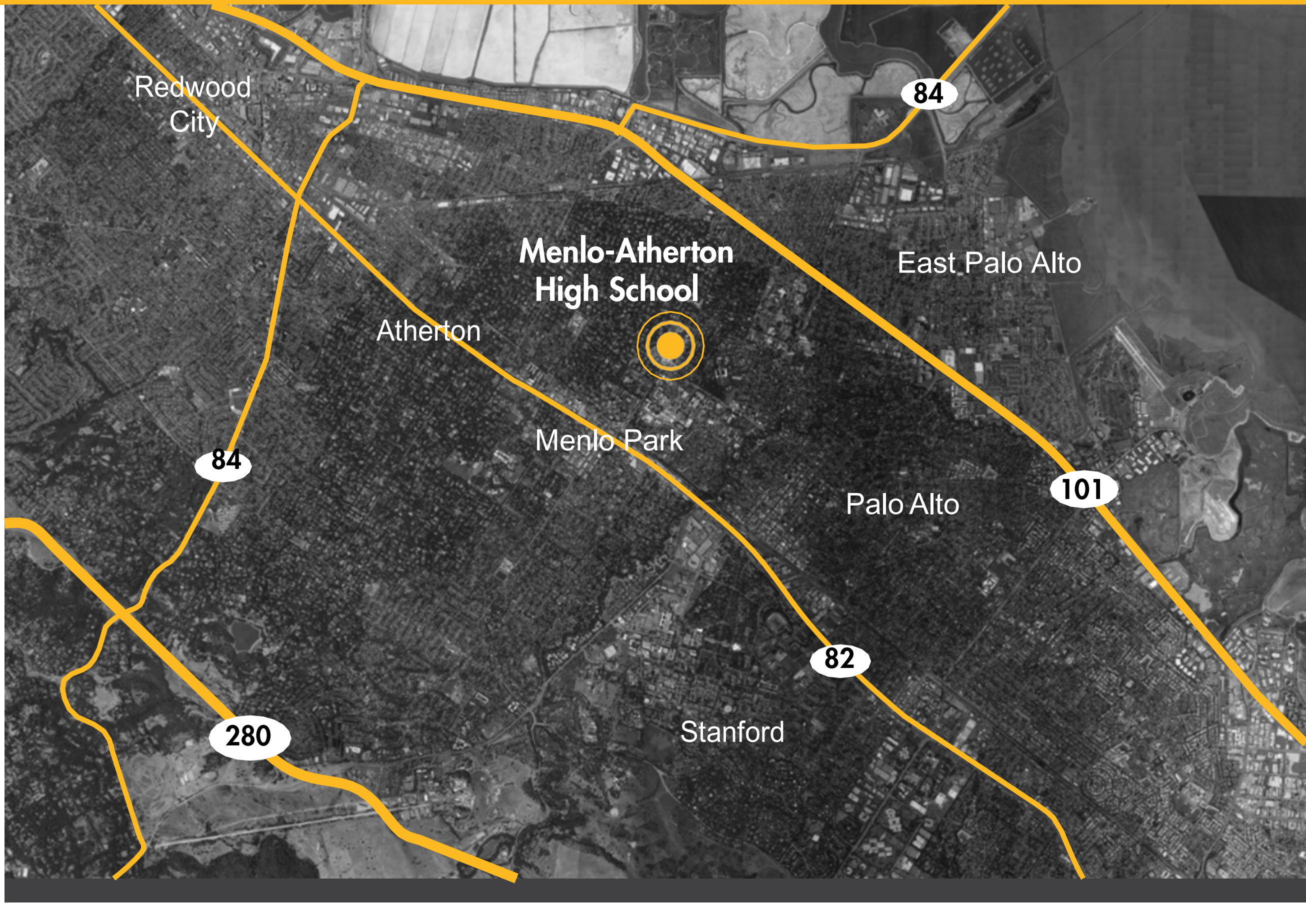
LPA

MENLO-ATHERTON HIGH SCHOOL

MENLO-ATHERTON HS: BACKGROUND

Menlo-Atherton is a four-year public comprehensive secondary school located in Atherton, California, a suburban community between San Francisco and San Jose in close proximity to Stanford University and Silicon Valley. Established in 1951, the school is part of the Sequoia Union High School District, which consists of four comprehensive high schools and a continuation high school. The school serves the cities of Atherton, Menlo Park, Redwood City, East Palo Alto, and Portola Valley, supporting a diverse community with high academic expectations. The school was named one of the top secondary schools in the nation by the United States Department of Education as part of its National School Recognition Program and recently also awarded California Distinguished School by the State Department of Education.

The current enrollment at Menlo-Atherton High School as of January 2015 is 2,167 students. The existing campus has a total of 95 Classrooms/ Teaching Stations. Enrollment is projected for the next 5 years to increase to 2,603* in October 2020, resulting in a need of 117 Classrooms. (*Enrollment projection per District demographics consultant).



PLANNING PROCESS: OVERVIEW

The Site Facility Master Plan Committee (SFMPC) for Menlo-Atherton High School was formed with a group of dedicated participants who met in a series of scheduled meetings throughout the master plan process. The process included open discussion and activities to gather information on existing conditions and issues, and come to consensus on the committee's long term goals, opportunities and possible solutions. The process began in July 2014 and will conclude with a final presentation to the Board of Education in April 2015.

The first focus of the committee's meetings was on Phase 1 requirements for accommodating growth at the site. The recommendations were summarized in the "Facilities Master Plan and Phase 1 Project Board Update" document presented to the Board on August 28, 2014. In order to ensure we were able to meet the construction schedule, the team in collaboration with the District decided to split the Phase 1 project into two increments: Increment 1 which includes the site utilities, and Increment 2 which includes the building. Construction for Increment 1 is projected to commence from May 29 - Sept. 10th, 2015 and for Increment 2 from Oct. 26, 2015 - Dec. 30, 2016.

As a concurrent project, the SFMPC began to discuss in September 2014, the longer term needs of the campus beyond the Phase 1 Classroom building. These included the 5-Year Capital Repair Plan scopes, Phase 2 new construction to accommodate growth, and Phase 3 modernization needs and support program spaces improvements, as well as proposed future projects. Below is an overview of the SFMPC meetings and agendas.

The following is a summary of the topics discussed at each of the Facilities Master Plan Site Committee meetings:

Meeting #1
- Review Meeting Dates & Agendas
- Start Capital Repair Plan Scope of Work discussion
- Discuss appropriate forums for authentic engagement of stakeholder community
- Pride Hallway student circulation

Meeting #2
- Facilities Needs Assessment Survey Report
- Capital Repair Plan items
- Facilities Task Force projects
- Educational program opportunities
- Campus influences analysis
- Charette

Meeting #3
- Demographic Projections Overview
- Review feedback from Stakeholder groups outreach meetings
- Present preliminary educational program
- Present idea plans and master plan options

PHASES COST

	PHASE	EST. COST
MEASURE A	Phase 1	$28,062,865
MEASURE A	5-Year Capital Repair	$5,245,988
MEASURE A	Phase 2	$15,769,478
MEASURE A	Phase 3	$2,812,125
	TOTAL	$51,890,456

PLANNING PROCESS: STAKEHOLDERS

Meeting #4
- Present final educational program
- Teaching station analysis
- Discuss refined campus master plan
- Packing of projects and phasing options priorities

Meeting #5
- Present Master Plan cost estimate
- FTFNA & Phase One budget analysis
- Prioritization exercise
- Discussion + Next Steps

Student Meeting
- Red dot/ Green dot exercise
- Campus likes vs. dislikes discussion
- 'If you could dream' discussion

PTA Meeting
- Update of new Phase I project
- 'If you could dream' discussion

PTA Meeting
- 'If you could dream' discussion

Staff Meeting
- FMP Update presentation

STAKEHOLDERS

Site Facility Master Plan Committee

Matthew Zito	Principal, M-AHS
Brien Oliver	Plant Manager, SUHSD
Christopher Tinsley	Student, M-AHS
Elizabeth Katz	Parent Representative
Laura Duran	Guidance, M-AHS
Patrick Maier	Teacher, M-AHS
Robert Fishtrom	Technology, SUHSD
Ruben Guerrero	Student, M-AHS
Simone Kennel	Asst. Principal, M-AHS
Jim Kisel	LPA, Inc.
Wendy Rogers	LPA, Inc.
Katia McClain	LPA, Inc.
Jomay Liao	LPA, Inc.

Student Meeting Participants

Emily Addicott
Sophie Frank
Reyna Arroyo
Sophie Bock
Diana Gruber
Paige Muschott
Diana Bojorquez

SUMMARY

At the start of the facilities master plan (FMP) process, the Site Master Plan Committee was formed for Menlo-Atherton High School (M-AHS). The committee members included both staff and students, with LPA as the master plan consultant. In addition to committee meetings, stakeholder outreach included several meetings with Maintenance & Operations, student interview with follow up survey, teacher/ staff presentation, discussion and survey, a PTA presentation, discussion and survey, and open-to-all townhall meetings where students and the community were involved.

The first meeting set the tone for the planning process and established meeting dates and agendas. A meeting with Maintenance and Operations (M&O) group to discuss and establish scope for the Capital Repair Plan was set. Discussion regarding Pride Hall, a major student circulation access at M-AHS and concerns with student restroom access and quantity of fixtures was also initiated.

Meeting #2: the committee discussed the projected teaching station analysis presented by LPA, based on graduation requirements, existing teaching stations and preliminary demographic projections. The school's enrollment is projected to increase from 2,167 to approximately 2,643 by 2020. This number has now been corrected by the District's demographics consultant to 2,603 which would result in an increase in required teaching stations from 95 to 114, assuming the current Classroom to teacher ratio of 0.85. If the District classroom to teacher ratio of 0.95 was to be met, this would increase the need for teaching stations even more. LPA also reviewed with the committee the results of the facilities needs assessment, and presented potential solution options. Other educational program opportunities discussed included clustering of classrooms by subjects, locker room and student service office needs.

Meeting #3: the demographic projections were further reviewed and an analysis was presented to demonstrate the number of teaching stations required versus phase of work. The budget established by the FTFNA was reviewed and initial locations of Phase 2 new construction scope of work were explored. LPA took into account committee comments to develop the options for Phase 2 presented at the next meeting.

Meeting #4: the scope of work and the budget vs. actual costs for Phase 3 modernization scope was discussed in further detail. The committee agreed that the scopes of work will need to be prioritized to meet the budget amount. The proposed improvements to Pride Hall to enhance the circulation, was approved by the committee. The Capital Repair plan was discussed and allocated vs. the school's needs, the Committee agreed because there is a negative delta between the budget these would need to be prioritized by M&O. Phase 2 options were presented and the Committee liked the idea of two separate buildings; one to replace the existing Food Service Kiosk and Restroom buildings and another to house the Labs. The committee asked LPA to explore locating the Lab building at the tennis court to the East of the Library. Long term Master Plan Future / Unfunded Projects were discussed. The group agreed to include a better school entry, locker room improvements, Team Rooms addition, Student Union connected to Administration and Guidance building along with fulfilling the teaching station needs.

Meeting #5: the Committee reviewed the enrollment projection analysis vs. construction phasing, presented by LPA. FMP budget was reviewed against the master plan cost estimate. A scope prioritization exercise was conducted and Phase 3 scopes of work were prioritized as shown in the following pages.

At the Student Engagement meeting, students were asked to place on the campus map a 'green' dot on areas they liked vs. a 'red' dot on areas that could be improved. The students raised important needs that included: improvements to circulation at Pride Hall, modernization of the old locker rooms, improvements to athletics, ventilation / air conditioning in Classrooms, more comfortable Classroom furniture, usable outdoor spaces, more shade, more restrooms and a Student Union for hanging out.

At the PTA meeting, parents and community members had an 'If you could dream...' discussion about the M-A HS campus. Issues that came out of the discussion included the following: better cafeteria with more food choices, more trees and shade, new connection from the Library to the Stadium, relocate trash cans, quieter HVAC at Classrooms, better/ cleaner bathrooms, more drinking fountains and bottle filling stations, improve circulation between classrooms, more WiFI access points, and a permanent place for PTA group storage of materials.

CAPITAL REPAIR PLAN, PHASE 1 & 2 ESTIMATED COSTS

SUHSD FMP Budget Tracking

PHASE 1 ESTIMATED COSTS

SCOPE OF WORK

1. Demo existing 11 Classroom Building (G Wing)
2. New Construction: 2-Story, 21 Classroom Building with Food Service

Total: $28,062,865

	SCOPE DESCRIPTION	COST
	Classroom and Food Service Building	$28,062,865

5-YEAR CAPITAL REPAIR PLAN

* Reference pages 14-19 for scope of work categories and descriptions.

Total: $5,245,988

	SCOPE DESCRIPTION	COST
	5-Year Capital Repair Plan	$5,245,988

PHASE 2 ESTIMATED COSTS

SCOPE OF WORK

1. Demo existing Food Service Kiosk, Restroom Building and one Tennis Court
2. New Construction: 2-Story Lab Building with (2) CTE Labs, (2) Biology/ Environmental Science Labs, and (2) Physics Labs
3. New Construction: Food Service + Kitchen and Restroom Building
4. Expand and Reconfigure existing Student Services
5. Add Skateboard Lockers to "Hello Hall" in areas where existing lockers were removed.
6. New Bike Storage Areas with Bike Racks, enclosed w/ Chainlink Fence & Gate

Total: $15,769,478

ITEM NO.	SCOPE DESCRIPTION	COST
2	Lab Building	$9,996,000
3	Food Service / Restroom Building	$4,750,000
4	Student Services Reconfiguration	$1,005,000
5	Add Skateboard Lockers to "Hello Hall"	TBD
6	New Bike Storage Areas w/ Chainlink Fence & Gate	TBD
	TOTAL	$15,751,000

PHASE 3 ESTIMATED COSTS & FUTURE PROJECTS

PHASE 3 ESTIMATED COSTS

The scopes of work are listed in the order of priority as discussed at the committee meeting at the end of February 2015. Scope numbers 1 through 4 are the prioritized scopes of work and align with the original SUHSD FMP budget. Items below the line (Items 5 and 6) will remain on the list and will be addressed at a later time as funds become available in the future.

* Reference Phase 3 Master Plan Diagram on page 24 for where scopes of work occur. Item numbers correspond to numbers in the Legend.

SUHSD FMP Budget Tracking

$975,000

$1,837,125

Total: $2,812,125

ITEM NO.	SCOPE DESCRIPTION	COST
1	Field Lighting	$1,050,000
2	Pride Hall Improvements	$308,668
3	Pride Hall Restroom Convert to Storage	$50,000
4	Convert C-2 to Chemistry Lab	$910,000
	Sub-Total	$2,318,668
5	Improve Ventilation at Building D/E	$75,000
6	Shower/Locker Room Mod Boys Girls	 $815,000 $850,000
	Sub-Total	$1,740,000

FUTURE PROJECTS PHASE

The Future Projects Phase includes proposed future projects that are currently not funded, but are part of the Facilities Master Plan to address identified campus needs.

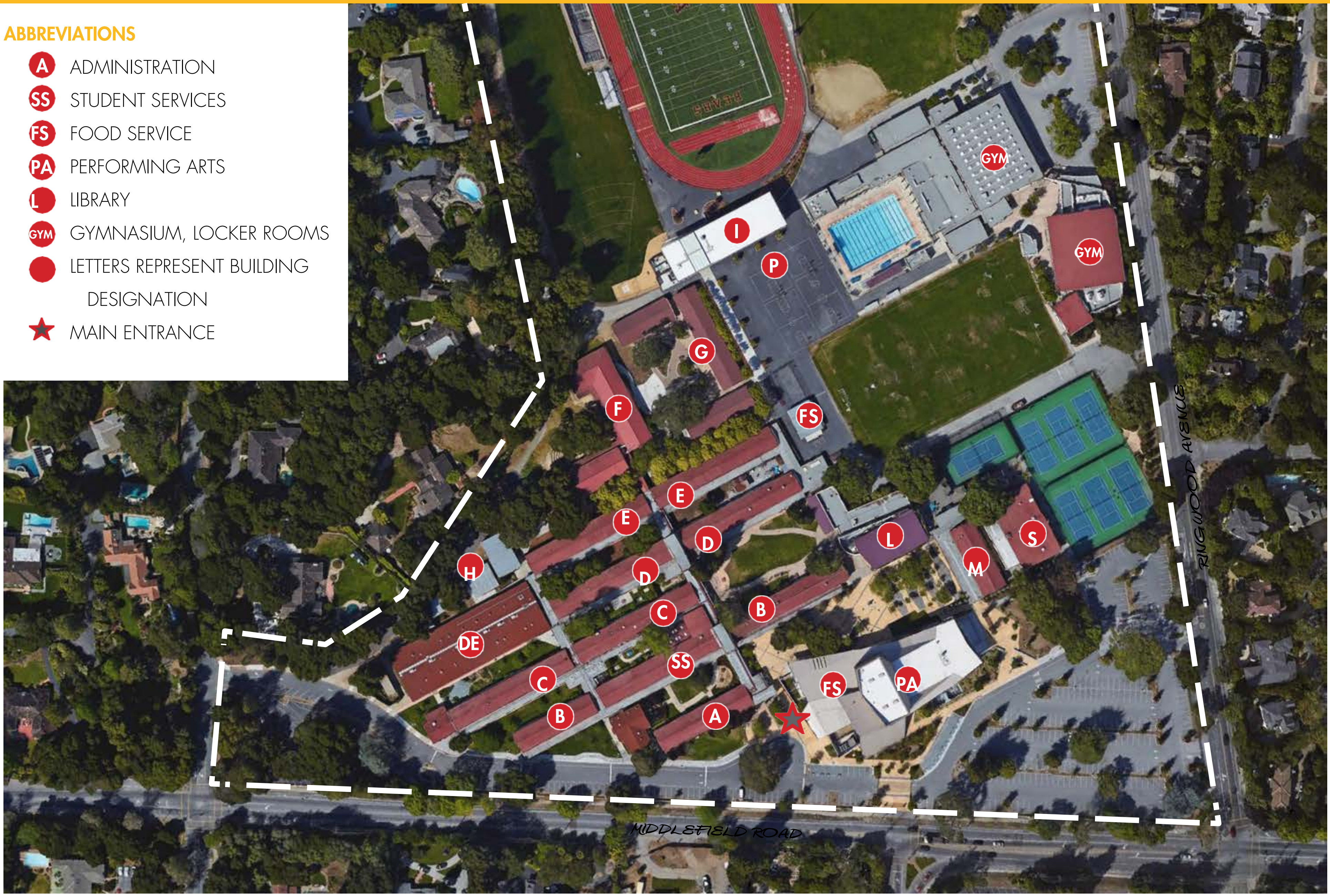
SCOPE OF WORK DESCRIPTION

1. Demo Buildings C, D-E, H, Admin, and Student Services / Resource Building
2. New Construction: 2-Story Academic Classroom / Lab Building
3. New Construction: 2-Story Administration, Student Services, Student Union Building
4. Modernization/ Reconfiguration of existing Boys and Girls Locker Rooms and Athletics Addition at old, Main Gym
5. Addition of lighting and re-surfacing at existing Tennis Courts
6. Replace existing turf with Synthetic Turf at Soccer Field
7. New Staff Parking Lot

MENLO-ATHERTON HS: EXISTING CAMPUS AERIAL

ABBREVIATIONS

- A ADMINISTRATION
- SS STUDENT SERVICES
- FS FOOD SERVICE
- PA PERFORMING ARTS
- L LIBRARY
- GYM GYMNASIUM, LOCKER ROOMS
- ● LETTERS REPRESENT BUILDING DESIGNATION
- ★ MAIN ENTRANCE



MENLO-ATHERTON HS: EXISTING SPACE DIAGRAM

LEGEND

- Classrooms
- Science Labs
- Student Services
- Electives
- Computer Lab
- Administration / Faculty
- Library / Performing Arts
- Food Service
- Physical Education / Athletics
- Support Spaces

- Hardcourts
- Play Fields
- Main Entrance
- Drop-off

- 1 Bike Storage Area

MENLO-ATHERTON HS: PHASE I - PLAN

The proposed Phase One Classroom Building at Menlo-Atherton High School has been planned to address the projected increase in student enrollment at the campus. The new building is to be located at the site of the current Building 'G'.

The (11) eleven existing modular classrooms of Building 'G' will be demolished and replaced with a new (21) twenty-one classroom 2-story building, for a net increase of (10) ten teaching stations at a gross program square footage of 43,730sf. Additional facilities proposed as part of the program include staff workroom/collaboration spaces, student/staff toilets, a food service serving kitchen and covered student dining. These elements are currently deficient on campus and were also highlighted as part of the District's Facilities Task Force Needs Assessment report.

SCOPE OF WORK

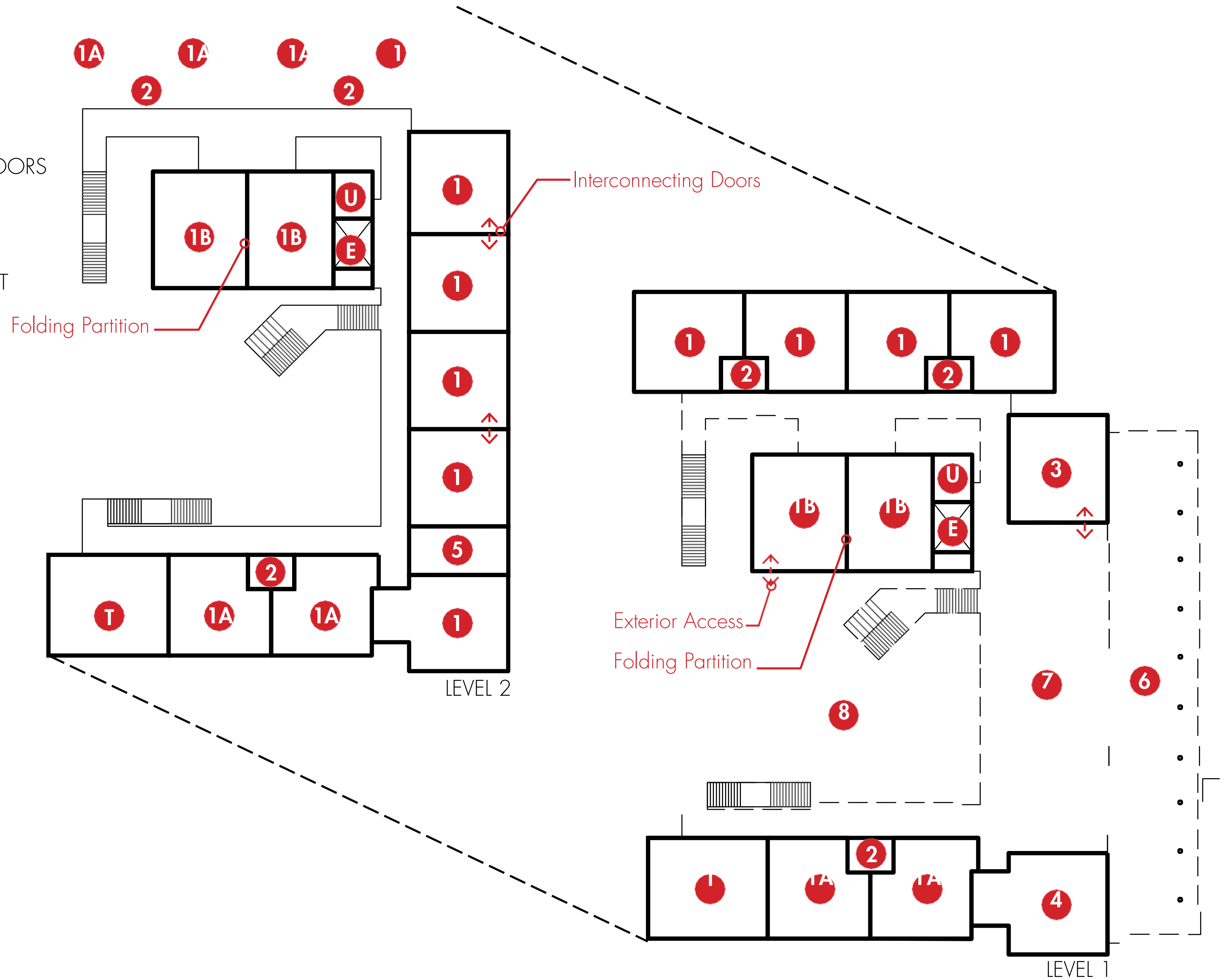
1. DEMO (E) 11 CLASSROOM BUILDING (G-WING)
2. NEW CONSTRUCTION 2-STORY 21 CLASSROOM BUILDING WITH FOOD SERVICE

N

MENLO-ATHERTON HS: PHASE I - FLOOR PLAN

LEGEND

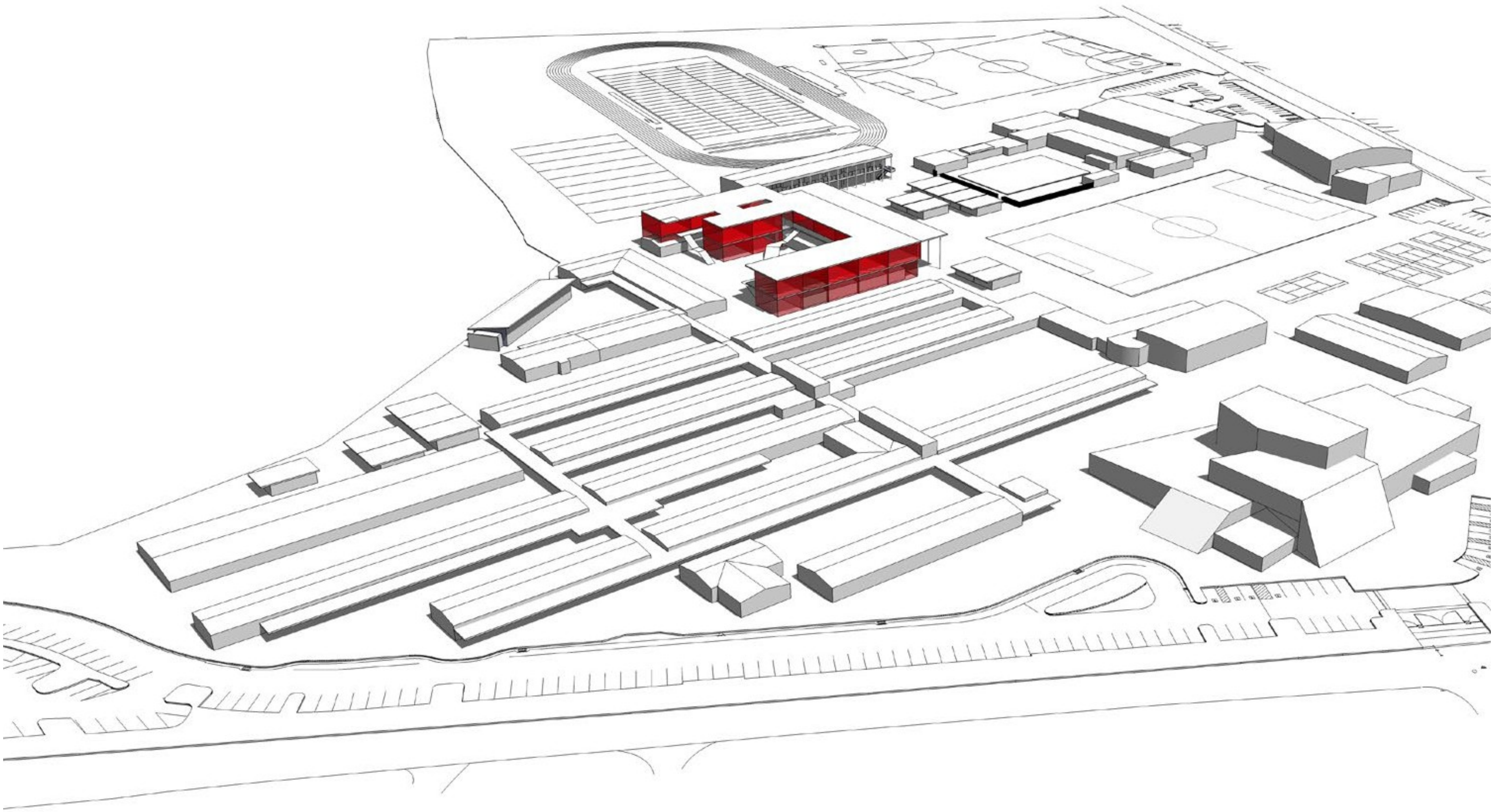
- 1A COLLABORATIVE CLASSROOM
- 1B COLLABORATIVE CLASSROOM W/ FOLDING PARTITION
- 1C COLLABORATIVE CLASSROOM W/ INTERCONNECTING DOORS
- 2 STUDENT COLLABORATION WORKROOM
- 3 LEARNING CENTER / STUDENT COLLABORATION
- 4 FOOD SERVICE
- 5 STAFF COLLABORATION / PLC
- 6 CANOPY
- 7 STUDENT DINING AREA
- 8 LEARNING COURT
- T TOILETS (STUDENT+ STAFF) & CUSTODIAL
- E ELEVATOR + MACHINE ROOM
- U UTILITY



$28,062,865 . . . . PHASE 1

Menlo-Atherton High School South-East Elevation

MENLO-ATHERTON HS: PHASE 1



PRIORITIZED SCOPE CATEGORIES

1. ADA Compliance

The following work is required to meet ADA compliance requirements:

- Add 48 inch opening in chainlink fence at track and field.
- Add concrete paving at ADA path of travel to North baseball field.
- Add concrete paving between batting cage and bench area at baseball field.
- Add concrete paving at bleacher floor, East baseball field.
- Add 5% slope transition for 2 inch elevation delta between bleacher floor and walkway, at East baseball field.
- Add 6'-0" long transition ramp to Ringwood Ave. sidewalk (1:12 slope max. with top and bottom landing and handrails), at North-East corner of Parking Lot.
- Provide minimum 1 accessible gate at track access from Parking Lot at Ringwood Ave. Add 10" bottom plate and push bar.
- Add truncated domes at drop-off and flush curb area in parking lot at Ringwood Ave.
- Add handrails at 2 existing ramps that are greater than 13% slope, north of I Wing.
- Replace all exterior drinking fountains to ADA compliant.
- Add cane detection side rails at drinking fountain at Concessions building.
- Site restrooms are in general ADA compliant. A few door locks, grab bars, and signage need to be replaced.
- All gates at the tennis court area need to be replaced to ADA compliant. One landing connected to path of travel between parking lot and tennis court needs handrails.
- Remove existing transition and add 6'-0" long transition ramp from tennis court to Parking Lot B off Ringwood Ave.
- Install lift for stage at Drama Classroom C16.
- Provide ADA compliant signage throughout campus.
- Reset / replace interlocking pavers that have shifted to mitigate potential tripping hazard.

2. Asbestos Mitigation	The District needs to hire a consultant to determine what specific areas/ materials need to be removed / abated. For all modernization projects, include an allowance for unknown and unforeseen mitigation.
3. Code Compliance Issues	• Per 2013 CBC, for a campus of 2,600 students, nineteen (19) drinking fountains are required. There were only twelve (12) drinking fountains counted on the site. From those, only one was ADA compliant. • Add drinking fountains at the playfields.
4. Electrical Upgrades	• Provide backup generators at the main gym. • Provide electrical upgrades at mechanical rooms and various Classrooms. • Enclose all exposed electrical equipment. • Campus electrical power distribution is comprised of underground feeders at 4160V, 3 phase. The wires found in the manholes vary in size. The new Phase 1 building requires up-sizing of the feeder to this side of campus to accommodate added load. It is recommended that all distribution wire throughout campus be replaced and up-sized accordingly. Remove all abandoned feeder wires. • If HVAC improvements add cooling capacity to existing buildings, the electrical distribution and panels at that building will need to be evaluated to determine if they can support the added load.
5. Fire and Life Safety	• Upgrades to fire alarm systems, as required. • Upgrades to security system. Scope and detail to be determined.

6. Heating and Ventilation	• Boiler systems were reviewed and were determined to be in good working order. • Replace domestic boiler in "T" Wing. This domestic water boiler has been repaired and is functioning well. This item can be removed. • Replace furnaces at B, C, D, E, F Wings (45 total) with hydronic fan coil units located outside the classroom. • Implement HVAC automation campus wide with DDC controls based on District standards.
7. Finish Floor Replacement	Replace all finish flooring at the end of its life cycle. New flooring to comply with District standards. Replace flooring in the listed rooms with new VCT flooring. Apply waterproof sealant to existing concrete slab and prepare for new floor finish. • Radio Station • B-1, B-2, B-3, B-4 B-11 • C-5, C-10, C-11, C-14, Offices between C-15 & C-16, C-16 • D-1, D-2, D-13, D-16, D-21, D-24 • E-0, E-25 Mechanical polishing/ grinding of existing concrete floor is recommended for the below listed rooms. Seal floors: • Boys locker room offices (3 total). • Water polo room • Pool office
8. Roof Replacement	• Replace sixty (60) 4' x 4' skylight units at the main Gym. • Remove existing roofing system at existing arcade and replace with District Standard roofing system. Slope needs to be added to roof possibly through built up rigid insulation to allow for water flow to drains.

M-AHS: 5-YEAR CAPITAL REPAIR PROJECTS

UNFUNDED SCOPE CATEGORIES

9. Energy Efficient Projects	• Provide electric charging station next to ADA stalls at the main parking lot, South of the Performing Arts Center and Main Administration.
10. Landscaping	• Tree assessment by a certified consulting arborist to determine the health of all trees on campus is recommended. • Tree mitigation ton include removal and replacement of unhealthy trees, and pruning of hazardous branching conditions. • Overall campus pruning to enhance structure and health of existing trees to remain is recommended. • Irrigation assessment to determine upgrades required for more efficient use of water, addition of a central control system and replacement of outdated and inefficient irrigation equipment. • Assess and repair the well system that provides irrigation to portions of the campus. • Verify the purpose of the 4' moat around existing oaks with a certified consulting arborist, and adjust as recommended.
11. Locker Room Repairs	• Provide modernization at main locker rooms at Main Gym. • Remove benches as required to provide 44" minimum ADA path of travel at Boys Locker Room. • Replace 5% lockers and benches with ADA compliant. • Install new 18" x 18" top and bottom lockers, for a total of 72 units at Boys Locker Room and at Girls Locker Room. • Provide accessible shower stall at Student showers and at Staff shower.

12. Painting	• New paint for all window frames and trims, including fascia and gutters throughout campus. • New paint for all buildings in the pool complex and old/ Main gym complex. • New paint for the exterior of the Teacher's Resource Center
13. Plumbing Upgrades	• Add drinking fountains at the playfields (football and baseball). • Convert twelve (12) existing wall plumbed showers to surface mount shower heads at Boys Locker Room • Replace water mains at B, C, D, E Wings. • Replace sanitary sewer from Senior Green to main at Oak Tree. • Repair/ replace sanitary sewer under C-0.
14. Sports Facilities	• Tennis courts need to be resurfaced; seal cracks, 2" AC pavement topping. Improve shed plane (slopes) and apply new finish coating (potentially the Draco system) and striping at all courts. • The track needs a new finish coat; match existing color. The rubberized track is in good condition (approximately 1/2" thick mat). The color is fading slightly. All tracks need to be re-striped.
15. Traffic Flow	• There is no work assigned to this category.

16. Window Replacement	• All existing classroom building window sills have dry rot which are not currently included in the maintenance plan. Window frames will need to be removed for sill replacement.
17. Parking	• Parking lots have potholes and cracks throughout the AC paving throughout. Patch and repair as required with new slurry coat.
18. Building Repairs	• Install bird protection net underneath exposed steel overhang areas at the Performing Arts Center (approx. +/- 4,600 sf). Spike-type bird deterrents currently utilized in some areas do not work well.

PHASE 2 -PROPOSED MASTER PLAN

The proposed scope of work for Phase 2 at Menlo-Atherton HS again addresses additional teaching station needs, improves a food service facility atthe center of campus, and addresses Student Services offices space needs. The existing 7th tennis court East of the Library will be demolished to build a new 2-story Lab building with Physics Labs, CTE Labs, Biology/ Environmental Science Labs and restrooms, for a gross square footage of 12,000sf. The existing modular Food Service Kiosk and restroom structure will be demolished and replaced with a new, 4,330sf permanent construction Food Service and restroom facility that includes Staff and Student Restrooms. The existing Student Services offices will be expanded and reconfigured to better serve their needs. Skateboard lockers will be added to 'Hello Hall' and bike storage displaced by new construction will be replaced with new.

SCOPE OF WORK

1. DEMO (E) TENNIS COURT, FOOD SERVICE KIOSK PORTABLE & RESTROOM BUILDING
2. *NEW CONSTRUCTION: FOOD SERVICE & RESTROOM BUILDING
3. NEW CONSTRUCTION: 2-STORY LAB BUILDING
4. RECONFIG. STUDENT SERVICES
5. ADD SKATEBOARD LOCKERS TO "HELLO HALL"
6. NEW BIKE STORAGE

* In order to remove the six (6) Portable Classrooms, the Food Service/ Restroom Building will need to be 2-Stories in order to meet the Teaching Station requirements based on projected enrollment. This scope is beyond the budget established by the FTFNA.

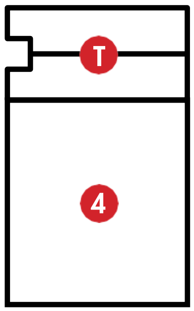
Menlo-Atherton High School

MENLO-ATHERTON HS: PHASE 2 - LAB BUILDING

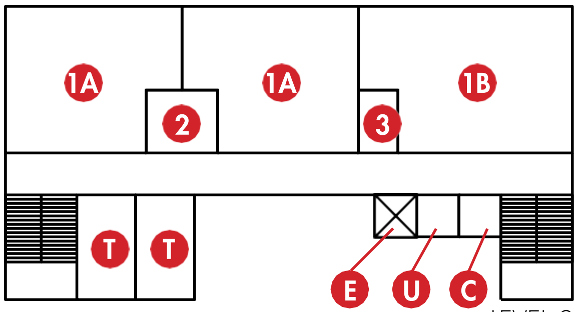
LEGEND

- 1A BIOLOGY/ENVIRONMENTAL SCIENCE LAB
- 1B CTE LAB
- 1C PHYSICS LAB
- 2 PREP ROOM
- 3 STORAGE / WORKROOM
- 4 FOOD SERVICE / KITCHEN
- T TOILETS (STAFF + STUDENT)
- U UTILITY ROOM
- E ELEVATOR
- C CUSTODIAL

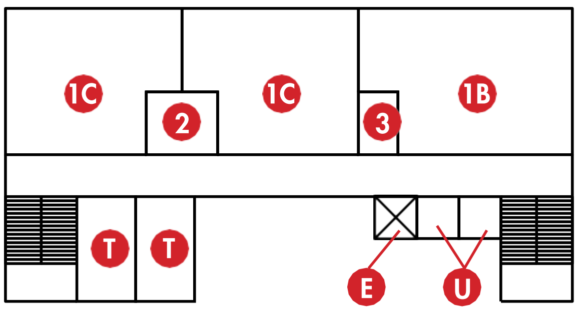
FOOD SERVICE / RESTROOM BUILDING



2-STORY LAB BUILDING



LEVEL 2



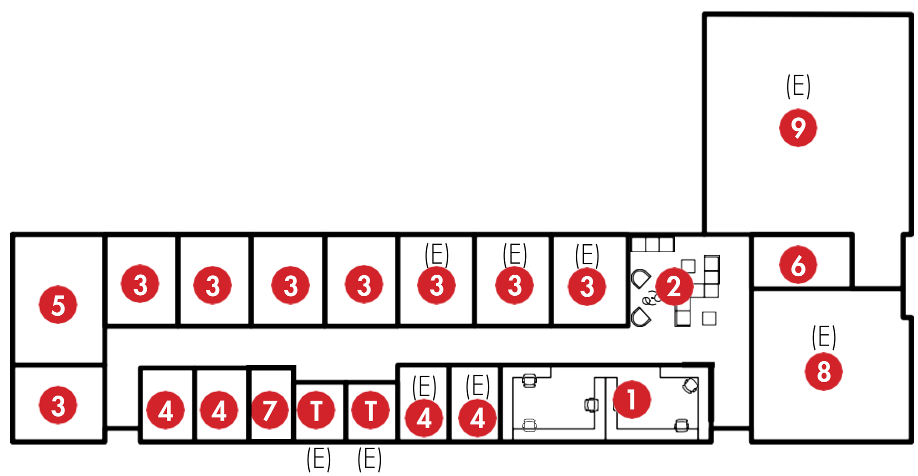
LEVEL 1

M-AHS: PHASE 2 - STUDENT SERVICES DIAGRAM

To address the additional space needs of the Student Services offices at Menlo-Atherton High School, the below diagram depicts an expansion of the space into Room B-12 and a reconfiguration. The diagram is just a test fit and will need to be reviewed with a Site Committee when a Design Team comes on board. Existing conditions will also need to be verified. The spaces that function well will remain; these include the Career Center, Presentation Room, (3) of the larger Guidance Offices, (2) of the Mental Health Offices and the existing Restrooms. The rest of the space will be reconfigured into additional, appropriately sized Guidance Offices, Mental Health offices, a Conference/ Lounge / Workroom, and a File/ Record Storage Room. The front entry will be reconfigured to provide a more open and welcoming entry with a lounge-like student waiting area. The square footage of the new Student Services area is approximately 5,600sf.

LEGEND

1 CLERICAL / RECEPTION
2 STUDENT LOUNGE / WAITING
3 GUIDANCE OFFICE
4 MENTAL HEALTH OFFICE
5 CONFERENCE / LOUNGE / WORKROOM
6 FILE/ RECORD STORAGE
7 SMALL TESTING ROOM
8 PRESENTATION ROOM
9 CAREER CENTER
T (E) TOILETS
(E) EXISTING TO REMAIN

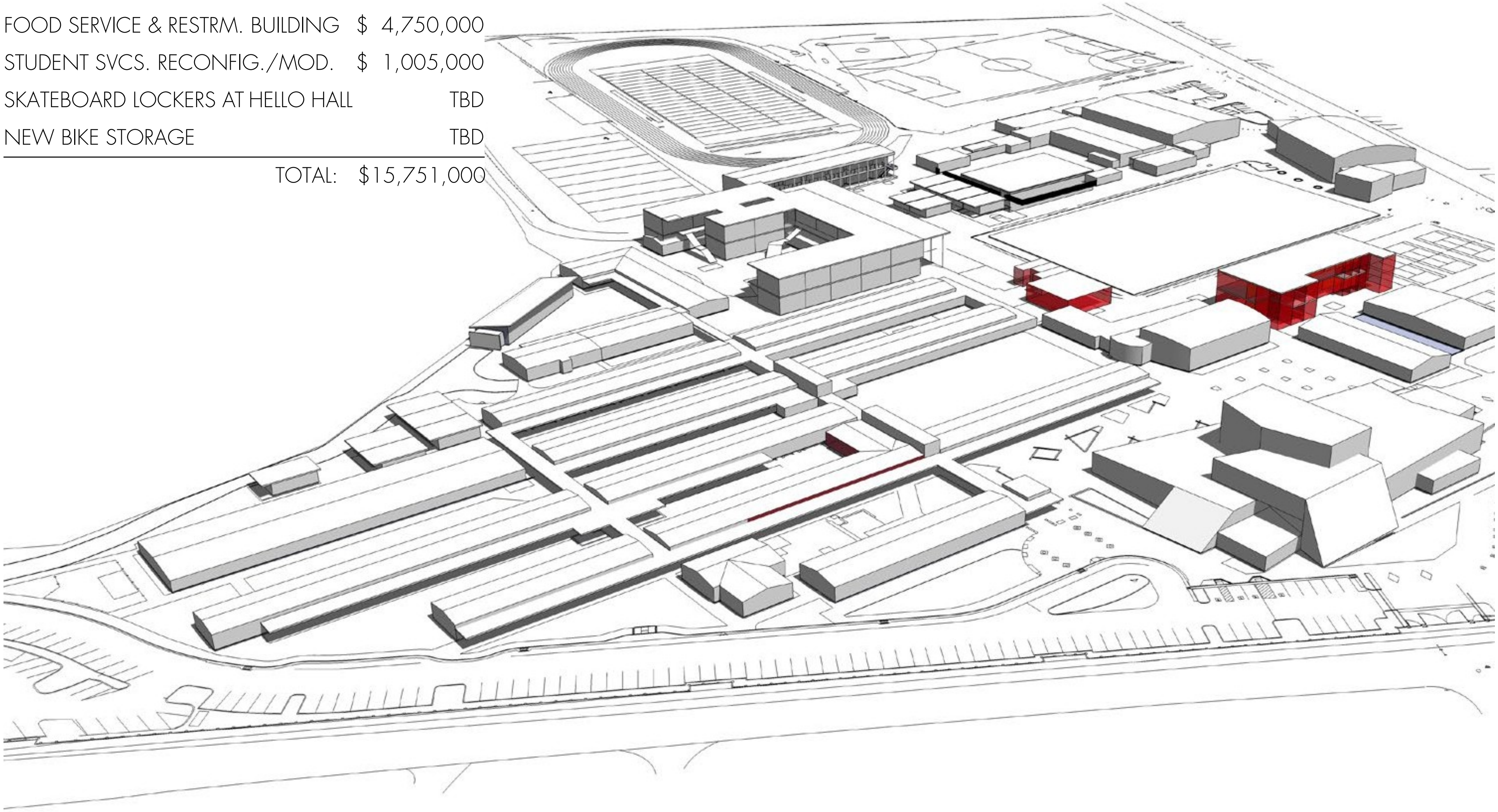


STUDENT SERVICES RECONFIGURATION / EXPANSION PLAN

$15,769,478 . . . . PHASE 2

ESTIMATED COSTS

2-STORY LAB BUILDING	$ 9,996,000
FOOD SERVICE & RESTRM. BUILDING	$ 4,750,000
STUDENT SVCS. RECONFIG./MOD.	$ 1,005,000
SKATEBOARD LOCKERS AT HELLO HALL	TBD
NEW BIKE STORAGE	TBD
TOTAL:	$15,751,000



Menlo-Atherton High School

PHASE 3 - PROPOSED MASTER PLAN

The proposed scope of work for Phase Three at Menlo-Atherton High School is to address the long term improvement needs of the campus. This work will include improvements to Pride Hall, field lighting at the soccer field, modernization of the shower/ locker rooms at the Main Gym, and the conversion of a Classroom to meet program needs. Reference page 7 for estimated costs.

SCOPE OF WORK

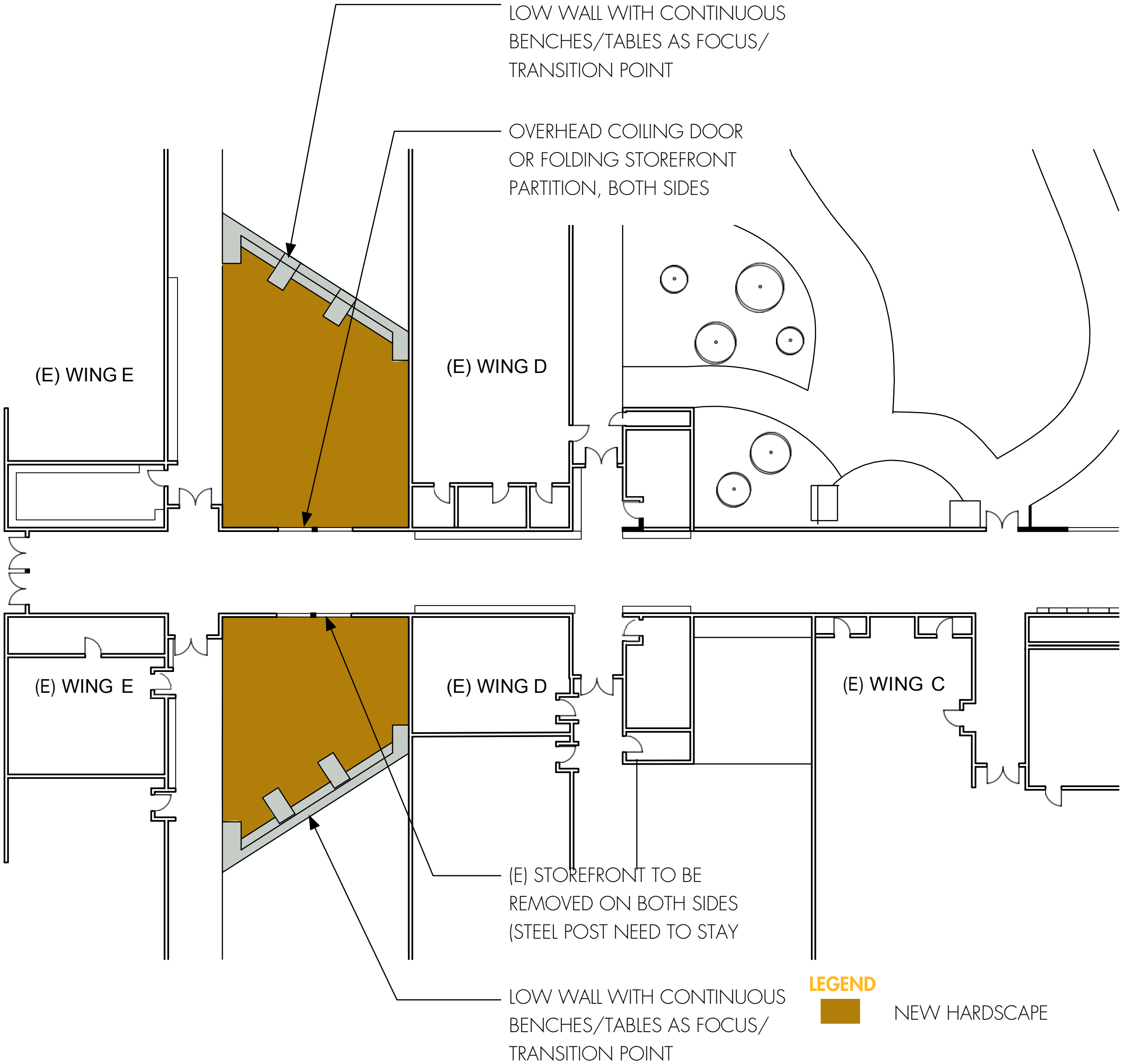
1. ADD FIELD LIGHTING TO SOCCER FIELD
2. PRIDE HALL IMPROVEMENTS
3. CONVERT RESTROOMS TO STORAGE
4. CONVERT CLASSRM. C-2 TO CHEMISTRY LAB
5. IMPROVE VENTILATION AT D-E WING
6. GYM SHOWER/LOCKER ROOM MODERNIZATION

Menlo-Atherton High School

PHASE 3 - PRIDE HALL IMPROVEMENTS

Pride Hall at Menlo-Atherton High School is a main circulation spine that runs North-South on the campus. Students utilize this enclosed hallway to access various academic wings and restrooms. The hallway is currently narrow and dim, creating congestion making access difficult and unsafe at times. The proposed improvements open up the area between 'D' Wing and 'E' Wing to create a larger through access in this space to alleviate the congestion at the most critical area. In addition to Pride Hall, improvements in other phases of work include the addition of student restroom facilities at all areas of new construction to offload some of the pressure within this main access-way.

M-AHS - BETWEEN D AND E WINGS



PROPOSED FUTURE PROJECTS: MASTER PLAN

The scope of work for proposed future projects at Menlo-Atherton HS addresses additional teaching station needs due to projected increase in student enrollment, consolidates the administrative and student services functions, provides a Student Union collaboration space and redefines the main campus entrance. It also addresses the deteriorated Locker Rooms at the old Gym and builds a 5,275sf addition to address the Athletics space needs. The new Academic building will be 51,500sf, and the new Campus Student Center/ Administration building will be 26,945sf.

SCOPE OF WORK

1. DEMO BUILDINGS C, D-E, H, ADMIN. & STUDENT SERVICES/ RESOURCE CENTER
2. NEW CONSTRUCTION: 2-STORY ACADEMIC CLASSRM/LAB BLDG.
3. NEW CONSTRUCTION: 2-STORY ADMIN./ STUDENT SVC./ STUDENT UNION
4. MODERNIZATION/ RECONFIG. OF LOCKER ROOMS & ATHLETICS ADDITION
5. TENNIS COURT LIGHTING
6. SYNTHETIC TURF
7. NEW STAFF PARKING

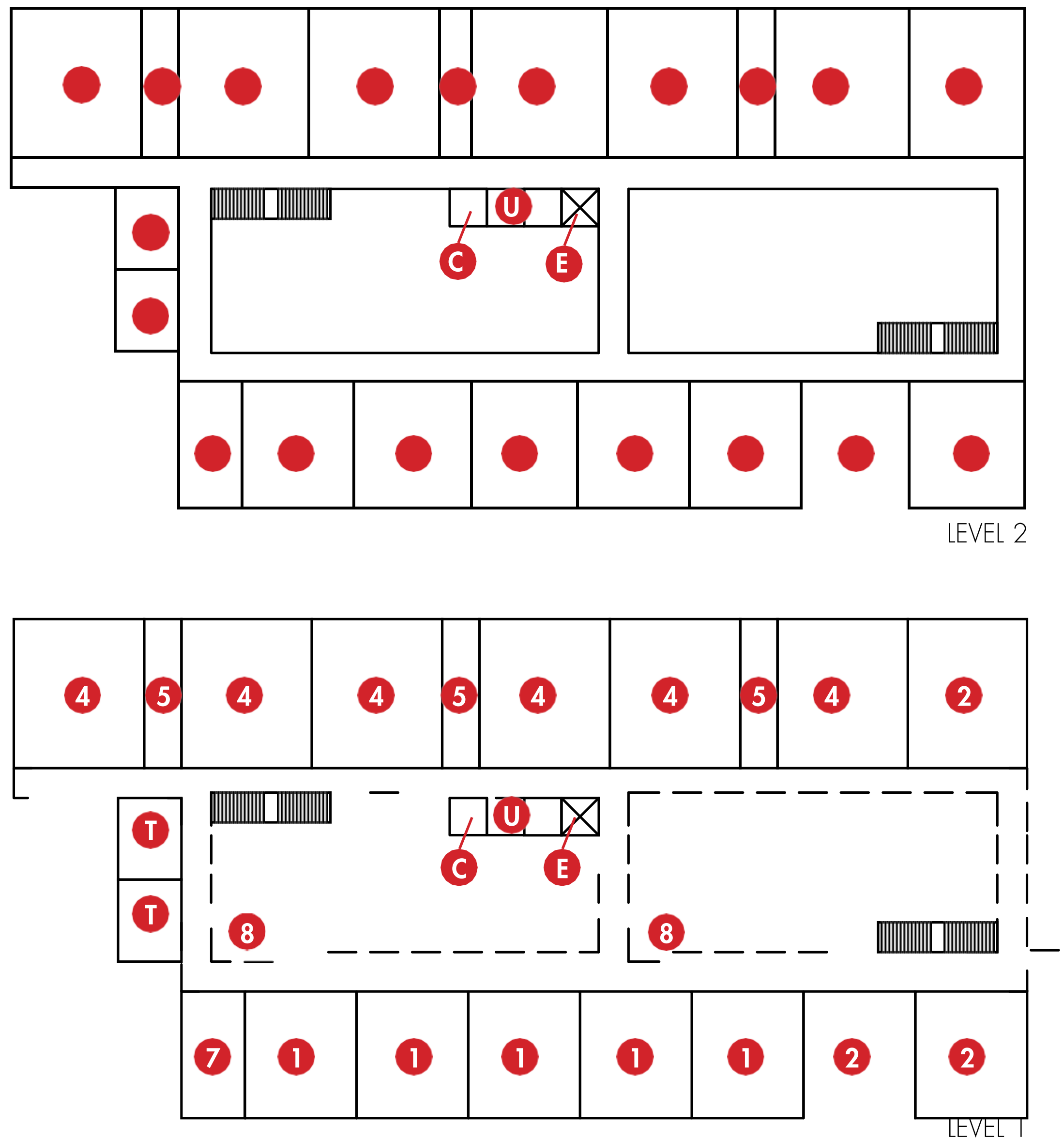
Menlo-Atherton High School

PROPOSED FUTURE PROJECT: ACADEMIC BUILDING

To address the increase in student enrollment and the need for additional teaching stations, the program for the new 2-story Academic Building will include science laboratories with prep rooms, general ed classrooms, special education classrooms, staff collaboration PLC's and student and staff restrooms. The central courtyard areas will include hardscape and landscaping that will enhance the educational program.

LEGEND

1 CLASSROOM + COLLABORATION
2 SPECIAL EDUCATION CLASSROOM
3 SPECIAL EDUCATION ILS ROOM
4 SCIENCE LAB
5 SCIENCE PREP
6 LEARNING CENTER
7 STAFF COLLABORATION (PLC) + STAFF TOILETS
8 LEARNING COURT
T TOILETS
U UTILITY ROOM
E ELEVATOR
C CUSTODIAL



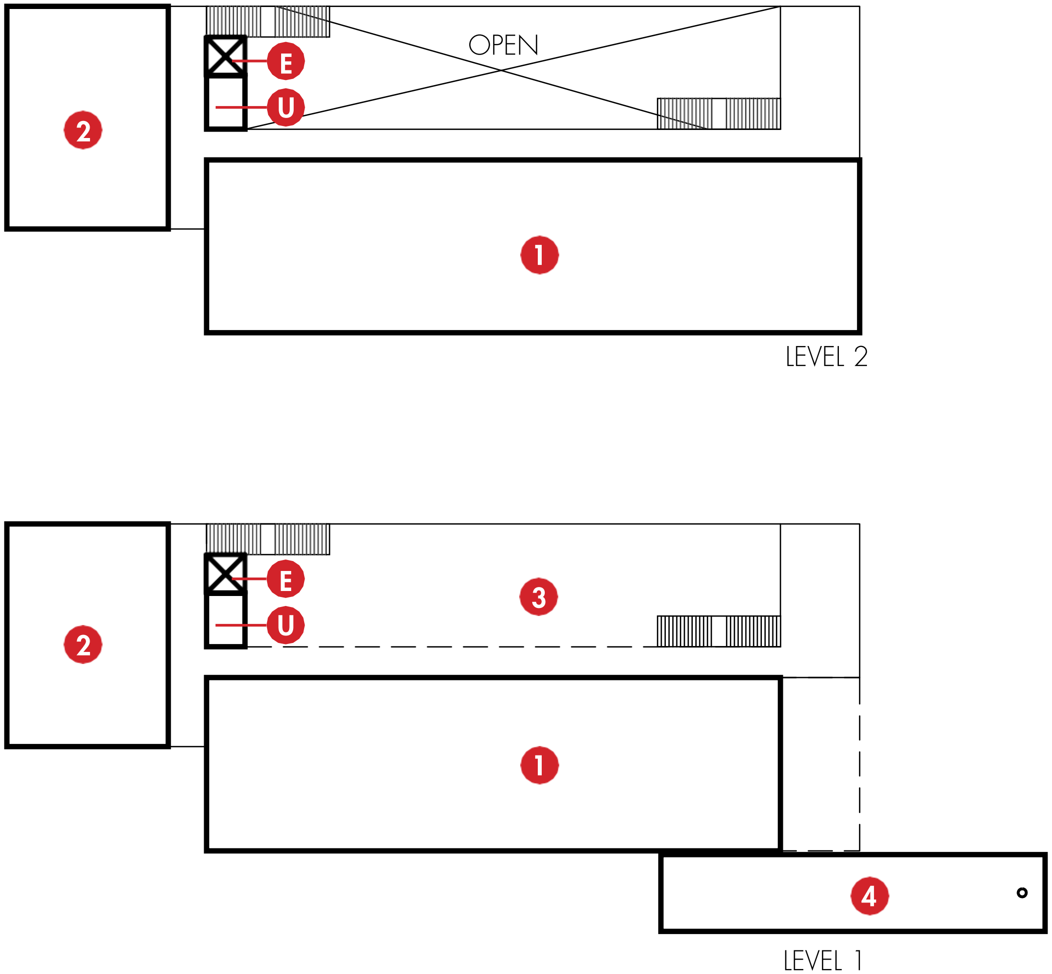
ACADEMIC BUILDING

PROPOSED FUTURE PROJECT: ACADEMIC CTR./ADMIN.

At Menlo-Atherton High School, the Administration offices, Student Services, and Guidance offices are located in three separate buildings. The program for the new 2-story Campus Academic Center / Administration Building will house all the administrative and student services functions in one place. A central Student Union will provide a place for collaboration and student to student and student to staff social and academic interaction. This new building will redefine the main entry of the campus and connect to the main access spine, Pride Hall.

LEGEND

- 1 ADMINISTRATION/ ATTENDANCE / HEALTH
- 2 STUDENT SERVICES
- 3 STUDENT UNION
- 4 ENTRY CANOPY
- T TOILETS (STAFF + STUDENT)
- U UTILITY ROOM
- E ELEVATOR
- C CUSTODIAL



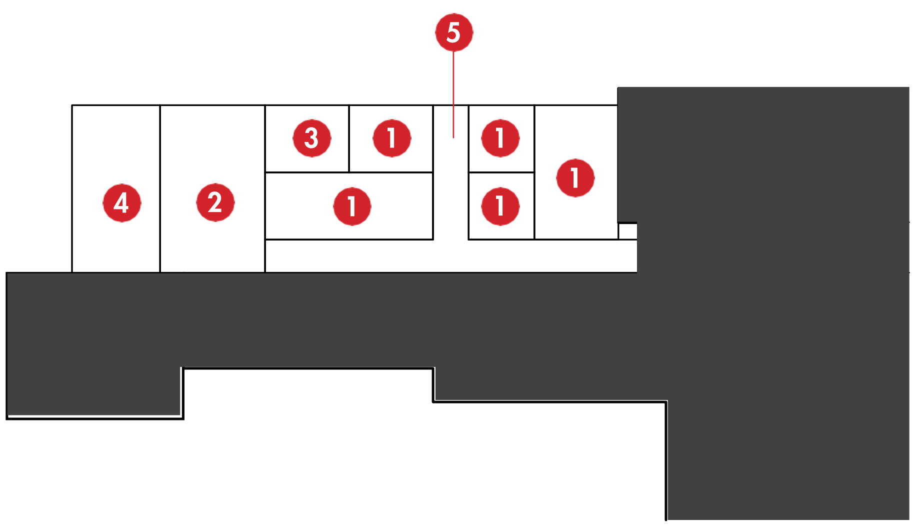
CAMPUS ADMINISTRATION/ STUDENT SERVICES CENTER

PROPOSED FUTURE PROJECT: TEAM ROOM ADDITION

At Menlo-Atherton High School, the existing locker rooms at the old, Main Gym have never been modernized and lack Team Rooms to support athletics programs. The new one-story athletic support spaces addition at the existing main gymnasium will address the need for adequate Team Rooms to support the Athletics program. The program for the addition includes Team Rooms, a Visiting Team Room and Athletic Equipment Storage room. All home Team Rooms to include deep lockers to store student athletic equipment and benches. The Visiting Team Room will have benches around the perimeter and an interactive whiteboard.

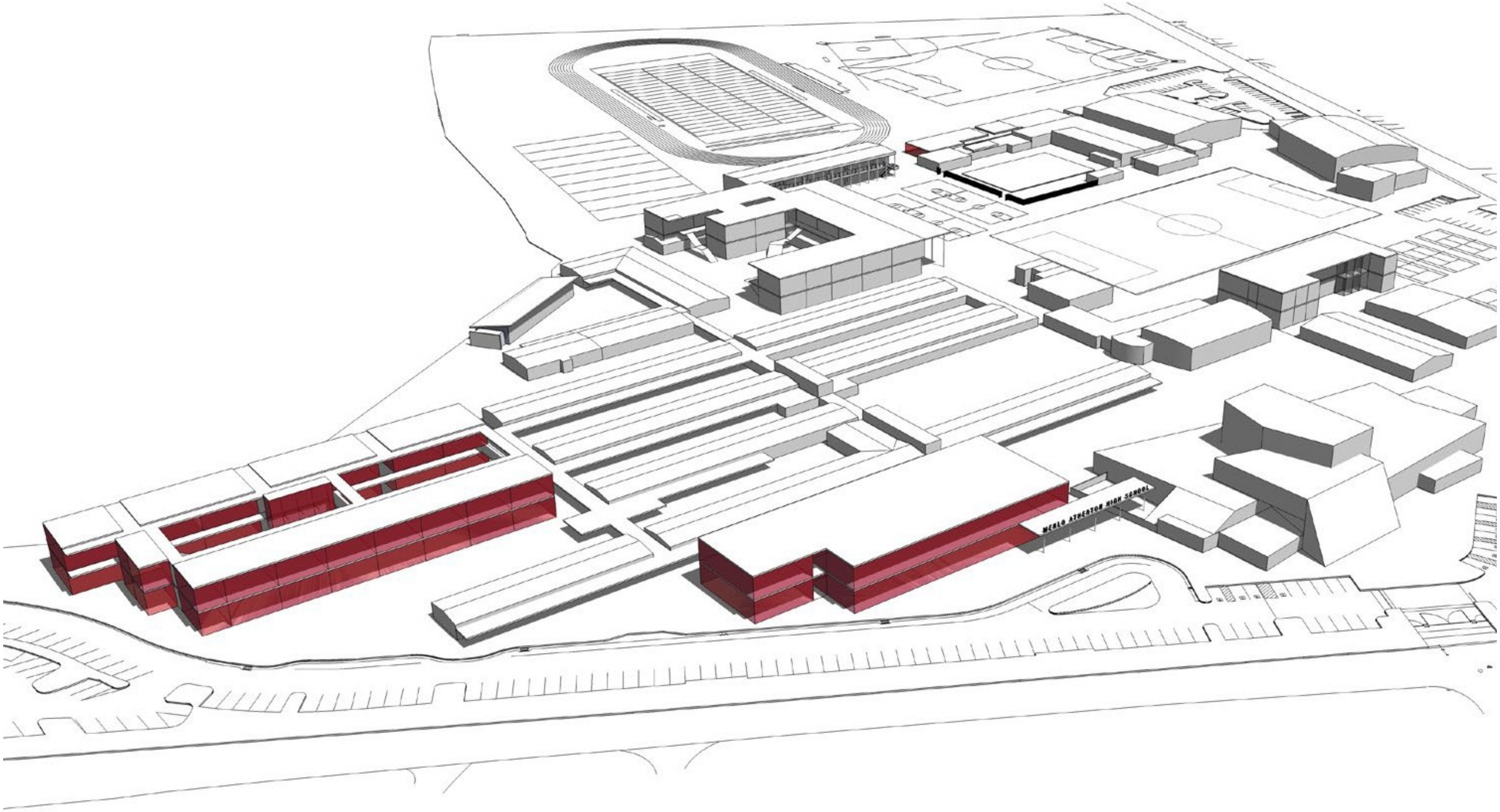
LEGEND

1 TEAM ROOM
2 TEAM ROOM (FOOTBALL)
3 VISITING TEAM ROOM
4 ATHLETIC EQUIPMENT STORAGE
5 HALLWAY / ACCESS



ATHLETICS EXPANSION AT MAIN GYM

PROPOSED FUTURE PROJECTS



Menlo-Atherton High School

M-AHS: PROPOSED MASTER PLAN SPACE DIAGRAM

Menlo-Atherton High School

LIBRARY SERVICES

October 20, 2015

Susan Holmer, Library Director
Menlo Park Libraries
701 Laurel Street
Menlo Park, CA 94025

Re: Library Services

Dear Susan Holmer:

The City of Menlo Park is currently updating the Land Use and Circulation Elements of the General Plan, which were last comprehensively updated in 1994. In addition, the City is updating the Bayfront Area Zoning ordinance. Collectively, the updates are referred to as ConnectMenlo. Both the General Plan Update and the Zoning Ordinance Update are summarized below, followed by Table 1, which is the existing and proposed 2040 Horizon-Year Buildout Projections. As shown in the table, the projected growth for the proposed ConnectMenlo Project for the 2040 horizon year, plus the Current General Plan development potential (but not including Facebook Campus Expansion), is 4.1 million square feet of non-residential space, 400 hotel rooms and 5,500 residential units, and up to 14,150 new residents and 9,900 employees.

General Plan Update

The proposed Land Use and Circulation Elements are intended to guide development and conservation in the city through the 2040 buildout horizon of this General Plan. These two elements are central components of the General Plan because they describe which land uses should be allowed in the city, where those land uses should be located, how those land uses may be accessed and connected, and how development of those uses should be managed so as to minimize impacts and maximize benefits to the city and its residents. The Land Use Element frames the type and scale of potential development that may occur over the next 24 years, particularly in the Bayfront Area. The Circulation Element addresses transportation issues throughout the city. Both updated Elements have been written to be consistent with the other General Plan Elements and the 2012 El Camino Real/Downtown Specific Plan.

Bayfront Area Zoning Ordinance Update

The Project includes an update to the City's Zoning Ordinance for the Bayfront Area formerly referred to as the "M-2 General Industrial Zoning District", including both development regulations and design standards, to ensure consistency with the General Plan Update and previously adopted ordinances and policies. The proposed Zoning Ordinance Update would create the following five new districts, which would apply to lands within the Bayfront Area: Light Industrial (I-L), Business Park (C-BP), Office/Tech/Research and Development (O), Life Sciences (LS), and Mixed Use Residential (R-MU). These districts are intended to foster innovation and emerging technologies; promote the creation of an employment district with travel patterns that

are oriented toward pedestrian, transit, and bicycle use; and provide amenities to surrounding neighborhoods and fiscal support to the City leveraged through development intensity bonuses. The standards for development within the LS and O districts allow increased development intensities with the provision of community amenities.

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]
BAYFRONT AREA									
Non-residential Square Feet									
Office District	7.2 million		927,000		1 million		700,000		9.4 million
Life Sciences District	1.4 million		0		700,000		1.4 million		3.5 million
Commercial[f]	50,000		50,000		75,000		200,000		375,000
Total Non-residential	*8.7 million*		*977,000*		*1.4 million*		*2.3 million*		*13.7 million*
Hotel Rooms[g]	0		450		n/a		400		850
Residential Units	0		780		150		4,500		5,430
Population[h]	0		2,000		390		11,570		13,960
Employees	19,800		11,250		3,400		5,500		39,950
REMAINDER OF CITY									
Non-residential Square Feet	5.9 million		550,000		375,000		n/a		6.8 million
Hotel Rooms[g]	570		70		n/a		n/a		640
Residential Units	13,100		500		850		n/a		14,450
Population[h]	32,900		1,300		2,190		n/a		35,390
Employees	11,100		1,200		1,000		n/a		13,300
CITYWIDE TOTALS									
Non-residential Square Feet	***14.6 million***		***1.5 million***		***1.8 million***		***2.3 million***		***20.6 million***
Hotel Rooms[g]	***570***		***520***		***0***		***400***		***1,490***
Residential Units	***13,100***		***1,280***		***1,000***		***4,500***		***19,880***
Population[h]	***32,900***		***3,300***		***2,580***		***11,570***		***50,350***
Employees	***30,900***		***12,450***		***4,400***		***5,500***		***53,250***

Notes: *Numbers are estimates and rounded for the purposes of this programmatic environmental review.*

a. Includes existing development on the ground.

b. Includes reasonably foreseeable projects (i.e. pending applications, recently approved, or under construction) in the Study Area; including the current Facebook Campus Expansion Project shown in a separate column. A list of approved projects is shown in Chapter 4, Environmental Evaluation, of this Draft EIR.

d. This represents what could be built if the proposed ConnectMenlo project were not approved, which is the "No Project" condition discussed in Chapter 5, Alternatives to the Proposed Project, of this Draft EIR.

e. The Proposed Bayfront Area development potential represents increased development potential for the Bayfront Area only, but does not include the Facebook Campus Expansion Project, which is shown in a separate column.

f. The Maximum Citywide Buildout represents the total of the 5 previous columns.

g. Potential Commercial square footage in the Bayfront Area would occur within Office and Residential districts.

h. An unknown number of additional hotel rooms could be proposed under the current General Plan; Hotel square footage is not included in the

TABLE 1 EXISTING AND PROPOSED 2040 HORIZON-YEAR BUILDOUT PROJECTIONS

Category	Existing Conditions[a]	+	"Approved" Projects[b]	+	Current General Plan[c]	+	Proposed Project (Bayfront Area)[d]	=	Maximum Citywide 2040 Buildout[e]

Facebook Campus Expansion Project and Proposed Bayfront Area development potential non-residential square feet.
i. Assumes 2.57 persons per household per Association of Bay Area Governments (ABAG) *Projections 2013, Subregional Study Area Table*.

As part of the environmental review process required by the California Environmental Quality Act (CEQA) a determination must be made as to whether the project would not be adequately served by existing library facilities thus requiring the construction of new facility or improvements to an existing facility that would result in a physical impact to the environment.

Below is an excerpt from Existing Conditions Reports that were released for public review in January 2015, including the information regarding library services in the City, followed by several questions. Because the information included in the Existing Conditions Reports was gathered last year, information regarding library operations (i.e. staffing levels, budget, and collection information) may no longer reflect current existing conditions. Your input in confirming and/or updating the information below will help us to complete our environmental review and to make a determination of whether or not a significant environmental impact could occur as a result of the adoption of the proposed Project, pursuant to State CEQA Guidelines.

The General Plan Update and Zoning Ordinance Update that are the subject of this EIR consist of long-term plans that will be implemented as policy documents guiding future development activities and City actions through the year 2040. Because this is a program-level EIR, this document does not evaluate the impacts of specific, individual developments that may be allowed under the General Plan. Future specific projects may require separate environmental review.

To determine whether the proposed project would have the potential to have a significant environmental effect related to **library services**, the Draft Environmental Impact Report (Draft EIR) being prepared for the proposed project applies the following standard of significance:

> *Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for library services?*

The purpose of the Draft EIR is to assess the project's potential impacts to various environmental issue areas and public service and utility agencies, including the City of Menlo Park's Library

System. The Draft EIR will also provide recommendations that may be necessary to reduce such potential impacts to "less-than-significant" levels.

Below are excerpts from the 2015 Existing Conditions Report for the Project. Please confirm the information, and any assistance that you can provide with the questions that follow would be greatly appreciated.

LIBRARY

Menlo Park libraries are part of the Peninsula Library System, a regional library cooperative which offers access to a wide variety of materials and databases shared by member libraries. Menlo Park operates two libraries that provide a diversity of services to Menlo Park residents and visitors. The Menlo Park Main Library is a 34,200-square-foot building located at 800 Alma Street in the Menlo Park Civic Center. The Main Library has a collection of 200,000 plus items, and offers a variety of spaces, services, and equipment. Equipment includes 17 computers for adult use with internet and office software, nine computers dedicated to children's use (three of which include literacy software), a paired computer and flatbed scanner, Scanning and Reading Appliance (SARA), two printers, and a copier. Main library services include free wireless internet access, book borrowing, eBooks, eMagazines, database access, and a wide variety of programs for children and adults such as seven weekly storytimes for children and a monthly program for adults on Saturday, and special programs throughout the year. The library also has an active program for teenagers, including a teen advisory group, reading club, and special activities. As of this writing, the Main Library is open seven days a week, but is closed during federal holidays.

In 1999, the City opened a 3,600-square-foot branch library in the Belle Haven Elementary School at 413 Ivy Drive as part of a joint venture with Ravenswood City School District. The Belle Haven Branch offers a variety of services and equipment. The Belle Haven Library provides 13 computer terminals for public use, with an additional two catalog computers. The publically accessible computers feature full internet access, as well as office software, with several of the computers featuring English language learning software and educational children's computer games. The library also features a copy machine, and includes services such as free wireless internet access, book borrowing, eBooks, eMagazines and database access. The Belle Haven Branch is the site for English as a Second Language (ESL) classes through the library's Adult Literacy Program and also has a weekly storytime for children. The library is open five days a week, Tuesday through Saturday. The Belle Haven Library has a collection of 21,000 items, of which 30 percent are in Spanish language.

1. According to the Menlo Park General Plan, the Menlo Park Library has a goal to maintain a ratio of 3.29 books per capita and a ratio of 1.02 square feet of library space per capita. Is the Menlo Park Library System currently meeting this goal? What assumptions are made when calculating service needs and how are service needs calculated?

2. Does the library have capacity to serve additional demand resulting from buildout of the Project?
3. Would the City of Menlo Park Libraries need to construct new library facilities or expand existing facilities in order to accommodate the project's demand for library services?

4. What is the funding program for the library system?

5. Does the library have identified Developer Impact Fees for the commercial and/or residential development in Menlo Park? If so, please describe the fees.

6. Are there any existing deficiencies, such as need for new facilities/staff, lack of funding?

7. What are the existing staff levels at the Menlo Park Libraries and are the existing staff levels at the library(s) adequate to meet current demands for the population in the project areas?

8. How many books do the Main Library and Belle Haven Library currently have?

9. Are the equipment levels adequate to meet the project area's current demand for library services?

10. Are there any plans for expansion or relocation of these library(s) that would serve the project? If so, please describe the expansion or relocation.

11. Please provide recommendations that could reduce the demand for library services created by the proposed project.

12. Are there any current documents on library service in the City including background reports, policy documents, and facility plans that you think would help with preparing the environmental review analysis for impacts to library services as a result of the proposed project?

If you have any questions, please feel free to contact me at 510.848.3815.

Sincerely,

Ricky Caperton

Placeworks Questions for Library

1) The figure quoted from the General Plan is a new one for me. There is no national or state standard for books or library square footage per capita so I don't know how this number was derived. As the current General Plan is very old, 1994, it represents library collections in books only. We now have a broader definition of collections and count books, DVDs, CDs, electronic databases, e-books and e-magazines as our collections. The updated General Plan should also address more than books.
2) No, the current library located at the Belle Haven Elementary School is not capable of servicing a large increase in population in the Bayfront area. It is already built out with its current collections and would have no room to add additional materials or workspace to serve the additional population.
3) Yes, a new library in Belle Haven would need to be constructed. The current library is in a building owned by the Ravenswood City School District so the city could not expand or modify that space without permission of the District. The physical location of the library, near the center of the community, is good but the location on an elementary school campus is not the best for a growing community.
4) City General Fund is the primary resource for library funding.
5) No, not to my knowledge.
6) Yes, the Main Library's last addition dates to 1990 and the earliest part of the building to 1960. The building no longer functions as a 21century library. A space needs study will take place in 2016. The Belle Haven Branch Library is not a city building so no additions or changes can be made to it. Both libraries suffer from staff reductions which date back to the recession years.
7) There are currently 14 FTE staff representing 19 employees (7 fulltime, 12 part-time) plus 36 temporary employees. They staff a Main Library open 59 hours per week and the Belle Haven Branch open 32 hours per week.
   Staffing levels at the Branch are sufficient to meet current schedule of open hours and activity.
8) Books Total Held as of June 30, 2014 165,659
   Electronic Books 46,524
   Total Physical Audio Materials 17,091
   Total Online Audio Materials 2,815
   Total Physical Video Materials 16,762
   Number of Current Print Serial Subscriptions 210
   Total Number of Volumes Held by Branch *20,474*
9) Yes, for current demand.
10) There are no current plans for expansion or relocation of the Belle Haven Branch Library.
11) It's not the role of the library to try and reduce demand for our services. Our role is to identify and provide new ways to meet growing demands for our services. We would not discourage growth in demand for library service.
12) Nothing that would relate to the impact to library services in the proposed project area.

APPENDIX I:
CONNECTMENLO WATER SUPPLY EVALUATION

WATER SUPPLY EVALUATION STUDY

ConnectMenlo – General Plan and M-2 Area Zoning Update
Menlo Park, California

Prepared for:
City of Menlo Park

Prepared by:
Erler & Kalinowski, Inc.

3 February 2016

EKI B50071.00

Water Supply Evaluation Study
ConnectMenlo – General Plan and M-2 Area Zoning Update
Menlo Park, California

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APPENDICES

1 INTRODUCTION

Erler and Kalinowski, Inc. ("EKI") is pleased to present this water supply evaluation study ("WSE Study") in support of the proposed update to the Menlo Park General Plan Land Use & Circulation Elements and the M-2 Area Zoning, collectively known as "ConnectMenlo," for the City of Menlo Park, California (the "City"; see Figure 1).

The City's current General Plan Land Use and Circulation Elements were last updated in 1994 and include outdated land use and traffic projections. The purpose of ConnectMenlo is to update the Land Use and Circulation Elements of the City's General Plan, with a particular geographical focus on the Bayfront Area (also known as the "M-2 Zoning Area"; see Figure 2), and to update the zoning provisions to reflect the proposed land use changes within the Bayfront Area. These updates to the General Plan are being analyzed in the ConnectMenlo Program Environmental Impact Report ("PEIR"; PlaceWorks, 2015).

Changes in land use within the Bayfront Area are the subject of this WSE Study. For the purposes of this WSE Study and per the PEIR, the "proposed Project" includes a maximum potential net increase in new development north of Highway 101 in the Bayfront Area of approximately:

- 2.3 million non-residential square feet, including offices, life-sciences buildings, and other commercial uses;
- 400 hotel rooms;
- 4,500 multi-family residential units;
- Two transit centers; and
- Up to 61 acres of landscaped open space.

As described in Section 2, a Water Supply Assessment ("WSA") is not required for the proposed Project pursuant to the California Water Code ("CWC" or "Water Code") §10910-10915. However, for informational purposes, specifically with respect to the proposed changes to the Bayfront Area, the City has voluntarily elected to prepare a WSE Study for the proposed Project that is modeled after, and in general conformance with, WSA requirements and the information requested within the California Department of Water Resource's ("DWR's") *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001: To Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning*, dated 8 October 2003. The text of specific sub-sections of the Water Code is included in indented and italicized font at the beginning of specific sections of this WSE Study. The information presented in those respective sections, and the associated tables and figures, respond directly to Water Code requirements.

Water service within the Bayfront Area is provided by the Menlo Park Municipal Water District ("MPMWD")[1]. The purpose of this WSE Study is to evaluate whether the MPMWD has sufficient water supply to meet the current and planned water demands within its service area, including the demands associated with the proposed Project, during normal and dry hydrologic years over a 20-year time horizon. More specifically, this WSE Study includes:

- A summary of the WSA requirements articulated in Water Code §10910-10915 and a description of how they have been addressed in the WSE Study prepared for the proposed Project;
- A description and analysis of the current and projected future water demands of the proposed Project through the year 2040;
- A description and analysis of the historical, current, and projected future water demands for the MPMWD service area through the year 2040;
- A description and analysis of the current and projected future water supplies for the MPMWD service area through the year 2040; and
- A comparison of the water supplies and demands for MPMWD's water service area, including the projected water demands associated with the proposed Project.

The information contained in this WSE Study is based primarily on MPMWD's 2010 Urban Water Management Plan ("UWMP"), MPMWD's draft 2015 UWMP (which is in development), information provided by the City staff, and information specific to the proposed Project (i.e., square footage of specific land uses; PlaceWorks, 2015).

This WSE Study has been prepared for the sole use and benefit of the City of Menlo Park and MPMWD. Unless specifically authorized in writing in an agreement acceptable to EKI, reliance on this WSE Study by any other entity or third party is not permitted or authorized.

[1] A portion of the Bayfront Area bounded by Highway 101, Marsh Road, and the Dumbarton Rail is served by California Water Service Company. The proposed land use changes in this area would generally reflect the same uses and intensity that is permitted under the current regulations.

2 GENERAL REQUIREMENTS FOR THE PREPARATION OF A WATER SUPPLY ASSESSMENT

The purpose of this section is to outline what types of projects require WSAs, who is responsible for their preparation, and the necessary components of a WSA.

2.1 APPLICABILITY OF SENATE BILL 610 TO THE PROJECT

Water Code Section 10910

(a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

Water Code Section 10912

For the purposes of this part, the following terms have the following meanings:

(a) "Project" means any of the following:
- *(1) A proposed residential development of more than 500 dwelling units.*
- *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
- *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
- *(4) A proposed hotel or motel, or both, having more than 500 rooms.*
- *(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
- *(6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
- *(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.*

As described in Section 1, the proposed Project includes an update to the City's current General Plan that would allow a net increase in allowable new development in the Bayfront Area. As such, this Project does not strictly meet the project definitions included in Water Code §10910(a) and 10912(a)(3). However, the City has determined that the proposed Project is subject to the California Environmental Quality Act ("CEQA") and is voluntarily preparing a WSE Study evaluation as part of the PEIR that is modeled after, and in conformance with, all WSA requirements.

2.2 RESPONSIBILITY FOR PREPARATION OF THE WSA

Water Code Section 10910

(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that

may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

Water for the proposed Project will be supplied by the MPMWD public water system and therefore, in accordance with Water Code §10910(b), the City would be the entity responsible for completing a Project-specific WSA. However, as noted previously, a WSA is not required for the proposed Project by the Water Code. However, the City voluntarily elected to prepare this WSE Study for the proposed Project that is modeled after, and in conformance with, all WSA requirements.

2.3 COMPONENTS OF A WATER SUPPLY ASSESSMENT

Water Code Section 10910

(c) (4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

As listed above in Water Code §10910(c)(4), the primary purpose of a WSA is to evaluate whether sufficient water supply is available to meet all future demands within the water supplier's service area, including those associated with the proposed Project, during normal and dry hydrologic years for a 20-year time horizon. In order to complete an equivalent assessment, the following information is included in this WSE Study:

- A description and analysis of the current and projected future water demands of the proposed Project through the year 2040;
- A description and analysis of the historical, current, and projected future water demands for the MPMWD service area through the year 2040;
- A description and analysis of the current and projected future water supplies for the MPMWD service area through the year 2040; and
- A comparison of the water supplies and demands for MPMWD's water service area, including the projected water demands associated with the proposed Project.

3 PROJECT DESCRIPTION

The Bayfront Area is located in the northern-most portion of the City of Menlo Park (Figure 1). Water service within the Bayfront Area is provided by MPMWD[2]. Other water suppliers within the City of Menlo Park include California Water Service Company - Bear Gulch District, O'Connor Tract Co-Operative Water Company, and Palo Alto Park Mutual Water Company.

Current land uses within the Bayfront Area include industrial and business park uses. Figure 2 shows the location of the Bayfront Area, which is generally bounded by San Francisco Bay to the north; Redwood City to the west; East Palo Alto to the southeast; and the Menlo Park neighborhoods of Belle Haven, Flood Triangle, Suburban Park, and Lorelei Manor to the south. Existing water use within the Bayfront Area is associated with office- and industrial-type activities (e.g., restrooms, process, cooling, and landscape irrigation). The proposed Project's future water demand will reflect a mixed land use and be associated with residential and commercial activities.

The proposed Project includes a maximum potential net increase in new development north of Highway 101 within the Bayfront Area of approximately:

- 2.3 million non-residential square feet, including offices, life-sciences buildings, and other commercial uses;
- 400 hotel rooms;
- 4,500 multi-family residential units;
- Two transit centers; and
- Up to 61 acres of landscaped open space[3].

As above, as part of the increase in new development, the proposed Project is anticipated to add 61 acres of landscaped open space to the Bayfront Area. Approximately 15 acres of landscaped area will be within residential lots and the remaining 46 acres of landscaped area will be dedicated to non-residential land uses including the commercial land uses, transit centers, and open space areas. However, it is noted that the City is currently in the process of drafting new zoning regulations for the Bayfront Area that may reduce the minimum required open space area in residential lots from what was analyzed, thus reducing the outdoor water demand associated with the proposed Project.

Project buildout is planned over a 25-year horizon through 2040. Water demands associated with the proposed Project are anticipated to increase in phase-specific increments between 2020 and

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[2] A portion of the Bayfront Area bounded by Highway 101, Marsh Road, and the Dumbarton Rail is served by California Water Service Company. The proposed land use changes in this area would generally reflect the same uses and intensity that is permitted under the current regulations.

[3] Information regarding landscaped areas within the proposed Project was provided by PlaceWorks on 13 August 2015.

2040. This WSE Study presents water demands for the proposed Project at buildout and at intermediate phases of development.

4 HISTORICAL AND CURRENT WATER USE WITHIN THE BAYFRONT AREA

Water use at each existing account within the Bayfront Area is metered and recorded by MPMWD on a monthly basis. Water use data for the period from April 2010 through December 2014 for the active water accounts within the Bayfront Area were provided by the City on 15 and 24 September 2015. A summary of the total historical water use for the Bayfront Area is included in Table 1.

Average annual water use within the Bayfront Area from 2010 through 2014 was approximately 195 million gallons ("MG"), with annual water use ranging from 162 MG in 2012 to 224 MG in 2010. The trends observed in historical water use within the Bayfront Area are generally consistent with those observed throughout MPMWD's service area, as discussed in Section 6.3, and likely reflect the influence of the recent droughts and vacancies in this area during the economic downturn.

It is expected that some or all of the existing demand within the Bayfront Area will be subsumed as part of the redevelopment plan for this area, as actual buildout of the proposed Project may replace some existing land uses. However, since the exact nature and location of the future development is unknown (i.e., whether it will add to or replace the existing land uses) we have conservatively assumed that all demands associated with the proposed Project are additive to the existing demands.

5 PROJECT WATER DEMAND

The City requires that all new residential and non-residential construction comply with the mandatory CALGreen Requirements.[4] The City also requires that new and rehabilitated landscapes on projects subject to city review and approval comply with the City's Water Efficient Landscaping Ordinance ("Landscaping Ordinance"), which was updated on 26 January 2016 to reflect recent changes to the State's Model Water Efficient Landscape Ordinance ("MWELO"; DWR, 2015). As such, at a minimum, future developments within the Bayfront Area are expected to include a number of water-efficiency features, including, but not limited to:

- Use of low-flow lavatory faucets, kitchen faucets, toilets, and urinals in accordance with CALGreen Code; and
- Inclusion of low-water use landscaping and high-efficiency irrigation systems to minimize outdoor water use in accordance with the Landscaping Ordinance.

In addition, the City is considering the adoption of recycled water requirements as part of new projects that meet certain criteria and are within the M 2 Zoning (Bayfront) Area. As part of the proposed Menlo Park General Plan Land Use & Circulation Elements and the M-2 Area Zoning Update, several new zoning district categories, including Office ("O"), Life Science ("LS"), and Mixed Use Residential ("MU-R"), are being proposed to the General Plan land use designations. Corresponding zoning district regulations could potentially include requirements for recycled water use, such as provide dual plumbing, use recycled water for landscape irrigation, and / or evaluate alternative water sources, including on-site recycling, for toilet and cooling water uses.

As described below, the proposed Project's average annual water use was estimated based on: (1) the application of well-established methodologies for estimating indoor and outdoor water use, and (2) assumptions regarding water efficiency for certain end uses based on conformance with the City requirements described above. As shown in Table 2, the annual water use associated with the proposed Project is conservatively estimated to be 343 MG at buildout.

5.1 RESIDENTIAL WATER USE

5.1.1 Residential Indoor Water Use Factors

The residential indoor water use factors were developed using a predictive model of residential water use developed for the United States Environmental Protection Agency ("U.S. EPA") and several large water utilities (DeOreo, 2011). The U.S. EPA model is based on residential indoor water use data collected over the years 2006 through 2010 at 300 single family homes[5] constructed since 2001 in nine American cities, including one city in California.

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[4] As described on the City's website: http://www.menlopark.org/DocumentCenter/Home/View/93

[5] End uses for indoor water use in single family homes are similar to those in multi-family homes, so we have assumed that the formulas developed in this study also apply to multi-family homes.

Because the U.S. EPA model reflects actual water use patterns observed in recently-constructed and occupied homes, it represents a sound basis for predicting indoor water use in new developments, which would be required to meet even higher standards of efficiency such as the CALGreen Code. The results of this model also compare well with recent residential per capita data being published for similar communities throughout California by the State Water Resources Control Board ("SWRCB", 2015) and residential water use factors within other Bay Area Water Supply and Conservation Agency ("BAWSCA") cities (BAWSCA, 2014a).

The U.S. EPA predictive model allows the projected total residential indoor use to be calculated from these demographic and water conservation inputs:

$$\text{INDOOR} = [71.2 \times \text{RESIDENTS}^{0.63} \times (1 + 0.91 \times \text{LEAK}) \times (1 - 0.23 \times \text{H.EFF.CW}) \times (1 + 0.12 \times \text{SOFTENER})] + 11.8$$

where:

INDOOR =	indoor water use in gallons per home per day
RESIDENTS =	number of residents in household
LEAK =	the fraction of homes with a significant leak greater than 50 gallons per day
H.EFF.CW =	the fraction of homes with a high-efficiency clothes washer that uses less than 30 gallons per load
SOFTENER =	the fraction of homes with a water softening system

Residential indoor water use factors were developed using the above model to reflect the proposed Project's water efficiency design standards and based the following assumptions:

- Home water softening systems (e.g., regenerating ion exchange units or reverse osmosis units) are not installed.
- A total of 75% of clothes washers installed in residential units would use less than 30 gallons per load.[6]
- Leaks greater than 50 gallons per day would occur in at most 9% of the residential units, which represents a conservative assumption (i.e., likely higher than would actually be encountered based on empirical data from existing residential developments; DeOreo, 2011).
- Based on the planned population and residential units of the proposed Project, the average household size is assumed to be 2.57 people (PlaceWorks, 2015).

[6] For context, approximately 39% of existing homes in the United States have clothes washers that use less than 30 gallons per load (DeOreo, 2011) and the majority of commercially-available home washing machines today use under 30 gallons per load.

Based on the above methodology and assumptions, indoor water use for each residential unit is estimated to be 127 gallons per day. Annual indoor water use for residential land use is estimated to be 209 MG, or 49.4 gallons per capita per day ("GPCD"). The estimated indoor residential water use calculations are shown in Table 3a.

5.1.2 Residential Outdoor Water Use Factors

The outdoor water use factors were estimated using the landscape irrigation demand model described in the recently-updated MWELO (DWR, 2015), which the City recently adopted and is implementing as part of its Landscaping Ordinance. The MWELO requires that the annual estimated total water use for landscape irrigation not exceed the Maximum Applied Water Allowance ("MAWA"). As shown below, the MAWA is calculated based on the regional reference evapotranspiration rate, an evaporation adjustment factor, the total landscaped area, and the area of "special landscaped area".[7] For the proposed Project we have conservatively assumed that outdoor water use will be equal to the MAWA, which is the upper limit of annual applied water for the established landscaped area. For the residential portion of the proposed Project, it was assumed that a total of 15 acres would be irrigated (PlaceWorks, 2015[8]).

The MAWA is calculated using the following equation:

$$MAWA = ETo \times [(ETAF \text{ x } LA) + (1 - ETAF) \times SLA]$$

where:

ETo	=	The regional reference evapotranspiration rate[9]
ETAF	=	Evapotranspiration Adjustment Factor
	=	For residential areas = 0.55
	=	For non-residential areas = 0.45
LA	=	Total landscape area (including SLA)
SLA	=	Special Landscape Area

Based on the above methodology and assumptions, outdoor water use for residential units is estimated to be 10 MG per year, or 2.3 GPCD. The estimated outdoor residential water use calculations are shown in Table 4. However, it is noted that the City is currently in the process of

[7] Special Landscaped Area includes landscaping dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water. No Special Landscaped Area is included in the proposed Project.

[8] Information regarding landscaped areas within the proposed Project was provided by PlaceWorks on 13 August 2015.

[9] Location-specific reference evapotranspiration ("ETo") data is required for calculating the the MAWA. Reference evapotranspiration data were obtained from Appendix A of the MWELO (DWR, 2015) based on values for Redwood City, which is the closest available City to the Bayfront Area. The total annual reference evapotranspiration is 42.8 inches as shown in Table 4.

drafting new zoning regulations for the Bayfront Area that may reduce the minimum required open space area in residential lots from what was analyzed, thus reducing the outdoor water demand associated with the proposed Project.

5.1.3 Total Residential Water Use

As shown in Table 2, based on the current land use assumptions, the total annual residential water use at Project buildout is estimated to be 219 MG, or 52 GPCD.

5.2 COMMERCIAL, INSTITUTIONAL, AND INDUSTRIAL WATER USE

5.2.1 Commercial, Institutional, and Industrial Indoor Water Use Factors

The Commercial, Institutional, and Industrial ("CII") indoor water use factors were developed using the data and methodology included in the Pacific Institute's *Waste Not, Want Not: The Potential for Urban Water Conservation in California* (2003), also referred to as the "Pacific Institute Study". This study developed indoor "employee water use factors" for wide range of commercial and industrial facilities based on statewide averages of (1) measured water use data, and (2) the number of employees for each type of facility. To account for implementation of more-stringent water efficiency standards since the study was completed, and the anticipated water-efficient design of the proposed Project, the "best" potential "conservation saving factors"[10] estimated in Appendices E and F of the Pacific Institute Study were applied to the employee water use factors. For reference, additional detail regarding the derivation of the Pacific Institute's water conservation factors is included in Appendix A to this WSE Study.

The CII indoor water use factors for the proposed Project were estimated for the assumed mix of specific CII land uses that are contemplated in the Bayfront Area, including office space, life science buildings, hotels and other commercial space.

Table 3b summarizes the CII land use parameters that were used to estimate the CII indoor water use factors. Each of these parameters is discussed in the following sections.

Number of Employees

The number of employees for office and hotel land use as shown in Table 3b for the proposed Project was based on information provided by City staff on 20 November 2015. The number of employees for life science buildings and other commercial land uses was estimated using the

[10] As shown in Appendix A, the Pacific Institute Study presented conservation saving factors for "high," "low," and "best" potential savings for each type of land use, and for specific end-uses. According to the Pacific Institute, the "best" potential conservation saving factors represent the most accurate estimate of likely conservation potential based on the source of the data, age of the data, and/or sample size.

average number of employees per floor area by CII category reported by the Federal Energy Information Administration in a 2006 study (EIA, 2006).[11]

Employee Indoor Water Use Factors

The employee water use factors discussed in the Pacific Institute Study identified the average indoor water consumption per employee per working day for each type of CII land use and normalized for a 225-day work year. For example, if the applicable employee water use factor is 100 gallons per employee per work day, each employee within the applicable CII land use category would consume 225 multiplied by 100, or 22,500 gallons per year.

It should be noted that the employee water use factors were derived from the Pacific Institute Study for comparable facilities based on water use data collected during or prior to the year 2000.[12] The water use efficiency for new commercial construction has generally improved since this these data was were collected. As a result, the employee water use factors developed as part of the Pacific Institute Study provide a conservative (i.e., high) estimate of CII water use for new buildings, a fact that was anticipated in the study and addressed through the development of conservation savings estimates, as discussed below.

Conservation Savings

The Pacific Institute Study was based on water use data that predated the adoption of the current CALGreen Code and other applicable water efficiency standards. Anticipating improved future water-efficiency, the Pacific Institute Study developed conservation saving factors, which can be applied to the employee water use factors to account for the implementation of more-stringent water efficiency standards. Specifically, the Pacific Institute Study estimated that the implementation of water conservation measures, such as those required by the current CALGreen Code and similar regulations, could reduce water demands by 26% to 42% compared with the water use factors developed in their study, depending on the conservation scenario, land use type, and type of water fixture or appliance. The water conservation measures accounted for in the Pacific Institute Study that would be implemented by the proposed Project include:

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[11] The Commercial Buildings Energy Consumption Survey is a comprehensive national survey that collects information on the stock of U.S. commercial buildings, including their energy-related building characteristics, energy usage data, and how many employees there are per square foot for different CII land uses.

[12] According to the Pacific Institute study (2003), CII employee water use factors were estimated from data gathered from CII water users around California in several surveys (DWR, 1995 and 2000; Davis et al., 1988; Dziegielewski et al., 1990; and Dziegielewski et al., 2000). To estimate statewide CII water use, these employee water use coefficients were then applied to statewide employment data to project the total water use for each sector. These estimated water usages were then compared with water-delivery data by sector, as reported by nearly 150 water districts across the state. The difference between CII water use estimates developed using these two methods was less than 10%.

- Installation of ultra-low flush toilets and urinals, plus low-flow faucet aerators and showerheads[13];
- Improvements to mechanical cooling systems by installation of conductivity controllers, addition of chemical treatments to improve the concentration ratio, and improved energy efficiency of other mechanical components; and
- Other technologies appropriate for kitchens, laundries, and industrial processes such as water-efficient dishwashers and washing machines and industrial water reuse.

Based on assumed implementation of these water-efficiency measures within the proposed Project, conservation saving factors for indoor water uses were estimated based on the "best" potential savings[14] identified in the Pacific Institute Study, as shown in Appendix A. These estimated conservation saving factors were incorporated into the proposed Project demand calculations for all CII categories, as shown in Table 3b.

However, it should be noted that these conservation savings factors do not directly account for the water savings associated with use of high-efficiency toilets required by the CALGreen Code (i.e., those that use 1.28 gallons per flush or less), or the increased efficiency of other water fixtures relative to the assumptions imbedded in the Pacific Institute Study. Nor do they account for the potential conversion of the proposed Project's landscape irrigation or other non-potable demands to recycled water, or other non-potable sources. As such, to the extent that actual water use at the proposed Project is less than what has been conservatively estimated herein (for the reasons stated above, or other reasons), the resultant impacts to MPMWD's water supply and demand projections (as discussed in Sections 5 and 6), will likewise be reduced.

5.2.2 Transit Centers

Indoor water use for the proposed transit centers is calculated separately from other CII land uses based on an end-use approach. The end-use approach assumes that indoor water uses in the transit centers are only associated with restroom visits and that restroom fixture efficiencies meet CALGreen requirements.

The estimated transit center indoor water use calculations are shown in Table 3c.

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[13] Effective January 2014, only high-efficiency toilets that use 1.28 gallons per flush will be available for purchase in California. The water savings estimates assumed in the Pacific Institute study only reflected installation of 1.6 gallon per flush toilets. Therefore, these CII conservation savings estimates may be conservative (i.e., underestimate the water savings potential).

[14] As shown in Appendix A, the Pacific Institute Study presented conservation saving factors for "high," "low," and "best" potential savings for each type of land use, and for specific end-uses. According to the Pacific Institute, the "best" potential conservation saving factors represent the most accurate estimate of likely conservation potential based on the source of the data, age of the data, and/or sample size.

5.2.3 Commercial, Institutional, and Industrial Outdoor Water Use Factors

As with the residential elements of the proposed Project, the CII outdoor water use factors were estimated using the landscape irrigation demand model described in the recently-updated MWELO (DWR, 2015), which the City has adopted and is implementing as part of its Landscaping Ordinance. For the proposed Project we have conservatively assumed that outdoor water use will be equal to the MAWA, which is the upper limit of annual applied water for the established landscaped area, which was estimated to be 46 acres (PlaceWorks, 2015). The estimated outdoor water demand calculations are shown in Table 4.

5.2.4 Total Commercial, Institutional, and Industrial Water Use

Based on the above methodologies and assumptions, the estimated annual total CII water use at Project buildout is estimated to be 124 MG, as shown in Table 2.

6 MPMWD WATER DEMAND

Water Code Section 10910

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(c) (3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

As part of the development of its 2015 UWMP, the City has estimated the current and projected future water demand for MPMWD water system service area based on buildout of the City's current General Plan and approved projects. In accordance with the UWMP Act (Water Code §10610-10656), MPMWD's projected future water demand is estimated in five year increments, between the years 2015 and 2040, and is subdivided between the following six customer sectors: (1) residential single family, (2) residential multi-family, (3) commercial and institutional, (4) industrial, (5) landscape, and (6) other.[15]

The proposed Project was not accounted for in the water demand projections of the current General Plan buildout. Therefore, although the proposed Project will likely supplant some existing demands within the Bayfront Area, we have considered the demand attributed to the proposed Project to be wholly additive to the current water demands (i.e., to existing conditions) and have conducted our analysis accordingly.

6.1 HISTORICAL AND CURRENT USE WITHIN THE MPMWD SERVICE AREA

Water use within the MPMWD service area is measured using water meters that are installed at each customer account and is summarized in Table 5. Records of current and historical water use at each account are maintained by the City Public Works Department. According to information provided by City staff on 30 September 2015, total annual water use for MPMWD was approximately 1,030 MG in 2014, which was a decrease relative to 2013 and a departure from the increase in water use observed between 2011 and 2013. Prior to 2011, water use had decreased

[15] System water loss is also included in the future water demand listed in the UWMP (Menlo Park, 2015). Losses were assumed to be approximately 4.5 percent of the total system water use.

since 2007; this decrease is thought to reflect impacts of the 2007-2009 drought and the economic downturn that resulted in lower residential and non-residential water use. The rebound in water use in 2011 and 2013 are thought to reflect improved economic conditions. Despite the economic rebound in the Bay Area, the resultant calls for water use cutbacks locally and mandatory state-wide restrictions[16] in response to the recent historic drought led to another decline in water use in 2014.

6.2 POPULATION AND EMPLOYMENT PROJECTIONS

Future water demands for MPMWD's service area were projected by BAWSCA on behalf of MPMWD in the 2014 *Regional Water Demand and Conservation Projections Report* (BAWSCA, 2014b). Future water demands were projected using the Demand Management Decision Support System Model ("DSS Model") and based on population and employment projections within MPMWD's service area, which were in turn developed using Association of Bay Area Governments ("ABAG") 2013 data.

In 2015, MPMWD's DSS Model was revised to account for several changes since the demand projections completed by BAWSCA. The 2015 DSS Model update includes revised population and employment projections developed by the City's Planning Division based on information related to the City's recently-approved projects and the current General Plan.

Specifically, future population within MPMWD's water service area is projected within the draft 2015 UWMP and 2015 DSS Model based on buildout of the current General Plan. The current General Plan estimates that there will be 18,614 residents within MPMWD's service area in 2040, an increase of 2,548 relative to the current 2015 population of 16,066.

The MPMWD also supplies water to its CII customers, which were collectively estimated to provide 12,443 jobs within MWMPD's water service area in 2015. Based on the current General Plan and the City's approved projects, the number of jobs within MWMPD is anticipated to grow to 17,143 in 2020, and to 20,543 in 2040. Anticipated job growth within MPMWD is a combined effect of growth in the commercial sector and decline in the industrial sector. Specifically, commercial jobs are expected to increase by 8,796 while industrial jobs are expected to decrease by 696 between 2015 and 2040 (Menlo Park, 2015b).

6.3 WATER DEMAND PROJECTIONS - CURRENT GENERAL PLAN BUILDOUT

The projected future water demand within MPMWD's service area was reported in the draft 2015 UWMP, and is summarized below and in Table 6. As described above, projected water demand

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[16] On 28 July 2014, the SWRCB adopted emergency regulations to mandate water agencies, including the MPMWD, to implement their Water Shortage Contingency Plan and minimum actions to reduce outdoor water use. On 5 May 2015, SWRCB adopted Resolution 2015-0032 to mandate further minimum actions by water suppliers and their customers to reduce potable water use into 2016 and assigns a mandatory water conservation savings goal to each water supplier based on their residential water use. MPMWD has a SWRCB-mandated reduction target of 16%.

within the MPMWD service area is the sum of water use in each sector and water that is projected to be lost during distribution ("system losses" or "non-revenue water").

Projected water demands within MPMWD are provided in Table 6 in five-year increments for 2020 through 2040. It is estimated that annual water demands associated with the City's current General Plan buildout are approximately 1,310 MG in 2020 and 1,240 MG in 2040. The anticipated decline in water demands between 2020 and 2040 in spite of growth in total population and jobs is largely due to:

- Decreasing projected water use in the industrial sector; and
- Increased water efficiency in the residential and non-residential sectors as a result of plumbing code changes and planned MPMWD conservation efforts.

6.4 OTHER PLANNED PROJECTS WITHIN MPMWD'S WATER SERVICE AREA

Table 7 identifies other planned projects within MPMWD's water service area that are included in the draft 2015 UWMP and the 2015 DSS Model. These projects were identified on the basis of information provided by the City's Planning Division.[17]

There are two projects that are pending City's approval that are not accounted for in the water demand projections of the City's current General Plan buildout or in the 2015 DSS Model. These projects and their potential annual water demands are included in Table 7. The total annual demand of these projects is approximately 31 MG.

6.5 TOTAL PROJECTED MPMWD WATER DEMAND

Total projected MPMWD water demand, as shown in Table 8, is the sum of water demands associated with the City's current General Plan buildout (i.e., as reflected in the 2015 DSS Model), the planned projects within the MPMWD service area in addition to the current General Plan, and the proposed Project. It is estimated that annual water demand will be approximately 1,271 MG in 2040 within MPMWD's service area (i.e., 1,240 MG for buildout of the current General Plan plus 31 MG for other planned projects), excluding the proposed Project. Including the estimated water demand for the proposed Project (i.e., 343 MG per year), approximately 1,614 MG of water demand is expected in 2040 within MPMWD's service area.

[17] Projects were identified from the City of Menlo Park Planning Division on 9 September 2015.

7 MPMWD SUPPLY

This section identifies MPMWD's water supplies and discusses the vulnerability of the various supplies to drought and other factors affecting water reliability.

7.1 IDENTIFICATION OF WATER SUPPLY RIGHTS

Water Code Section 10910

(d) (1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

Pursuant to Water Code §10910(d)(1), a WSA is required to include identification of all water supply entitlements, water rights, and water service contracts relevant to the identified water supply for the Project. In accordance with these requirements, this WSE Study includes a summary of MPMWD's water supply sources and the agreements between MPMWD and its wholesale supplier.

7.1.1 SFPUC Regional Water System

MPMWD receives water from the City and County of San Francisco's Regional Water System ("Regional System"), which is operated by the San Francisco Public Utilities Commission ("SFPUC"). This supply originates predominantly from the Sierra Nevada and is delivered through the Hetch-Hetchy aqueducts. The supply also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. Approximately 85% of the Regional System supply comes from the Tuolumne River and the Hetch-Hetchy Reservoir. The remaining 15% comes from local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs.

The business relationship between San Francisco and its wholesale customers (including MPMWD) is largely defined by the Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County ("Agreement") entered into in July 2009. The Agreement, which has a 25-year term, addresses water supply availability for the Regional System as well as the methodology used by the SFPUC in setting wholesale water rates. This agreement supersedes an earlier 25-year agreement signed in 1984.

The Agreement provides 184 million gallons per day ("MGD") to the wholesale customers during normal water years. This volume, referred to as the "Supply Assurance" is subject to reduction during periods of water shortage due to drought, emergencies, or other scenarios resulting in a water shortage. Each wholesale customer's share of the 184 MGD is referred to as their Individual Supply Guarantee ("ISG"). The MPMWD's ISG is 4.465 MGD (approximately 1,630 MG per year). Although the Agreement expires in 2034, the Supply Assurance and ISG continue in perpetuity.

The Agreement also recognizes the SFPUC's decision made in October 2008 to (a) defer any consideration of an increase to the 184 MGD Supply Assurance until 2018, (b) place an interim limit on sales of 184 MGD for all wholesale customers, including San Jose and Santa Clara, (i.e., those customers who do not have ISGs), (c) establish interim supply allocations ("ISAs") for each wholesale customer through 2018, and (d) develop an environmental enhancement surcharge to be applied to wholesale agencies that exceed their ISA, if total use by SFPUC's retail customers and wholesale customers exceeds 265 MGD.

However, these ISAs are entirely distinct from the permanent ISGs as they will last only until 2018 and will only be used as basis for applying the surcharge. Therefore, although the establishment of the ISAs may potentially increase the cost of water supplied by SFPUC to MPMWD if MPMWD exceeds its ISA at a time when collective deliveries from the Regional System exceed 265 MGD, the ISAs will not affect MPMWD's ISG of 4.465 MGD. Therefore, projected water supplies to MPMWD from SFPUC that are identified in the 2010 UWMP and rely on MPMWD's ISG have not been modified based upon the provisions of the new Agreement.

Currently MPMWD purchases 100% of its potable water supply from the SFPUC. The MPMWD's current and projected purchase quantities are approximately equal to an average of 2.79 MGD in 2014 (1,017 MG per year, Table 9) and 4.42 MGD based on projected demands in 2040 (1,614 MG per year), respectively. Both current and projected purchase quantities are less than MPMWD's ISG of 4.465 MGD.

7.1.2 Other Water Supplies

The MPMWD does not currently operate any potable groundwater wells for water supplies, but plans to construct approximately three to four emergency wells to provide water supply reliability to its northern service area, which includes the Bayfront Area. The wells will be designed to operate following a major earthquake or other emergency. The MPMWD is currently preparing environmental documents for the first well at the Corporation Yard and continues to review potential sites for the remaining wells.

The MPMWD is also assessing the feasibility of delivering recycled water to its southern service area in collaboration with the West Bay Sanitary District ("WBSD"). In November 2015, WBSD certified a *Mitigated Negative Declaration for the West Bay Sanitary District Recycled Water Project – Sharon Heights* (WBSD, 2015). The subject of this document is a proposed satellite wastewater treatment plant and recycled water treatment facility in the Sharon Heights area to serve irrigation demands to the Sharon Heights Golf and Country Club and potentially other customers in its vicinity. The MPMWD is also considering options related to service of recycled water to the entire Bayfront Area, or options related to onsite recycling and reuse. These and other options will be developed in more detail as part of the update to MPMWD's *Water System Master Plan*, that has an estimated completion date in 2017.

In addition, the City is considering the adoption of recycled water requirements as part of new projects meeting certain criteria and are within the Bayfront Area. As part of the proposed Project, several new zoning district categories are being added to the General Plan land use designations. Corresponding zoning district regulations for these zoning districts have been drafted and propose requirements regarding recycled water use such as provide dual plumbing, use recycled water for landscape irrigation, and / or evaluate alternative water sources, including on-site recycling, for toilet and cooling water uses.

7.2 TOTAL SUPPLY IN NORMAL, SINGLE DRY, AND MULTIPLE DRY YEARS

Water Code Section 10910

(c) (3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

As shown in Table 10, the MPMWD's current and planned future water supply for normal hydrologic years is assumed to be equal to its ISG of 4.465 MGD, or 1,630 MG per year. The anticipated dry-year supply estimates presented below are based on the delivery estimates provided by BAWSCA and SFPUC as part of the 2015 UWMP update process (SFPUC, 2016; BAWSCA, 2016) and per application of the Tier 1 and Tier 2 allocation processes described in the City's Water Supply Agreement[18] and the BAWSCA Drought Implementation Plan ("DRIP").

During single dry years, the MPMWD draft 2015 UWMP estimates that annual deliveries from SFPUC will be reduced to 1,281 MG (Menlo Park, 2015b). Supply shortfalls relative to total demands during single dry years are estimated to range between 4.5% in 2020 and 21% in 2040 (see Table 11).

During multiple dry years, the MPMWD draft 2015 UWMP estimates that annual deliveries from SFPUC will be reduced to 1,108 MG during a multi-year drought (Menlo Park, 2015b). Supply shortfalls relative to total demands during the second and third year of a drought are estimated to range between 17% in 2020 and 31% in 2040 (see Table 12).

Projected supply shortfalls will be met through the implementation of MPMWD's Water Shortage Contingency Plan. As described in the 2010 UWMP and the draft 2015 UWMP, MPMWD has developed a Water Shortage Contingency Plan that systematically identifies ways in which MPMWD can reduce water demands during dry years. The most recent update to the Water Shortage Contingency Plan was completed in May 2015. The overall reduction goals in the Water

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[18] The Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County entered into in July 2009.

Shortage Contingency Plan are established in five drought stages and for water demand reductions up to 50%.

As customers within the MPMWD service area, future development within the proposed Project would be obligated to comply with the demand reduction efforts imposed by MPMWD through implementation of the Water Shortage Contingency Plan. Therefore, the proposed Project would contribute a proportionate share of the reduction in water demands during dry years.

8 COMPARISON OF SUPPLY AND DEMAND

Water Code Section 10910

(c) (3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

As shown in Tables 8, 10, and 13, MPMWD is expected to have adequate water supplies during normal years to meet its total annual projected demands including the proposed Project demand (i.e., 343 MG per year) based on MPMWD's 2010 UWMP and draft 2015 UWMP.

During single-dry years, MPMWD's total annual water demand is expected exceed the total annual supply by approximately 50 MG, which results in a total water supply shortfall of 4.5%, either with or without the proposed Project demand (0 MG in 2020) based on MPMWD's draft 2015 UWMP. By 2040, MPMWD's total annual water demand, including the proposed Project demand, is estimated to exceed total single-dry year supply by approximately 333 MG, which results in a total water supply shortfall of 21% (Table 11). Without the proposed Project, there is sufficient supply to meet the anticipated demand during single dry years in 2040. Therefore, the proposed changes to the Bayfront Area creates an incremental shortfall of approximately 21% in 2040 compared to the without-Project conditions (Table 13).

During multiple-dry years in 2020, MPMWD's total annual water demand, either including or excluding the Project demand (0 MG in 2020), is projected to exceed the total annual supply by approximately 233 MG, which results in a total water supply shortfall of 17%. In 2040, MPMWD's total annual water demand, including the Project demand, is projected to exceed the total annual supply by approximately 506 MG, which results in a total water supply shortfall of 31% (Table 12). Without the proposed Project, the multiple dry year shortfall in 2040 is projected to be 13%. Therefore, the proposed Project creates an incremental shortfall of approximately 18% compared to the without-Project conditions (Table 13).

As described in Section 6, in response to anticipated future dry-year shortfalls, MPMWD has developed a Water Shortage Contingency Plan that systematically identifies ways in which MPMWD can reduce water demands and augment supplies during dry years. It is expected that, even without the proposed Project, the City would have to rely on implementation of its Water Shortage Contingency Plan during dry years to reduce demands. The MPMWD would likely have to implement higher stages of its Water Shortage Contingency Plan in response to a drought after the proposed Project is completed, however, it is not expected that MPMWD would have to change its operations or the general implementation of its Water Shortage Contingency Plan.

Further, this WSE Study has been prepared based on several very conservative assumptions. Firstly, it has been assumed that all of the proposed Project demands will be additive to the current demands in the Bayfront Area; in reality, the proposed Project will likely supplant some or all of the existing demands.

Secondly, as stated in Section 5.2.1, the water demand estimates for the proposed Project did not explicitly account for the increased water efficiency of toilets and other fixtures that are required for new construction per the CALGreen Code. Nor did they account for future zoning district regulations for the Bayfront Area that may reduce open space requirements on residential lots, and thus residential outdoor water use (Section 5.1.2).

Thirdly, as above, this WSE Study does not explicitly account for the fact that the City is considering the adoption of recycled water requirements within the Bayfront Area. To the extent that the City develops recycled water, or individual projects within the Bayfront Area implement on-site water recycling, the total future potable demands of the proposed Project would be expected to be less and therefore the resultant supply shortage will likely to be smaller. The MPMWD is developing these and other supplemental supply options as part of its 2017 *Water System Master Plan* update to minimize future dry year impacts.

9 CONCLUSIONS

As listed in Water Code §10910(c)(4), the primary purpose of this WSE Study is to evaluate whether sufficient water supply is available to meet all future water demands within the water supplier's service area, including those associated with the proposed Project, during normal and dry hydrologic years for a 20-year time horizon. This WSE Study has been prepared based on the following conservative assumptions:

- All of the proposed Project demands will be additive to the current demands in the Bayfront Area; in reality, the proposed Project will likely supplant some or all of the existing demands;
- The proposed Project demand estimates to do not account for future zoning district regulations for the Bayfront Area that may reduce the minimum requirement of open space on residential lots from what was analyzed, and thus reduce residential outdoor water use;
- The proposed Project demand estimates to do not directly account for the water savings associated with use of high-efficiency toilets (i.e., those that use 1.28 gallons per flush or less), or the increased efficiency of other water fixtures relative to the assumptions imbedded in the Pacific Institute Study; and
- The Project demand estimates to do not account for the potential conversion of the Project's landscape irrigation or other non-potable demands to recycled water, which may be required by the City's future zoning district regulations for the Bayfront Area.

Even with these conservative assumptions, based on the results of this WSE Study, MWMPD expects to have sufficient water supply to meet its planned demands, plus the demands of the proposed Project, during normal years through 2040.

During the 2040 worst-case drought scenario, MPMWD projects a water supply shortfall of 13% without the proposed Project, wherein it would implement its Water Shortage Contingency Plan. Using well-established methodologies for estimating water use and the conservative demand assumptions noted above, buildout of the proposed Project is estimated to increase this shortfall by approximately 18% in 2040, resulting in a total shortage of 31%.

Therefore, this study concludes that MPMWD has sufficient water supply to meet all future demands within its service area, including those associated with the proposed Project, during normal years for a 20-year time horizon. During dry years, MPMWD expects to experience some supply shortfalls over a 20-year time horizon and plans to meet these shortfalls through implementation of its Water Shortage Contingency Plan. Buildout of the proposed Project is conservatively estimated to increase the severity of these shortfalls by 18% in the 2040 worst-case drought scenario.

Based upon this increase in water supply shortfalls, MPMWD may have to implement higher stages of its Water Shortage Contingency Plan in response to a drought after the proposed Project is completed. However, it is not anticipated that MPMWD would need to change its operations or the general implementation of its Water Shortage Contingency Plan after Project buildout.

Further, to the extent that the City adopts recycled water requirements for the Bayfront Area and develops recycled water, or that individual projects within the Bayfront Area implement on-site water recycling, the total future potable demands of the proposed Project would be expected to be less and therefore the resultant supply shortage will likely to be smaller. The MPMWD is developing plans for recycled water and other supplemental supplies as part of its the 2017 *Water System Master Plan* update to minimize future dry year impacts.

10 REFERENCES

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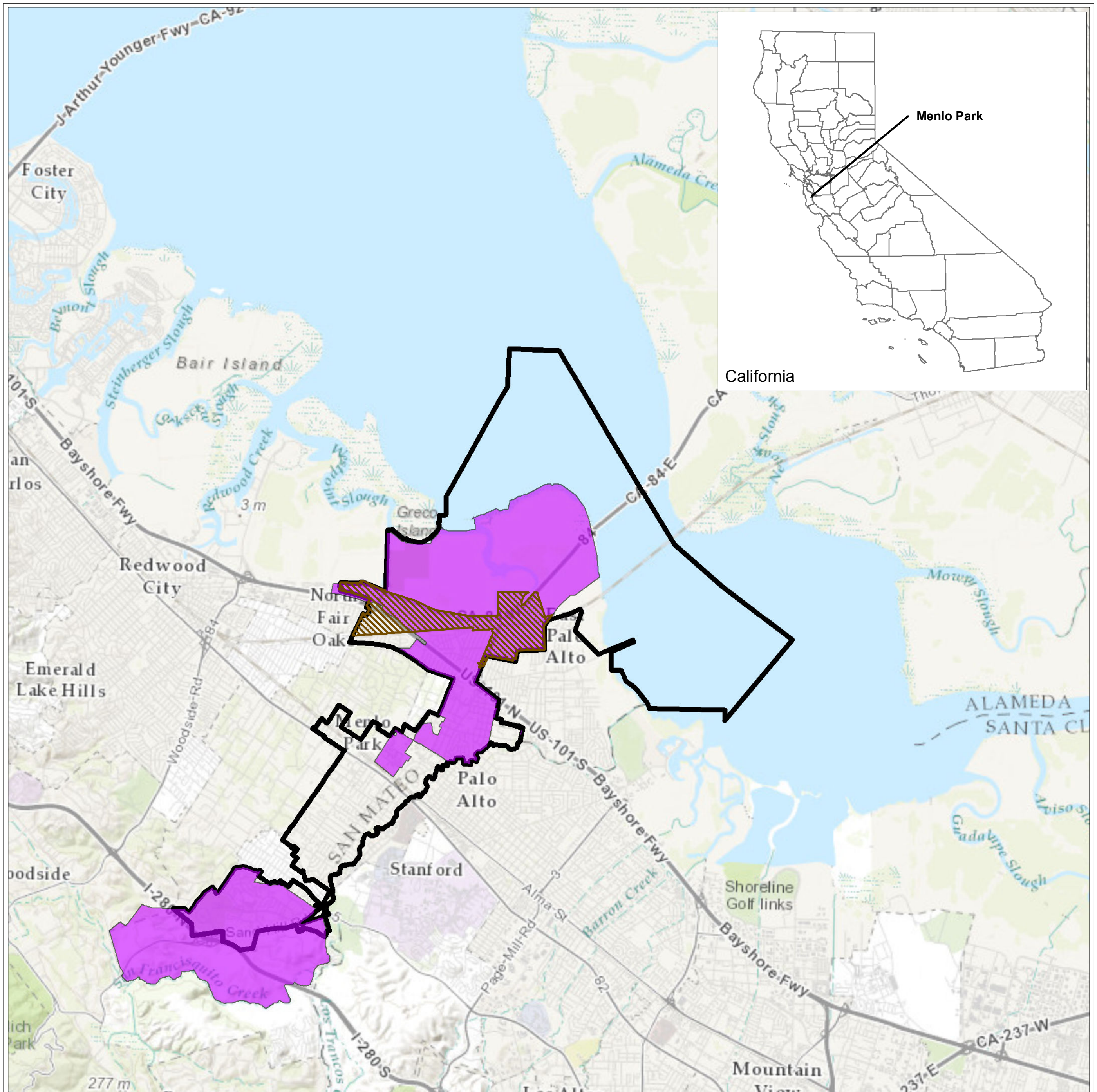


Legend

Bayfront Area

MPMWD Service Area

Menlo Park City Limit

Abbreviation

MPMWD = Menlo Park Municipal Water District

Note

1. All locations are approximate.
2. The proposed Project is located within the Bayfront Area and north of Highway 101.

Source

World Topographic base map provided by ArcGIS Online (ESRI, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBease, IGN, Kadaster NL, Ordinance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, OpenStreetMap contributors, and the GIS User Community), obtained 9 November 2015.

N

0 2 4

(Approximate Scale in Miles)

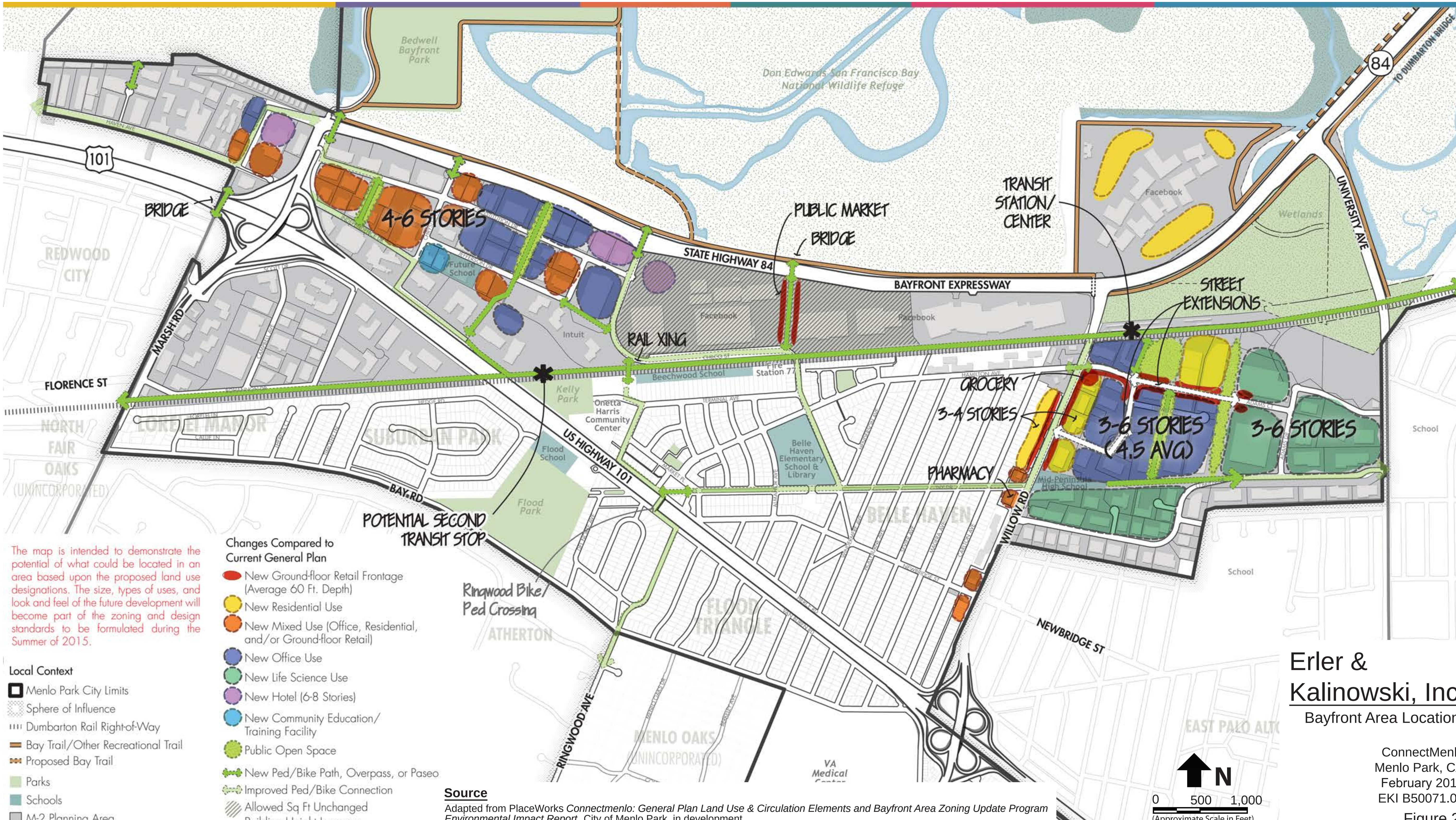
Erler & Kalinowski, Inc.

Regional Map

ConnectMenlo
Menlo Park, CA
February 2016
EKI B50071.00

Figure 1

Path: X:\B50071\Maps\11\Fig1_BayfrontAreaLocation_TW.mxd



Source

Adapted from PlaceWorks *Connectmenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update Program Environmental Impact Report*, City of Menlo Park, in development.

Erler & Kalinowski, Inc.

Bayfront Area Location

ConnectMenlo
Menlo Park, CA
February 2016
EKI B50071.00

Figure 2

Table 1
Historical Annual Water Use

ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Year	Total Annual Water Use within the Bayfront Area (MG) (a)
2010 (b)	224
2011	199
2012	162
2013	200
2014	191
Average Annual Water Use (2010 - 2014)	**195**

Abbreviations:

"MG" = million gallons

"MPMWD" = Menlo Park Municipal Water District

Notes:

(a) Total annual water use is based on MPMWD's metered water use data, provided by City staff on 15 and 24 September 2015 for 318 accounts within the Bayfront Area north of Highway 101.

(b) Actual water use in 2010 was only available from April through December and was interpolated to estimate water use for the whole year.

Table 2
Summary of Estimated Project Water Demand at Buildout (2040)
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

<table>
<tr><th rowspan="3">Project Component</th><th colspan="4">Annual Water Demand at Buildout</th></tr>
<tr><th rowspan="2">Indoor
(MG) (a)</th><th rowspan="2">Outdoor
(MG) (b)</th><th colspan="2">Total</th></tr>
<tr><th>(MG) (c)</th><th>(GPCD) (d)</th></tr>
<tr><td colspan="5">Residential</td></tr>
<tr><td>Multi-family Residential</td><td>209</td><td>10</td><td>219</td><td>52</td></tr>
<tr><td colspan="5">Non-Residential</td></tr>
<tr><td>CII (Excluding Transit Center)</td><td>99</td><td rowspan="2">24</td><td rowspan="2">124</td><td rowspan="2">--</td></tr>
<tr><td>Transit Center</td><td>0.4</td></tr>
<tr><td colspan="3">Total Project Water Demand</td><td>343</td><td>81</td></tr>
</table>

Abbreviations:

"CII" = Commercial, Industrial, and Institutional
"MG" = million gallons
"GPCD" = gallons per capita per day

Notes:

(a) The estimated annual indoor water demand at buildout for each project component is calculated in Tables 3a through 3c.
(b) The estimated annual outdoor water demand at buildout for each project component is calculated in Table 4.
(c) The estimated total annual water demand for residential and non-residential land uses, in MG, is calculated as the sum of indoor and outdoor water demands. Totals may not sum exactly due to rounding.
(d) The estimated total water demand, in GPCD, is calculated for residential land uses and the Project total. It is calculated as the sum of indoor and outdoor water demands divided by the estimated population for the project (see Table 3a) and the days per year. Total water demand in GPCD is not calculated for non-residential land uses.

Table 3a
Estimated Project Annual Indoor Water Demand, Residential Land Use
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

	[A]	[B]	[C]	[D]	[E]	[F]
			C = B / A		E = A × D	F = E × 365 / 1,000,000
Land Use	**Number of Dwelling Units** (a)	**Population** (a)	**Average Household Size** (people/du)	**Household Water Use Factor** (gphd) (b)	**Average Daily Indoor Water Use** (gpd) (c)	**Total Annual Indoor Water Demand** (MG) (d)
Multi-family Residential	4,500	11,570	2.57	127	572,985	209
					Total Indoor Water Demand, Residential Land Use	**209**

Abbreviations:

"du" = dwelling unit
"gpd" = gallons per day
"GPCD" = gallons per capita per day
"gphd" = gallons per household per day
"MG" = million gallons

Table 3a
Estimated Project Annual Indoor Water Demand, Residential Land Use
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Notes:

(a) Number of residential dwelling units and population are based on project information included in Reference 1.

(b) Residential indoor water use factor was estimated using a model of total indoor water use developed in Reference 2. The statistical model is based on single family homes that meet the standards for the Federal Energy Policy Act of 1992. The following assumptions were used for estimating project residential water uses:

1. The average household size (i.e., number of residents per home) is 2.57 persons/dwelling unit.
2. Home water softening systems (e.g., regenerating ion exchange units or reverse osmosis units) are not installed.
3. High-efficiency clothes washers that use less than 30 gallons of water per load are installed in 75% of the dwelling units
4. Significant leaks (i.e., leaks greater than 50 gallons per day) occur at approximately 9% of the dwelling units.

Based on the above assumptions, the residential indoor water use factor is estimated to be 127 gphd, or 49.4 GPCD.

(c) The average daily indoor water use is estimated by multiplying the number of dwelling units and the household water use factor.

(d) Total annual indoor water demand for residential land uses, in MG, is calculated as the product of daily indoor water use and the days per year. The product is then divided by the number of gallons per MG (1,000,000).

References:

1. ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update Program Environmental Impact Report, City of Menlo Park, in development.
2. DeOreo, 2011. *Analysis of Water Use in New Single-Family Homes,* 20 July 2011.

Table 3b
Estimated Project Annual Indoor Water Demand, CII Land Use (Excluding Transit Center)
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

	[A]	[B]	[C] C = A × B / 1,000	[D]	[E]	[F] F = D x (1 - E)	[G] G = C x F	[H] H = G x 225 / 1,000,000
Land Use	**Area** (sq ft) (a)	**Employee Density** (emp/1,000 sq ft) (b)	**Employees** (emp) (c)	**Employee Indoor Water Use Factor** (gpd/emp) (d)	**Indoor Conservation Factor** (%) (e)	**Employee Water Use After Conservation** (gpd/emp) (f)	**Average Daily Indoor Water Use** (gpd) (g)	**Total Annual Indoor Water Demand** (MG) (h)
Office	700,000	3.33	2,333	79	33%	53	123,034	28
Life Science (R&D)	1,400,000	2.12	2,963	148	40%	89	263,429	59
Commercial/Retail	200,000	0.80	161	109	34%	72	11,517	3
Hotel	350,000	0.86	300	216	32%	147	43,999	10
Total Indoor Water Demand, CII Land Use (Excluding Transit Center)								**99**

Abbreviations:

"CII" = Commercial, Industrial, and Institutional
"MG" = million gallons
"emp" = employees
"gpd" = gallons per day
"R&D" = Research and Development
"sq ft" = square feet

Table 3b
Estimated Project Annual Indoor Water Demand, CII Land Use (Excluding Transit Center)

ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Notes:

(a) Areas of proposed land uses are based on project information included in Reference 1.
(b) Employee densities of office and hotel land uses were provided by City staff on 20 November 2015. Employee densities of life science and commercial/retail land uses are based on Table B1 of Reference 2.
(c) The number of employees was estimated by multiplying the floor area ratio, expressed in 1,000 square feet, by the employees per 1,000 square feet.
(d) The employee indoor water use factors are based on information contained in Appendices E and F of Reference 3, which are each based on a 225-day work year.
(e) The employee water use factors reported in Reference 3 represent water use in older buildings; they do not incorporate the benefits of more recent water saving technologies or account for the CALGreen standards. Therefore, to account for reductions in water use associated with the installation of water-efficient plumbing fixtures, appliances, and other recent technologies, conservation savings, based on the "best" conservation savings potential presented in Appendices E and F of Reference 3, were calculated in Appendix A and applied to each land use.
(f) Daily employee water use after conservation is calculated by multiplying the employee indoor water use factor by 100% minus the conservation potential.
(g) The total daily indoor water use for each land use is estimated by multiplying the number of employees by the land use-specific employee daily water use.
(h) Total annual indoor water use is calculated by multiplying the daily indoor water use by the 225-day work year from Reference 3 for the employee water use factors, then dividing by 1,000,000 gallons per MG.

References:

1. ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update Program Environmental Impact Report, City of Menlo Park, in development.
2. U.S. Energy Information Administration, 2006, *2003 Commercial Buildings Energy Consumption Survey* .
3. Pacific Institute, 2003. *Waste Not, Want Not: The Potential for Urban Water Conservation in California* , November 2003.

Table 3c
Estimated Project Annual Indoor Water Demand, Transit Center
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

	[A]	[B]	[C]	[D]	[E]	[F]
					E = A x B × C x D	F = E x 365 / 1,000,000
Water Use (a)	**Daily Usage of the Transit Center** (b)	**Average # of Restroom Visits per Usage** (c)	**Fixture Rate** (d)	**Average # of Fixture Uses per Restroom Visit** (e)	**Average Daily Indoor Water Use** (gpd) (f)	**Total Annual Indoor Water Demand** (MG) (g)
Restroom						
Water Closet (male)	10,000	0.1	1.28 gpf	0.1	128	0.05
Water Closet (female)	10,000	0.1	1.28 gpf	0.5	640	0.2
Urinal	10,000	0.1	0.5 gpf	0.4	200	0.07
Lavatory	10,000	0.1	0.5 gpm	0.5	250	0.09
Total Indoor Water Demand, Transit Center						**0.4**

Abbreviations:
"gpd" = gallons per day
"MG" = million gallons
"gpf" = gallons per flush
"gpm" = gallons per minute

Table 3c
Estimated Project Annual Indoor Water Demand, Transit Center
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Notes:

(a) Indoor water use in the transit center is assumed to be associated with restroom visits of transit center users.
(b) Daily usage of the transit center is based on project information included in Reference 1.
(c) The average number of restroom visits assumes one restroom visit occurs in every ten person-usages of the transit center.
(d) Fixture rates are based on requirements of the CalGreen standards in Reference 2.
(e) The average number of fixture uses per restroom visit are estimated based upon the following assumptions:
1. Usage of the transit center restroom is from 50% male and 50% female;
2. On average each restroom visit consists of one toilet use and one 30-second lavatory use; and
3. On average males use the urinal in four out of five toilet uses.
(f) The daily indoor water use for each fixture is estimated by multiplying the fixture rate by the number of restroom visits per day and the number of fixture uses per visit.
(g) Total annual indoor water demand, in MG, is calculated as the product of daily indoor water use and the days per year. The product is then divided by the number of gallons per MG (1,000,000).

References:

1. ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update Program Environmental Impact Report, City of Menlo Park, in development.
2. 2013 California Green Building Standards Code (Effective January 1, 2014).

Table 4
Estimated Project Annual Outdoor Water Demand
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

	[A]	[B]	[C]	[D] D = B / 12 x C x A * 0.326
Land Use	**Total Landscaped Area** (acres) (a)	**Reference ET (ETo)** (inches/year) (b)	**ET Adjustment Factor** (c)	**Total Annual Outdoor Water Demand** (MG) (d)
Residential	15.3	42.8	0.55	10 (e)
Non-residential	46.2	42.8	0.45	24
			Total Project Outdoor Water Demand	**34**

Abbreviations:

"ET" = evapotranspiration
"MG" = million gallons
"GPCD" = gallons per capita per day
"CII" = commercial, industrial, and institutional
"MAWA" = Maximum Applied Water Allowance
"MWELO" = Model Water Efficient Landscape Ordinance

Table 4
Estimated Project Annual Outdoor Water Demand
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Notes:

(a) Areas dedicated to landscaping are based on project information included in Reference 1. Non-residential land use includes CII spaces, transit center, and public spaces.

(b) The reference ET is based on values for Redwood City in Appendix A of Reference 2. Redwood City is the closest available City to the project area.

(c) Per the California MWELO (Reference 2), ET adjustment factors of 0.55 and 0.45 were used to calculate the MAWA for residential and nonresidential areas, respectively. The project does not include any Special Landscape Areas, which include recreation areas, areas permanently and solely dedicated to edible plants, and areas irrigated with recycled water.

(d) Total annual landscaping water demand, in MG, is calculated based on the MAWA formula in Reference 2. Total annual landscaping water demand is conservatively assumed to be equal to the MAWA, which is the upper limit of annual applied water for the established landscaped area based upon the area's reference evapotranspiration, the ET Adjustment Factor, and the size of the landscape area.

(e) The residential outdoor water demand of 10 MG is equivalent to 2.3 GPCD based on the proposed number of residential units and population (see Table 3a).

References:

1. ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update Program Environmental Impact Report, City of Menlo Park, in development.
2. California Model Water Efficient Landscape Ordinance, 2015 Update.

Table 5
Historical Water Use for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Customer Category	Measured Annual Water Use (MG) (a)										Percent of Total 2014 Use
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	
Single Family Residential	473	408	485	483	456	382	376	386	402	354	34%
Multi-family Residential	72	71	76	79	70	108	115	119	118	106	10%
Commercial	156	173	193	189	191	162	141	153	206	183	18%
Industrial	360	347	362	298	244	234	240	217	231	215	21%
Public Facility	92	76	90	88	81	49	52	66	63	50	5%
Landscape Irrigation (b)	110	109	122	128	119	117	108	137	167	117	11%
Other (c)	4	3	1	1	1	0	0	1	3	4	0.42%
Total Water Use (d)	**1,268**	**1,187**	**1,329**	**1,267**	**1,163**	**1,052**	**1,033**	**1,079**	**1,189**	**1,030**	**100%**

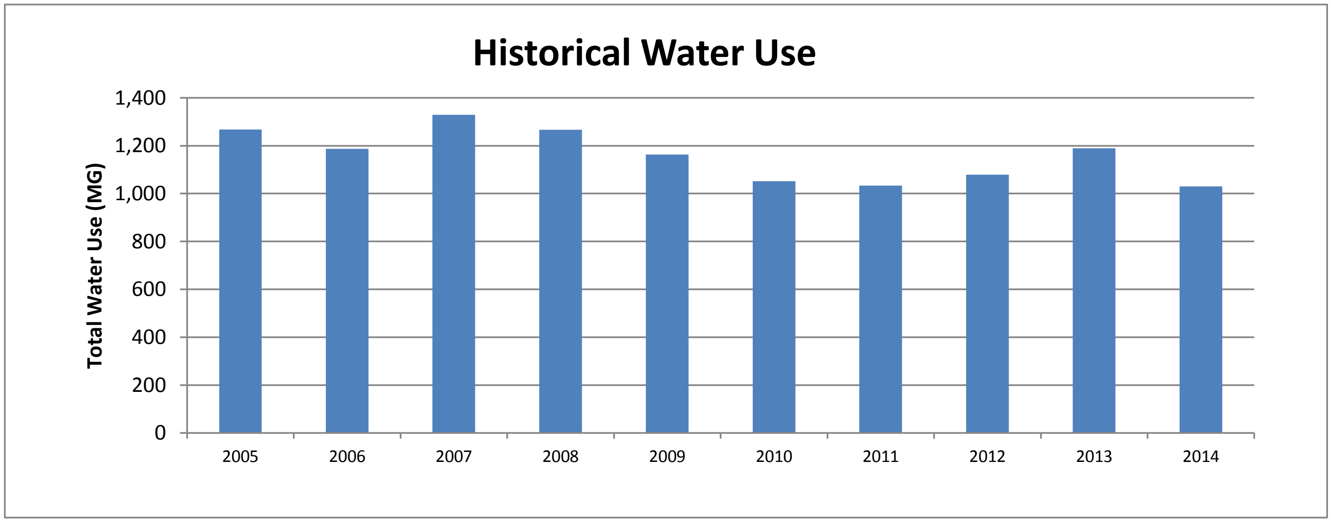


Table 5
Historical Water Use for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Abbreviations:

"MG" = million gallons
"MPMWD" = Menlo Park Municipal Water District
"UWMP" = Urban Water Management Plan

Notes:

(a) The measured annual water use for years 2005 through 2010 was from MPMWD's 2010 UWMP (Reference 1). The measured annual water use for years 2011 through 2014 was obtained from City staff on 30 September 2015. Totals may not sum exactly due to rounding.

(b) Irrigation water use includes water use for irrigation meters of accounts that are sub-metered. For most accounts, indoor and outdoors water use are measured by one meter and are shown in other categories. Therefore, irrigation water use shown here does not represent all of the outdoor irrigation water use within MPMWD.

(c) Other water use includes water used for temporary meters.

(d) "Non-revenue water" is defined herein as the difference between the MPMWD's customers' metered use and the MPMWD's metered supply. The total water use shown here does not include non-revenue water.

References:

1. 2010 Urban Water Management Plan, prepared by the City of Menlo Park, amended November 2014.

Table 6
Projected Future Water Demands of Current General Plan Buildout for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Customer Category	Projected Annual Water Demand of Current General Plan Buildout (MG) (a)				
	2020	**2025**	**2030**	**2035**	**2040**
Single Family Residential	447	438	430	425	422
Multi-family Residential	119	117	115	114	113
Commercial/Institutional	150	158	166	174	182
Industrial	315	289	264	241	221
Institutional/Governmental	86	86	87	87	88
Landscape Irrigation (b)	128	133	139	145	151
Other (Temporary Meters) (c)	3	3	3	3	3
Total Water Use	1,248	1,224	1,204	1,189	1,179
Non-Revenue Water (d)	*62*	*62*	*61*	*61*	*61*
Total Water Demand (e)	**1,310**	**1,286**	**1,265**	**1,251**	**1,240**

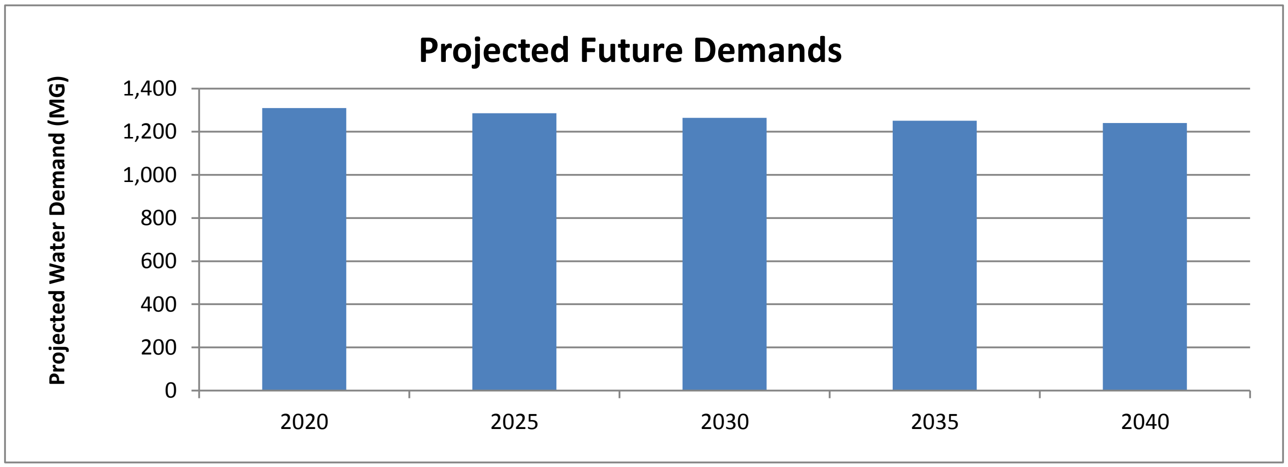


Table 6
Projected Future Water Demands of Current General Plan Buildout for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Abbreviations:

"MPMWD" = Menlo Park Municipal Water District
"UWMP" = Urban Water Management Plan
"MG" = million gallons

Notes:

(a) The projected future water demands of current General Plan buildout are from the MPMWD's draft 2015 UWMP (Reference 1).
(b) Irrigation water use includes water use for irrigation meters of accounts that are sub-metered and does not represent all of the outdoor irrigation water use within MPMWD.
(c) Other water use includes water used for temporary meters.
(d) "Non-revenue water" is defined herein as the difference between the MPMWD's customers' metered use and the MPMWD's metered supply. Thus, non-revenue water includes apparent losses such as customer metering inaccuracies, real losses such as distribution main leakage, and authorized unmetered uses such as fire hydrant flow testing. The values for non-revenue water were from MPMWD's draft 2015 UWMP and are assumed to be approximately 4.5% of the total water use.
(e) The total water demand is the sum of total water use and non-revenue water. The projected water demands include savings from plumbing code updates and conservation efforts the City plans to undertake.

References:

1. 2015 Urban Water Management Plan, prepared by the City of Menlo Park, in development.

Table 7
Preliminary Water Demand Estimates for Planned Projects within the MPMWD

ConnectMenlo - General Plan and M-2 Area Zoning Update

Menlo Park, California

Project Name (a)	Type of Use	Size		Status	Project Location	Included in General Plan Water Demand Projections?	Estimated Annual Water Demand (MG)
Facebook Campus Expansion (b)	Office Hotel	962,400 200	sq ft rooms	Pending	North of U.S. 101	No	30
New Magnate High School (c)	School	400	students	Pending	North of U.S. 101	No	0.6
333 Ravenswood Ave	R&D Campus	3,000	employees	Pending	West Menlo/Downtown/El Camino Real	Yes	--
1283 Willow Rd (Police/City Service Center)	Office Retail	3,800 5,096	sq ft sq ft	Approved	North of U.S. 101	Yes	--
100-155 Constitution Dr & 100-190 Independence Dr (Menlo Gateway)	Office Health Club Restaurant Hotel Hotel	694,664 41,000 6,947 250 197,050	sq ft sq ft sq ft rooms sq ft	Approved	North of U.S. 101	Yes	--
Facebook West (Building 20) (d)	Office	433,656	sq ft	Approved	North of U.S. 101	Yes	--
Commonwealth Corp. Center	Office	259,920	sq ft	Approved	North of U.S. 101	Yes	--
VA/Core 605 Willow Rd	Residential	60	du	Approved	South of U.S. 101	Yes	--
Anton Menlo	Residential	394	du	Approved	North of U.S. 101	Yes	--
777 Hamilton Ave	Residential	195	du	Approved	North of U.S. 101	Yes	--
3645 Haven Ave	Residential	146	du	Approved	North of U.S. 101	Yes	--

Table 7
Preliminary Water Demand Estimates for Planned Projects within the MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Project Name (a)	Type of Use	Size	Status	Project Location	Included in General Plan Water Demand Projections?	Estimated Annual Water Demand (MG)
Sequoia Belle Haven	Residential	90 du	Approved	North of U.S. 101	Yes	--
Facebook Building 23	Office	180,108 sq ft	Approved	North of U.S. 101	Yes	--
German American School	School	400 students	Approved	South of U.S. 101	Yes	--
Water Demands for Planned Projects not Included in Current General Plan Buildout Demand Projections (MG)						**31**

Abbreviations:
"Cal Water" - California Water Service Company
"du" = dwelling units
"MG" million gallons
"MPMWD" = Menlo Park Municipal Water District
"R&D" = Research and Development
"sq ft" = square feet

Notes:
(a) Projects were identified by City staff based on applications received before or near June 18, 2015 Notice of Preparations. Table includes all projects within MPMWD's service area (and not those within Cal Water's service area) that have filed a complete development application for five (5) or more net new residential units or 5,000 sq ft or more of net new commercial space.
(b) Water demand for the Facebook Expansion Project was estimated in Reference 1.
(c) Water demand for the New Magnate High School was provided by City staff on 21 December 2015. The annual water demand was estimated using 7.9 gallons per day per student for 400 students and 180 school days per year.
(d) Facebook West (Building 20) was completed early 2015 but is included in the approved project list because 2015 City water meter data are not yet available.

References:

1. Water Supply Assessment Study, Facebook Campus Expansion, Menlo Park, California, prepared by the City of Menlo Park, in development.

Table 8
Total Projected Future Water Demands for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Water Demand Estimate	Projected Future Water Demand (MG)				
	2020	**2025**	**2030**	**2035**	**2040**
Water Demand of Current General Plan Buildout (a)	*1,310*	*1,286*	*1,265*	*1,251*	*1,240*
Water Demand for Other Planned Projects (b)	*31*	*31*	*31*	*31*	*31*
Total Water Demand without Project	**1,341**	**1,317**	**1,296**	**1,282**	**1,271**
Project Water Demand (c)	0	86	172	257	343
Total Water Demand with Project	**1,341**	**1,403**	**1,468**	**1,539**	**1,614**

Abbreviations:

"MG" = million gallons
"MPMWD" = Menlo Park Municipal Water District
"UWMP" = Urban Water Management Plan

Notes:

(a) The total projected MPMWD-wide water demand between 2010 and 2040 is based on water demand projections within the MPMWD's draft 2015 UWMP (Reference 1) (see Table 6).
(b) The total estimated water demand for currently planned projects is 31 MG (see Table 7).
(c) The proposed project is expecting buildout by 2040 over a 25-year horizon, based on information provided by City staff on 3 November 2015. Therefore, project water demands at buildout (Table 2) are phased from 2020 to 2040 to reflect phased buildout.

References:

1. 2015 Urban Water Management Plan, prepared by the City of Menlo Park, in development.

Table 9
Historical Water Supply for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Water Supply Source	Historical Water Supply (MG) (a)									
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
SFPUC (b)	1,259	1,185	1,314	1,267	1,159	1,085	1,084	1,190	1,344	1,017
Total Water Supply	1,259	1,185	1,314	1,267	1,159	1,085	1,084	1,190	1,344	1,017

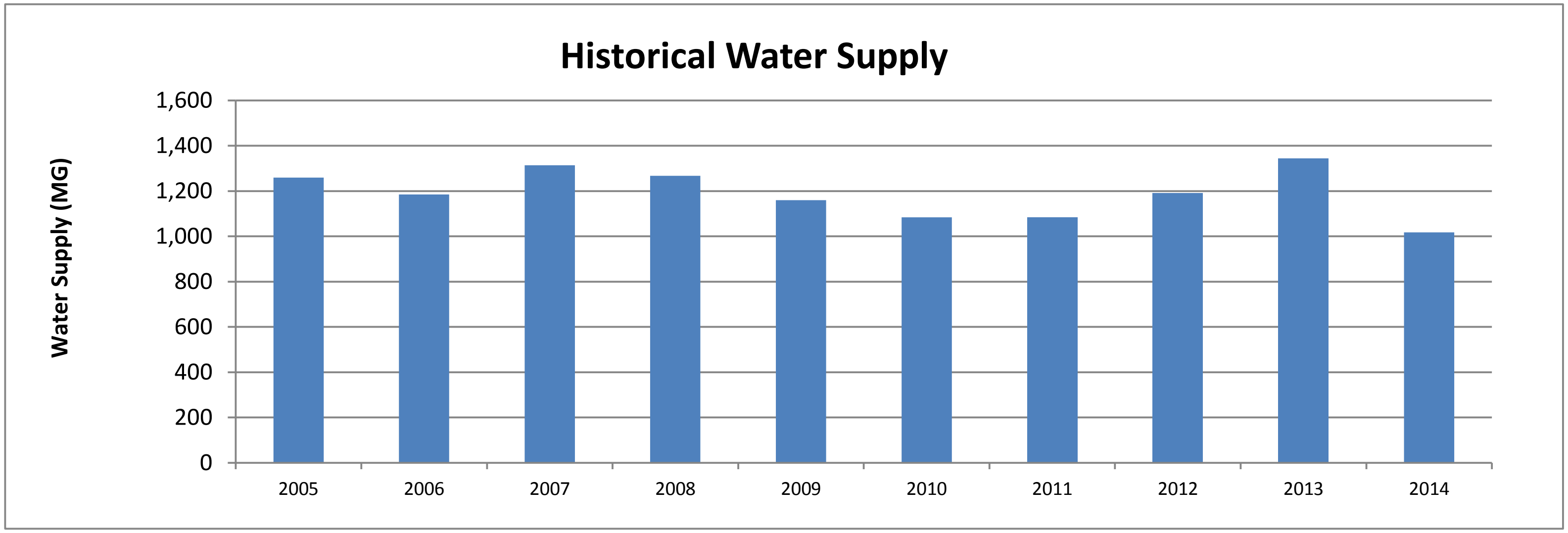


Table 9
Historical Water Supply for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Abbreviations:

"MG" = million gallons
"MGD" = million gallons per day
"MPMWD" = Menlo Park Municipal Water District
"SFPUC" = San Francisco Public Utilities Commission

Notes:

(a) The annual water supply values for 2005 through 2014 are based on monthly wholesale water meter readings provided by City staff on 13 and 16 October 2015.

(b) The MPMWD has a SFPUC individual supply guarantee of 4.465 MGD, or approximately 1,630 MG per year (Reference 1).

References:

1. 2010 Urban Water Management Plan, prepared by the City of Menlo Park, amended November 2014.

Table 10
Projected Future Normal Year Water Supply for MPMWD

ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Water Supply Source	Projected Normal Year Supply (MG)				
	2020	**2025**	**2030**	**2035**	**2040**
Primary Supply Sources					
SFPUC (a)	*1,630*	*1,630*	*1,630*	*1,630*	*1,630*
Groundwater	*0*	*0*	*0*	*0*	*0*
Total Normal Year Potable Supply	1,630	1,630	1,630	1,630	1,630
Recycled Water	0	0	0	0	0
Total Normal Year Water Supply (b)	1,630	1,630	1,630	1,630	1,630

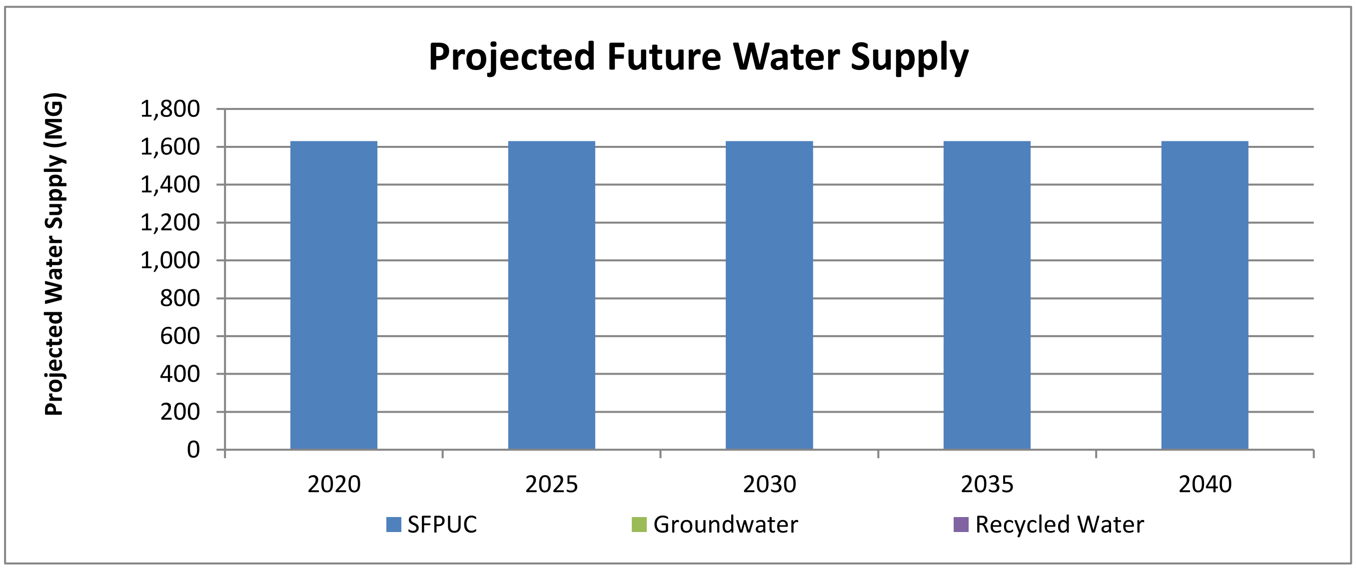


Table 10
Projected Future Normal Year Water Supply for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Abbreviations:

"ISA" = Interim Supply Allocation
"MG" = million gallons
"MGD" = million gallons per day
"MPMWD" = Menlo Park Municipal Water District
"SFPUC" = San Francisco Public Utilities Commission

Notes:

(a) The MPMWD has a SFPUC individual supply guarantee of 4.465 MGD, or approximately 1,630 MG per year. The MPMWD's ISA through 2018 is 4.4 MGD, or approximately 1,607 MG per year, but this ISA is only triggered when the demand of the Regional System as a whole exceeds 265 MGD, and then it only means that MPMWD would be charged a surcharge for any incremental use over the ISA amount (Reference 1).
(b) Total supply is the sum of the potable and recycled water supplies.

References:

1. 2015 Urban Water Management Plan, prepared by the City of Menlo Park, in development.

Table 11
Comparison of Single Dry Year Water Supply and Demand for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Water Supply Source	Projected Water Supply and Demand (MG)				
	2020	**2025**	**2030**	**2035**	**2040**
Primary Supply Sources (a)					
SFPUC	*1,281*	*1,281*	*1,281*	*1,281*	*1,281*
Groundwater	*0*	*0*	*0*	*0*	*0*
Total Dry Year Potable Supply	1,281	1,281	1,281	1,281	1,281
Potable Demand	1,341	1,403	1,468	1,539	1,614
Supply Shortfall	60	122	187	258	333
Supply Shortfall (% demand)	4.5%	8.7%	13%	17%	21%

Abbreviations:
"MG" = million gallons
"UWMP" = Urban Water Management Plan
"MPMWD" = Menlo Park Municipal Water District
"SFPUC" = San Francisco Public Utilities Commission

Notes:
(a) Projected available water supplies and demand during multiple dry years are from the MPMWD's draft 2015 UWMP (Reference 1).

References:
1. 2015 Urban Water Management Plan, prepared by the City of Menlo Park, in development.

Table 12
Comparison of Multiple Dry Year Water Supply and Demand for MPMWD
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Supply Source	Projected Water Supply and Demand During Mutiple Dry Years (MG)														
	2020			2025			2030			2035			2040		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Primary Supply Sources (a)															
SFPUC	*1,281*	*1,108*	*1,108*	*1,281*	*1,108*	*1,108*	*1,281*	*1,108*	*1,108*	*1,281*	*1,108*	*1,108*	*1,281*	*1,108*	*1,108*
Groundwater	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Total Dry Year Potable Supply	1,281	1,108	1,108	1,281	1,108	1,108	1,281	1,108	1,108	1,281	1,108	1,108	1,281	1,108	1,108
Potable Demand	1,341	1,341	1,341	1,403	1,403	1,403	1,468	1,468	1,468	1,539	1,539	1,539	1,614	1,614	1,614
Supply Shortfall	60	233	233	122	295	295	187	360	360	258	431	431	333	506	506
Supply Shortfall (% demand)	4.5%	17%	17%	8.7%	21%	21%	13%	24%	24%	17%	28%	28%	21%	31%	31%

Abbreviations:
"MG" = million gallons
"MPMWD" = Menlo Park Municipal Water District
"SFPUC" = San Francisco Public Utilities Commission
"UWMP" = Urban Water Management Plan

Notes:
(a) Projected available water supplies and demand during multiple dry years are from the MPMWD's draft 2015 UWMP (Reference 1).

References:

1. 2015 Urban Water Management Plan, prepared by the City of Menlo Park, in development.

Table 13
Incremental Impact of the Project on MPMWD's Water Supply and Demand in Normal and Dry Years
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Year			[A] Total Potable Supply (MG) (a)	Without Project [B] Potable Demand (MG) (b)	Without Project [C] C = (A - B) / B Supply Shortfall (% of Demand)	With Project [D] Potable Demand (MG) (b)	With Project [E] E = (A - D) / D Supply Shortfall (% of Demand)	[F] F = E - C Incremental Shortage (c)
2020	Normal		1,630	1,341	No Shortfall	1,341	No Shortfall	0%
	SDY		1,281	1,341	4.5%	1,341	4.5%	0%
	MDY	Year 1	1,281	1,341	4.5%	1,341	4.5%	0%
		Year 2	1,108	1,341	17%	1,341	17%	0%
		Year 3	1,108	1,341	17%	1,341	17%	0%
2025	Normal		1,630	1,317	No Shortfall	1,403	No Shortfall	0%
	SDY		1,281	1,317	2.7%	1,403	8.7%	6%
	MDY	Year 1	1,281	1,317	2.7%	1,403	8.7%	6%
		Year 2	1,108	1,317	16%	1,403	21%	5%
		Year 3	1,108	1,317	16%	1,403	21%	5%
2030	Normal		1,630	1,296	No Shortfall	1,468	No Shortfall	0%
	SDY		1,281	1,296	1.1%	1,468	13%	12%
	MDY	Year 1	1,281	1,296	1.1%	1,468	13%	12%
		Year 2	1,108	1,296	14%	1,468	24%	10%
		Year 3	1,108	1,296	14%	1,468	24%	10%
2035	Normal		1,630	1,282	No Shortfall	1,539	No Shortfall	0%
	SDY		1,281	1,282	0.1%	1,539	17%	17%
	MDY	Year 1	1,281	1,282	0.1%	1,539	17%	17%
		Year 2	1,108	1,282	14%	1,539	28%	14%
		Year 3	1,108	1,282	14%	1,539	28%	14%
2040	Normal		1,630	1,271	No Shortfall	1,614	No Shortfall	0%
	SDY		1,281	1,271	No Shortfall	1,614	21%	21%
	MDY	Year 1	1,281	1,271	No Shortfall	1,614	21%	21%
		Year 2	1,108	1,271	13%	1,614	31%	18%
		Year 3	1,108	1,271	13%	1,614	31%	18%

Table 13
Incremental Impact of the Project on MPMWD's Water Supply and Demand in Normal and Dry Years
ConnectMenlo - General Plan and M-2 Area Zoning Update
Menlo Park, California

Abbreviations:

"MG" = million gallons
"MDY" = Multiple Dry Year
"MPMWD" = Menlo Park Municipal Water District
"SDY" = Single Dry Year
"UWMP" = Urban Water Management Plan

Notes:

(a) Projected available water supplies during normal, single dry and multiple dry years are from MPMWD's draft 2015 UWMP (Reference 1), and are documented in Tables 10, 11, and 12.
(b) Values for projected water demand with and without project are calculated in Table 8.
(c) Values are subject to rounding.

References:

1. 2015 Urban Water Management Plan, prepared by the City of Menlo Park, in development.

Appendix A

Summary of Conservation Saving Factors for Indoor Water Uses

and

Appendices E and F to the Pacific Institute's *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, November 2003.

Savings potential for each end use in specific CII land uses are listed in Appendices E and F of the Pacific Institute Study. Using data from the Pacific Institute Study, the conservation factor for indoor water use is calculated in Tables A-1 through A-4 below.

Table A-1: Indoor Conservation Factor for Office Buildings

End Use	**Water Use (TAF)** (a) (b)	**Conservation Potential** (c)		
		Best	**Low**	**High**
Restroom	88	49%	49%	49%
Cooling	77.9	26%	9%	41%
Kitchen	10.2	20%	20%	20%
Other	33.9	10%	0%	25%
Indoor Total (d)	**210**	**<u>33%</u>**	**25%**	**41%**

Notes and Abbreviations:

(a) TAF = Thousand Acre-Feet
(b) Total water use in sampled office buildings obtained from Table E-1 of the Pacific Institute Study.
(c) Conservation potential for each end use in office buildings are obtained from Table E-3 of the Pacific Institute Study.
(d) The indoor total conservation potential is calculated as the weighted average of the conservation potential for each end use based on their water use.

Table A-2: Indoor Conservation Factor for Life Science Buildings

End Use	**Water Use (TAF)** (a) (b)	**Conservation Potential** (c)		
		Best	**Low**	**High**
Process	52.5	43%	29%	53%
Cooling	15.0	26%	9%	41%
Restroom	3.8	49%	49%	49%
Indoor Total (d)	**71.3**	**<u>40%</u>**	**26%**	**50%**

Notes and Abbreviations:

(a) TAF = Thousand Acre-Feet
(b) Total water use in sampled high tech industry obtained from Table F-33 of the Pacific Institute Study.
(c) Conservation potential for each end use in the high tech industry are obtained from Table F-33 of the Pacific Institute Study.
(d) The indoor total conservation potential is calculated as the weighted average of the conservation potential for each end use based on their water use.

Table A-3: Indoor Conservation Factor for the Commercial / Retail Industry (a)

End Use	**Grocery Stores**		**Other Retail**	
	Water Use (TAF) (b) (c)	**"Best" Conservation Potential** (d)	**Water Use (TAF)** (b) (c)	**"Best" Conservation Potential** (d)
Restroom	5.9	51%	30.7	N/A
Cooling	16.9	26%	24.8	N/A
Other	7.6	10%	13.0	N/A
Kitchen	3.1	20%	4.7	N/A
Indoor Total (e)	33.5	26%	83.2	37%
Indoor Total for the Commercial / Retail Industry (f)				**34%**

Notes and Abbreviations:

(a) Conservation factors were determined separately for grocery stores and other retail stores in the Pacific Institute Study. These factors were combined to obtain the indoor total conservation factor for the commercial / retail industry.

(b) TAF = Thousand Acre-Feet

(c) Total water use in sampled grocery and retails stores obtained respectively from Tables E-23 and E-24 of the Pacific Institute Study.

(d) Conservation potential for each end use in grocery stores are obtained from Table E-23 of the Pacific Institute Study. Conservation potential for each end use in other retail stores are likely to have printed erroneously in Table E-24, therefore, the indoor conservation potential is assumed to be the total conservation potential.

(e) The indoor conservation potential for grocery stores is calculated as the weighted average of the conservation potential for each end use in grocery stores based on their water use.

(f) The indoor total conservation factor is calculated as a weighted average of conservation potential in grocery stores and other retail stores based on their water use.

Table A-4: Indoor Conservation Factor for Hotels

End Use	**Water Use (TAF) (a) (b)**	**Conservation Potential**		
		Best	**Low**	**High**
Restroom	16.7	31%	31%	31%
Laundry	4.2	54%	42%	66%
Cooling	3	26%	9%	41%
Kitchen	2.4	20%	20%	20%
Other	0.9	0%	0%	0%
Indoor Total	**27.2**	**32%**	**28%**	**36%**

Notes and Abbreviations:

(g) TAF = Thousand Acre-Feet

(h) Total water use in sampled hotels obtained from Table E-4 of the Pacific Institute Study.

(i) Conservation potentials for each end use in hotels are obtained from Table E-6 of the Pacific Institute Study.

The indoor total conservation potential is each calculated as the weighted average of the conservation potential based on total water use for “best”, “high”, or “low” potential.

Appendix E

Details of Commercial Water Use and Potential Savings, by Sector

Office Buildings
(SIC codes 60–64, 67, 73, 81, 87, and 90)

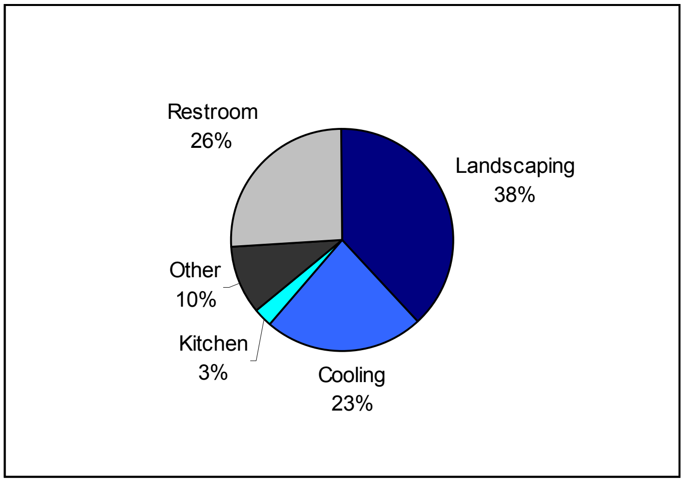
Offices buildings house a wide variety of companies ranging from insurance brokers to law offices. Although the types of offices differ, their employees are usually engaged in similar activities and can therefore be aggregated under one category. We did not, however, include SIC code 65 (real estate) or SIC code 86 (membership organizations) in our analysis, because the GEDs estimated were unreasonably high; indicating problems with either the data or the categorization. For example, we suspect that SIC code 65 includes multi-family housing in addition to real estate offices because it includes in its description "apartment building operators," and rental offices are often located within apartment complexes, where water is used for residential purposes.

Table E-1
Employment and Water Use in Office Buildings (2000)

Sub-industry	SIC code	Gallons per Employee Day (GED)[1,2]	Employees	Annual Use, Thousand Acre-Feet (TAF)
Depository	60	58	198,500	7.9
Non-Depository	61	135	84,700	7.9
Security, Broker	62	176	75,100	9.1
Insurance	63	169	136,300	15.9
Insurance	64	129	83,400	7.4
Holding/Investment	67	176	39,680	4.8
Business	73	129	1,350,530	120.1
Legal	81	99	123,204	8.4
Engineering	87	113	472,069	36.7
Government	90	136	1,279,745	120.3
Office Buildings Total		**127 (average)**	**3,843,303**	**338.5**

[1] Based on a 225-day year.
[1] Note that the GED coefficients estimated for 1995 were decreased by 20% to obtain the GED coefficients for 2000 for the commercial sector. See the write-up on correcting GED Estimates for 2000 in the report.

Figure E-1
Water Use, by End Use, in Office Buildings



Source: Calculated from MWD audit data of selected office buildings (MWD 2002).

Comparison of GED-derived Estimate to Modeled Water Use

We modeled water use in office buildings, using published estimates of restroom visits by employees, irrigated turf area, cooling requirements etc. We compared our GED-derived estimate of water use per employee to that predicted by the model Table E-2. The end-use calculations in the GED-derived estimate are from Figure E-1 and the model's assumptions are derived from the end use data in Appendix D.

Table E-2
Modeled Water Use in Office Buildings (2000)

End Use	Unit	Rate	Number	Modeled Water Use (GED)	GED-derived (GED)
Toilets[1]					
Employee use	gpf	3.00	2.60 flushes/day	7.8	
Visitor use	gpf	3.00	0.33 flushes/day	1.0	
Urinals[1]					
Employee use	gpf	1.60	1.25 flushes/day	2.0	
Visitor use	gpf	1.60	0.17 flushes/day	0.3	
Faucets[1]					
Employee use	gpf	0.11	3.85 flushes/day	0.4	
Visitor use	gpf	0.11	0.50 flushes/day	0.1	
Total restroom				11.6	33.0
Cooling	gal/sq ft/day	0.07[2]	350[3] sq.ft/employee	23.3	29.2
Landscaping	gal/sq ft	0.08[4]	547[5] sq. ft/employee	20.7	48.3
Kitchen	gal/meal	10.1[6]	0.33 meals/employee/day	3.3	3.8
Other				12.7	12.7
Total				**72**	**127**

[1] See Appendix D.

[2] Two case studies estimated 15 and 34 gal/sq ft./year. The average is about 25 gal/sq.ft/year. We estimate that only 60 percent of office buildings have cooling towers so this works out to 15 gal/sq ft/year on average or 0.07 gal/sq ft/day (Dziegielewski et al. 2000).
[3] Statistical average of 67 office buildings (Dziegielewski et al. 2000).
[4] See Appendix D.
[5] MWD 2002.
[6] See Appendix D.

Estimate of Potential Savings

By applying the conservation potential calculated in the end use studies (see Appendix D) to our GED-derived estimates of end use, we estimated potential water savings (shown in Table E-3).

Table E-3
Potential Water Savings in Office Buildings (2000)

End Use	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
		Low	High	Best	Low	High	Best
Landscaping	128.6	38%	53%	50%	48.3	68.0	64.2
Restroom	88.0	49%	49%	49%	43.4	43.4	43.4
Cooling	77.9	9%	41%	26%	7.4	32.3	20.0
Kitchen	10.2	20%	20%	20%	2.0	2.0	2.0
Other	33.9	0%	25%	10%	0.0	8.5	3.4
Total	**338.5**	**30%**	**46%**	**39%**	**101.1**	**154.1**	**133.0**

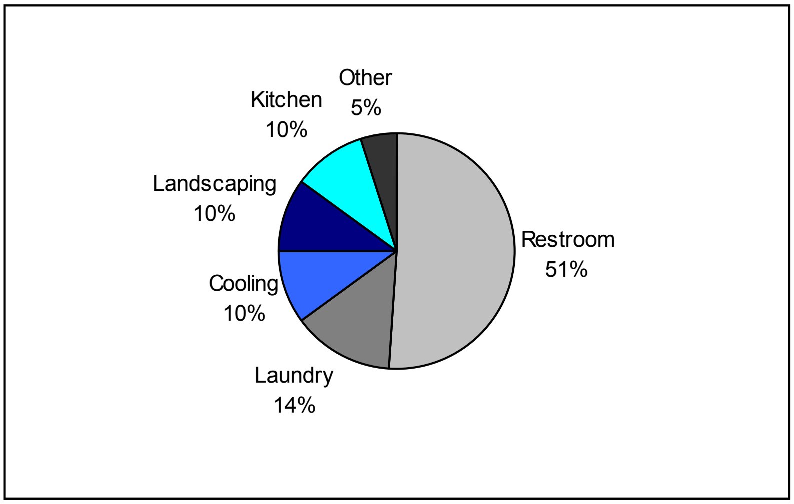
Hotels (SIC codes 701 and 704)

Sub-industries under SIC code 70 include hotels, motels, rooming and boarding houses, recreational vehicle parks, camp sites, and a variety of other types of lodging establishments. Because the literature focuses primarily on water use in hotels, motels, and bed and breakfasts (SIC codes 701 and 704), we limited our focus to these three types of lodging establishments, which we refer to collectively as hotels.

Table E-4
Employment and Water Use in the Hotel Industry (2000)

Industry	SIC codes	GED	Employees	Annual Use (TAF)
Hotels	701,704	240	182,640	30.3

Figure E-2
Water Use, by End Use, in the Hotel Industry



Source: Calculated from MWD audit data of 93 hotels (MWD 2002).

Comparison of GED-derived Estimate to Modeled Water Use

We modeled the water use in hotels, using published estimates of restroom visits, showers, faucet use by guests and employees, irrigated turf area, cooling requirements etc. We converted our GED-derived estimate of water use per employee into water use per occupied room per day and then compared it to that predicted by the water use model. The end use calculations in the GED-derived estimate are from Figure E-2 and the model's assumptions are based on the end use data in Appendix D and a study of water use in the hotel industry (Redlin and deRoos 1990).

Table E-5
Modeled Water Use in Hotels (2000)

		Typical Use/Occupied Room/Day			
	Measurement Unit	**Rate/Unit**	**Number of Units**	**Water Use (gal/day)**	**GED-derived Use (gal/day)**
Showers[1]	gal/minute	2.2	16.0	35.2	
Faucets[1]	gal/minute	1.3	0.4	0.6	
Toilets[1]	gal/flush	3.0	4.0	12.0	
Laundry[2]	gal/lb.	2.5	8.0[3]	20.0	
Kitchen	gal/meal	7.6[4]	2.2[5]	17.0	
Icemakers	gal/meal	0.5[6]	2.2[5]	1.1	
Misc.	gal			25.0	

INDOOR				**111.0**	
Cooling[7]	gal/CDD	5.6	1.4	8.0	
COOLING				**8.0**	
Irrigation[8]	gal/sq. ft.	0.2	50.0	10.0	
Pool				0.5	
OUTDOOR				**10.5**	
TOTAL				**130**	**117**[9]

[1] See Appendix D.
[2] See Appendix D.
[3] Pounds/occupied room/day of laundry is obtained from the average of the 12 hotels in Redlin and de Roos (1990). Eighty-nine percent of hotels have in-house laundries (Redlin and de Roos 1990).
[4] Average gal/meal is obtained from the restaurant sector. Seventy-six percent of hotels have restaurants (Redlin and de Roos 1990).
[5] Meals/occupied room (Redlin and de Roos 1990)
[6] 0.5 lbs/meal * 1 gal/lb : lbs/meal taken from 1994 ASHRAE Refrigeration Handbook, 1 gal/lb estimated from Pike 1995.
[7] Nearly 50 percent of the hotels surveyed in Redlin and de Roos (1990) had central cooling. Average annual Cooling Degree Days (CDD) in California was 1035. Therefore Cooling Degrees per day = 1035*50%/365 = 1.4 gal/CDD obtained from Redlin and de Roos (1990).
[8] See Appendix D.
[9] We used information on the total number of occupied hotel rooms and total water used by the hotel sector in 2000. When we divided 2000 water use (30.3 TAF) by 350,000 rooms times the average occupancy rate for the year (66%), the water use/occupied room/day was about 117 gallons.

Estimate of Potential Savings

By applying the conservation potential calculated in the end use studies (see Appendix D) to our GED-derived estimates of water use, we estimated potential water savings (shown in Table E-6).

Table E-6
Potential Water Savings in the Hotel Industry (2000)

End Use	**Water Use (TAF)**	**Conservation Potential (percent)**			**Conservation Potential (TAF)**		
		Low	**High**	**Best**	**Low**	**High**	**Best**
Restrooms	16.7	31%	31%	31%	5.3	5.3	5.3
Laundry	4.2	42%	66%	54%	1.8	2.8	2.3
Cooling	3.0	9%	41%	26%	0.3	1.3	0.8
Landscaping	3.0	47%	53%	50%	1.1	1.6	1.5
Kitchen	2.4	20%	20%	20%	0.5	0.5	0.5
Other	0.9	0%	0%	0%	0.0	0.0	0.0
Total Savings	**30.3**	**30%**	**38%**	**34%**	**9.0**	**11.4**	**10.3**

Golf Courses (SIC code 7992)

SIC code 79 includes various recreational establishments such as theaters, amusement parks, movie studios, and golf courses. Because water use in these industries varies tremendously, we included only golf courses (SIC code 7992), which comprise a very water intensive sub-industry, in our analysis. Indeed, in 2000, there were nearly 900 golf courses in the state, covering close to 89,000 acres (Horton, 2002), and using 342 TAF of water annually.

Table E-7
Employment and Water Use at Golf Courses (2000)

Industry	SIC	GED	Employees	Annual Use (TAF)
Golf Courses	7992	7,718	34,100	341.8[1]

[1] Freshwater comprised 229 AF of 2000 use and the remaining water was reclaimed water (California State Water Resources Control Board 2002).

Although we do not know the exact breakdown of water use at golf courses, we do know that water is used primarily for landscaping. Without published data, we assumed that 95 percent of golf course water use is used for irrigating turf while the remaining 5 percent is used in restrooms, kitchens, and cooling, which we consolidated as "other." Golf courses tend to use high amounts of reclaimed water in addition to self-supplied and agency-supplied water.[1]

Comparison of GED-derived Estimate to Modeled Water Use

Since landscaping comprises nearly all of a golf course's water use and little or no information was available on restroom, kitchen, or cooling uses, we modeled only the irrigation component to crosscheck our GED-derived estimate. First, we totaled the number and acreage of golf courses by hydrological region and then applied what we know about turf water use in different regions to these acreages to determine total water use in 2000.[2]

[1] According to the National Golf Foundation, in 1998, about 33% of the water supply to golf courses in Region 8 (which includes So Cal, W.AZ and So NV) was supplied from reclaimed water. This percentage was assumed to apply to California. The rest of the water supply to golf courses was from freshwater sources: lakes and streams (22%), wells (32%), public supply(9%), and other (5%). (Thompson, 2002).

Table E-8
Modeled Irrigation Water Use at Golf Courses

Hydrologic Region	Percentage Golf Acreage[1]	Acreage 2000[2]	EV Ratio w.r.t Central Coast[3]	Annual Water Use (AF/Acre)	Modeled Total Irrig. Use (TAF)	GED-derived Estimate of Total Use (TAF)
North Coast	3%	2,945	1.01	2.02	**5.9**	
San Francisco	15%	13,394	1.26	2.52	**33.8**	
Central Coast	7%	6,126	1.00	2.00	**12.3**	
South Coast	46%	41,012	1.37	2.74	**112.4**	
Tulare Lake	5%	4,082	1.80	3.60	**14.7**	
San Joaquin	6%	5,687	1.80	3.60	**20.5**	
Sacramento River	13%	11,211	1.80	3.60	**40.4**	
North Lahontan	1%	544	1.56	3.12	**1.7**	
South Lahontan	4%	3,412	2.08	4.16	**14.2**	
Colorado River	0%	360	2.53	5.06	**1.8**	
Total Irrigation		**88,773**			**258**	**324.6**
Total All End Uses						**341.8**

[1] The number of golf courses was reported by county and we translated this into hydrologic region (California Golf Owners Association 2002). We then converted the number of golf courses in each region into a percentage of the state's total golf course acreage.
[2] The total acreage of golf courses was reported by the California Golf Owners Association (2002) and then distributed among regions based on the percentage of golf courses in each region.
[3] see Appendix D.

Estimate of Potential Savings

By applying the conservation potential calculated in the end use studies (see Appendix D) to our GED-derived estimates of water use, we estimated potential water savings (shown in Table E-9).

Table E-9
Potential Water Savings at Golf Courses (2000)

End Use	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
		Low	**High**	**Best**	**Low**	**High**	**Best**
Irrigation (Freshwater)	211.9[1]	26%	100%	39%	60.1	211.9[2]	88.7
Irrigation (Reclaimed)	112.8[1]	0%	0%	0%	0	0	0
Other	17.1	0%	0%	0%	0	0	0
Total	**341.8**	**26%**	**100%**	**39%**	**55.6**	**82.1xx**	**211.9xx**

[1] According to the National Golf Foundation, in 1998, about 33% of the water supply to golf courses in Region 8 (which includes So Cal, W.AZ and So NV) was supplied from reclaimed water. (Thompson, 2002)
[2] The low and best estimates coincide with the findings in Appendix D while the high estimate includes potential freshwater savings if all freshwater currently used in golf course irrigation (229 AF/year) was replaced with reclaimed water.

Hospitals (SIC code 806)

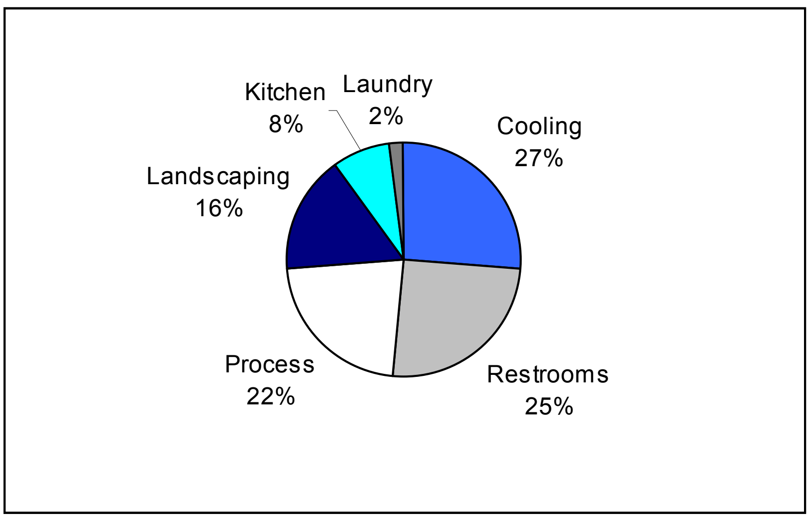
Hospitals are classified under SIC code 80, which also includes physicians' offices (SIC codes 801, 802, and 804), nursing homes and special care facilities (SIC code 805), laboratories and dental clinics (SIC code 807), and outpatient clinics and blood banks (SIC codes 808 and 809). Because the water use in these facilities varies considerably, we focused solely on hospitals (SIC code 806), which are the largest single sub-industry in SIC code 80. Table E-10 and Figure E-3 show water use in hospitals by end-use.

Table E-10
Employment and Water Use in the Hospital Industry (2000)

Industry	SIC code	GED[1,2]	Employees	Annual Use (TAF)
Hospitals	806	124	428,450	36.7

[1] Based on a 225-day year.
[2] Note that the GED coefficients estimated for 1995, were decreased by 20% to obtain the GED coefficients for 2000 for the commercial sector.

Figure E-3
Water Use, by End Use, in the Hospitals



Source: Calculated from MWD audit data of regional hospitals (MWD 2002).

Process Water Description

Hospitals use process water to operate the following equipment:

- X-ray machines (as part of the film development process);
- Steam sterilizers (for sterilizing equipment);
- Washers;
- Autoclaves (for sterilizing equipment);
- Laboratories;
- Boilers;
- Vacuum pumps (for sterilizing environments); and

- Other, misc. processes.

Potential Process Water Savings

Table E-11
Potential Process Water Savings in the Hospital Industry (2000)

Sub-end Use	Water Conservation Measure	Sub-end Use (x) [1]	Technology Savings (c)	Penetration Rate (p)	Conservation Potential (s) [2]
		(percent)			
X-ray	Recirculating x-ray machines[3]	22%	90%[3]	5%[4]	90%
Steam sterilizers	Replace steam sterilizers with ozone based ones; recirculate water where replacement is not possible	23%	70%[5]	50%[6]	65%
Washers	None				
Autoclave	None				
Laboratories	Improve efficiency of reverse osmosis units; install ultrasonically controlled sinks; retrofit sterilizers	1%	20%	30%[6]	20%
Boilers	Recycle boiler condensate	1%	50%	85%[6]	50%
Vacuum pumps	Replace with oil-ring pumps	4%	100%[7]	95%[8]	100%
Other			0%	50%	30%
Total			**52%**		

[1] Estimated from data in three case studies (B&V 1991 (c&d), MWD 1996, B&M, 1995).
[2] Percent Savings Potential = Savings * (1-Penetration)/ (1- Savings*Penetration Rate)
[3] Water Saver/Plus TM units can save 98 percent of water used for x-ray machines (CUWCC 2001). Because this technology is relatively new, only a handful of machines have been retrofitted and we assumed that 95 percent of x-ray machines in California are yet to be replaced.
[4] Estimated from data in CUWCC (2001).
[5] The typical conservation recommendations for sterilizers include installing auto-shutoff valves, running the sterilizer or autoclave with full loads only, and recycling steam condensate and non-contact cooling water from sterilizers as make-up water in cooling towers or boilers. These conservation measures could result in savings up to 60 percent (LADWP 1991). However, more recently a few hospitals have replaced steam sterilization with chemical-based sterilizers, saving both water and energy. Almost 70 percent of a hospital's sterilizing needs can be met without steam (Scaramelli and Cohen 2002).
[6] Estimate based on how many years the technology has been around
[7] Converting from water ring pumps to oil ring pumps eliminate water use altogether. Where steam must be used, recirculation is increasingly becoming common (Scaramelli and Cohen 2002).
[8] Oil-ring vacuum pumps currently dominate 80 percent of the market, about 17 percent are oil-less, and roughly 3 percent are still water-ring pumps (Britain 2002).

Estimate of Potential Savings

By applying the conservation potential calculated in the end use studies (see Appendix D) and Table E-11 to our GED-derived estimates of water use, we estimated potential water savings (shown in Table E-12).

Table E-12
Potential Water Savings in the Hospital Industry (2000)

End Use	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
		Low	**High**	**Best**	**Low**	**High**	**Best**
Cooling	9.6	9%	41%	26%	0.9	4.0	2.5
Restrooms	9.2	47%	47%	47%	4.3	4.3	4.3
Process	8.1	39%	57%	52%	3.1	4.6	4.2
Landscaping	5.9	38%	53%	50%	2.2	3.1	2.9
Kitchen	2.9	20%	20%	20%	0.6	0.6	0.6
Laundry	0.7	42%	42%	42%	0.3	0.3	0.3
	36.7	**31%**	**46%**	**40%**	**11.4**	**16.8**	**14.8**

Laundries (SIC code 721)

SIC code 721 consists of a range of facilities that include carpet and upholstery cleaners, large linen rental companies, and a variety of laundries, including industrial laundries that clean rags used to wipe inks and solvents off equipment. We include all laundries except SIC code 7215, coin laundries. Table E-13 shows employment and gallons per employee per day coefficients. Figure E-4 shows laundry end-use estimates. As expected, most water use in this industry goes to washing clothes, though about 15% goes to other end uses.

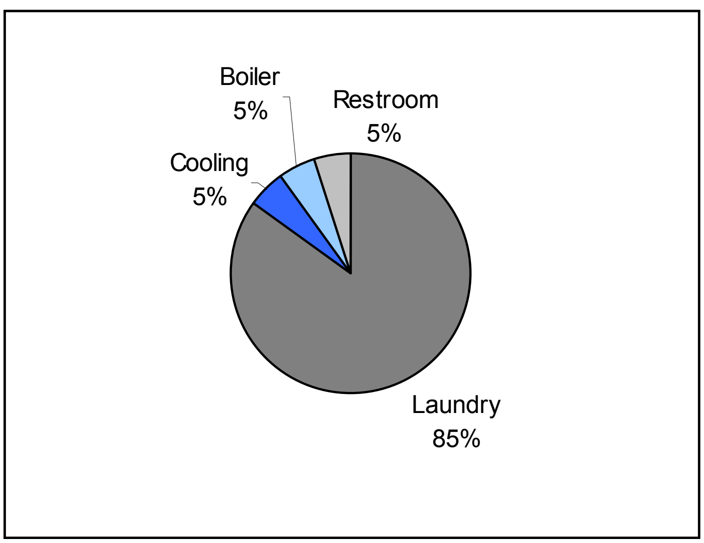
Table E-13
Employment and Water Use in the Laundry Industry (2000)

Sub-industry	SIC code	GED[1,2]	Employees	Annual Use (TAF)
Dry cleaning & laundry	7216	981	21,410	14.5
Linen supply	7213	977	7,860	5.3
Carpet & upholstery	7217	984	5,890	4.0
Industrial launderers	7218	981	9,150	6.2
Total	**49,965**		**44,310**	**30.0**

[1] Based on a 225-day year.
[2] Note that the GED coefficients estimated for 1995, were decreased by 20% to obtain the GED coefficients for 2000 for the commercial sector.

In the laundry industry, water is used primarily to remove soil and odors from textiles through laundering and very little water (<15 percent) is used for other purposes.

Figure E-4
Water Use, by End Use, in the Laundry Industry



Source: Based on average of two laundry case studies (AWWARF 2000)

Estimate of Potential Savings

By applying the conservation potential calculated in the end use studies (see Appendix D) to our GED-derived estimates of water use, we estimated potential water savings (as shown in Table E-14).

Table E-14
Potential Water Savings in the Industrial Laundry Industry (2000)

	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
End Use		**Low**	**High**	**Best**	**Low**	**High**	**Best**
Laundry	25.5	42%	66%	54%	10.8	16.9	13.8
Cooling	1.5	9%	41%	26%	0.1	0.6	0.4
Boiler[1]	1.5	0%	25%	10%	0.0	0.4	0.2
Restroom	1.5	34%	34%	34%	0.5	0.5	0.5
Total	**30.0**	**38%**	**61%**	**49%**	**11.4**	**18.4**	**14.8**

[1] Assumed Range

Restaurants (SIC code 58)

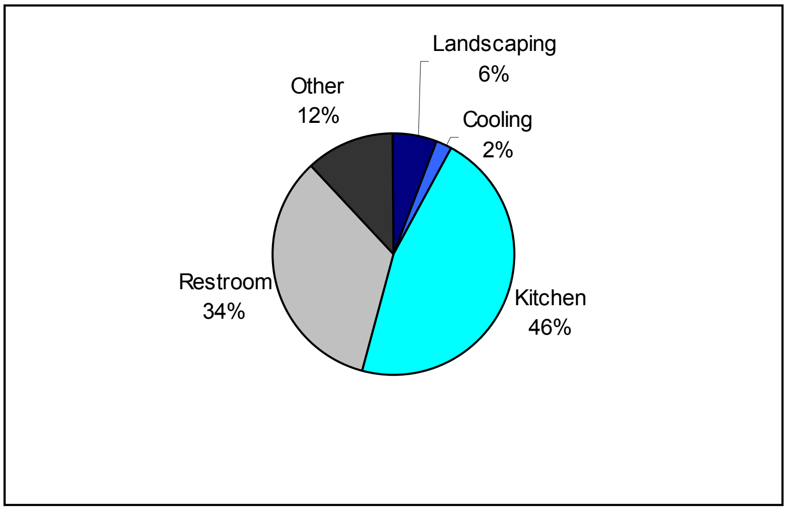
Water is used in restaurants primarily for kitchen purposes, such as washing dishes, making ice, and preparing food (see Appendix D for a description of these uses). A significant amount of water is also used for restrooms. Table E-15 and Figure E-5 provide our estimates of total water use in the restaurant industry by end use.

Table E-15
Employment and Water Use in the Restaurant Industry (2000)

Industry	**SIC code**	**GED[1,2]**	**Employees**	**Annual Use (TAF)**
Restaurants	58	265	890,600	163.0

[1] Based on a 225-day year.
[2] Note that the GED coefficients estimated for 1995, were decreased by 20% to obtain the GED coefficients for 2000 for the commercial sector.

Figure E-5
Water Use, by End Use, in the Restaurant Industry



Source: Calculated from MWD audit data of 89 restaurants (MWD 2002).

Comparison of GED-derived Estimate to Modeled Water Use

We modeled water use in restaurants using published estimates of restroom visits by employees and customers, irrigated turf area, cooling requirements, dishwashing water use etc. We converted our GED-derived estimate of water use per employee into water use per meal and then compared it to that predicted by the water use model. To convert the GED-derived estimate, we first divided the amount of water used in the restaurant sector in 2000 by the number of meals eaten to calculate the average gallons/meal/day.

Because the number of meals eaten at California restaurants per day was not available, we estimated this number with two different methods (see Tables E-16 and E-17).

Table E-16
Number of Meals Served in California (2000), Method One

Data	Source	Value (2000)
A) Employees in California	US Census Bureau	895,000
B) Meals/employee/day	Average of restaurants[1]	15
C) Total meals/day in California	A*B	13,500,000
D) Percentage of drive-through meals	Restaurant USA	18%
E) Take out meals/day	C*D	2,400,000
F) Sit down meals/day	C-E	11,100,000

[1] Average of data from several case studies (LADWP, 1991 (a & b), MWD, 1992, MWRA, 1990)

Table E-17
Number of Meals Served in California (2000), Method Two

Data	Source	Value (2000)
A) Population in California in 2000	US Census Bureau	33,800,000
B) Meals eaten out/week	Restaurant USA	4.2
C) Total meals/day in California	A*B/7	18,200,000
D) Fraction of meals eaten at cafeterias (not in SIC code 58)	Fraction of establishments not included in SIC code 58	25%[1]
E) Meals in SIC code 58	C*(1-D)	13,700,000
F) Percentage of drive-through meals	Restaurant USA	18%
G) Number of drive-through meals	D*E	2,500,000
H) Sit-down meals/day in restaurants	D-F	11,200,000

[1] We used the number of establishments (74,000) published by the California Restaurants Association (www.calrest.org). The number listed under SIC code 58 (57,000), is about 77 percent of the total restaurants.

To model the water use in a medium-sized restaurant, we considered a food establishment with 25 employees and 60 seats. The meal turnover industry average of 5 meals/seat/day (or 250 meals/day) (LADWP, 1991 (a & b), MWD, 1992, MWRA, 1990) was applied to end-use data from Appendix D.

Table E-18
Modeled Daily Water Use in Restaurants (2000)

Water End Use	Volume[1]	Times Per Day[1]	Use Gal/Day	Use Gal/Meal/Day	Use Efficient Gal/Meal/Day[2]
Dishwasher					
Pre-rinse nozzles	2.5 gpm	60 min	150	0.6	0.40
Pot and pan sink	40 gal	3 sinks * 2 fills[3]	300	1.20	1.20
Garbage disposal	4.5 gpm	30 min	135	0.54	0.20
Dishwasher	2.4 gal/rack	0.5 racks/meal, 70 percent capacity[4]	429	1.71	0.79
Restrooms[5]					
Employee use restrooms	2.8 gal/visit	25 employees * 4.6 visits/day gal/day	322	1.3	0.72
Customer use restrooms	2.7 gal/visit	250 customers *50 percent of customers	338	1.4	0.79
Food Prep					
Preparation sink	15 gal	2 fills/day	30	0.12	0.12
Water used in food	0.5 gal/meal	250 meals/day	125	0.50	0.50
Icemaker					
Ice maker	1 gal/lb[6]	1.5 lb/meal[7]*250 meals	338	1.5	1.2
General Sanitation					
Floor wash	12 gal/clean	3 cleans[8]	36	0.14	0.14
Other[9]	30 gal		125	0.50	0.50
Miscellaneous	100 gal		100	0.40	0.40
Total			**25,607**	**9.91**	**6.96**

[1] Volume and use were estimated from data in several case studies (LADWP, 1991 (a & b), MWD, 1992, MWRA, 1990), except where otherwise noted.
[2] See Appendix D
[3] Three pot sinks of 50 gallons capacity are filled and emptied twice daily.
[4] The amount of dishes generated was assumed to be 2.5 racks/guest (Bohlig 2002).
[5] See Appendix D.

[6] Ice used per meal was about 1.5 lbs and icemaker water use of 1 gal/lb was assumed (note that one gallon of water produces only one pound of ice because, during the process, several gallons are lost to bleed-off.
[7] ASHRAE 1994
[8] Assuming the restaurant uses about 25 gallons each time it cleans the floor and counters and it does this twice daily.
[9] The restaurant uses 100 gallons daily in other uses including laundry and landscaping (about 5 percent of total use). The restaurant does not have a cooling tower.

Our comparison of the GED-derived and modeled estimates is shown in Table E-19 below.

Table E-19
Comparison of Estimates of Water Use in a Typical Restaurant

	GED-derived (gallons/meal)	Model 1 (typical use)	Model 2 (efficient use)
Total	12.9[1]	9.9	7.0

[1] Using 163 TAF in 2000 for SIC code 58 and dividing this by the number of meals per day and then by 365 days in a year, we got about 12.9 gal/meal.

Estimate of Potential Savings

By applying the conservation potential calculated in the end use studies (see Appendix D) to our GED-derived estimates of water use, we estimated potential water savings (shown in Table E-20).

Table E-20
Potential Water Savings in the Restaurant Industry (2000)

	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
End Use		**Low**	**High**	**Best**	**Low**	**High**	**Best**
Landscaping[1]	9.8	38%	53%	50%	3.7	5.2	4.9
Cooling	3.3	9%	41%	26%	0.3	1.4	0.8
Kitchen	75.0	20%	20%	20%	14.9	14.9	14.9
Restrooms	55.4	46%	46%	46%	25.2	25.2	25.2
Other[2]	19.6	0%	25%	10%	0.0	4.9	2.0
Total	**163.0**	**27%**	**32%**	**29%**	**44.0**	**51.5**	**47.7**

[1] Based on our modeled landscaping use, we assumed that about 18 TAF, or 4 percent, of total restaurant use is used for landscaping. The remaining 13 TAF, or 6 percent, of the other/landscaping category was used for other purposes. See Appendix D for more information on landscaping.
[2] Range assumed

Retail Stores (SIC codes 53, 54, 55, 56, 57, 59)

Retail stores include grocery stores, department stores, gas stations, and non-store retailers (i.e., retailers who work from home). In 2000, there were nearly 800,000 retail stores in the state. Due to known differences in water use, we categorize retail establishments as grocery stores or "miscellaneous retail" stores. These are shown in Table E-21 and Figure E-6 and Figure E-7.

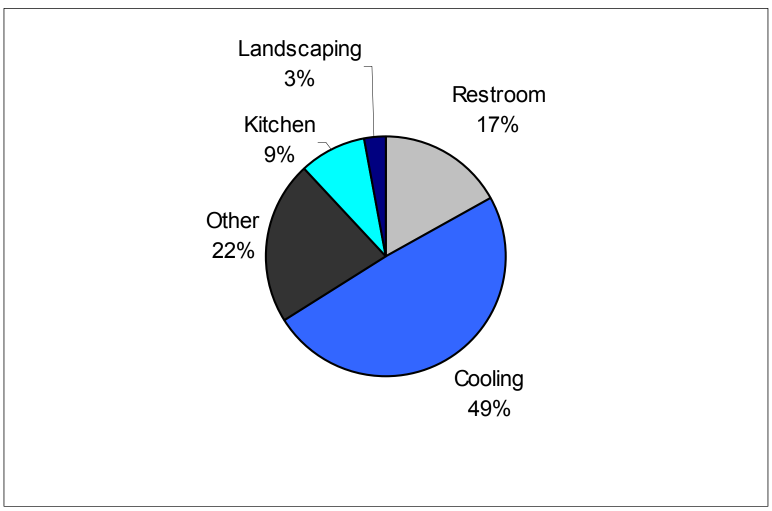
Table E-21
Employment and Water Use in the Retail Industry (2000)

Sub-industry	SIC code	GED[1,2]	Employees	Annual Use (TAF)
Grocery	540	170	293,224	34.5
Misc. Retail	53,55,56,57,59	152	1,128,210	118.1
Total			**1,421,434**	**153.0**

[1] Based on a 225-day year.
[2] Note that the GED coefficients estimated for 1995, were decreased by 20% to obtain the GED coefficients for 2000 for the commercial sector.

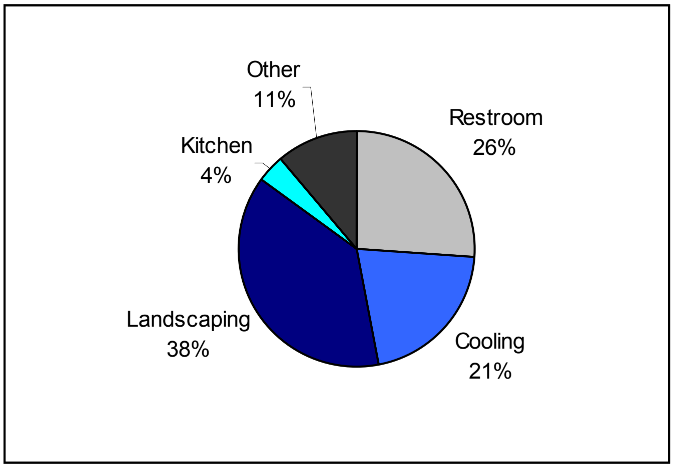
Retail stores use water in kitchens and restrooms and for cooling and irrigation. Although no process water is typically used in the Retail industry, water use varies considerably among the different types of retail stores. For example, grocery stores use water more intensively than other retail stores because they have sinks and dishwashing nozzles in meat and deli departments, misters to keep produce moist, and ice makers. In contrast, department and other retail stores use water mostly for restrooms and space cooling.

Figure E-6
Water Use, by End Use, in the Grocery Sub-industry



Source: Calculated from MWD audit data of 45 grocery stores (MWD 2002).

Figure E-7
Water Use, by End Use, in Misc. Retail Sub-industries



Source: Calculated from MWD audit data of 38 miscellaneous retail stores (MWD 2002).

Comparison of GED-derived Estimate to Modeled Water Use

We could not create a complete model of typical water use because of data insufficiency on kitchen and cooling water use in retail establishments. However, we did compare our GED-derived estimates to some of the various end uses that were calculated in Appendix D, as shown in Table E-22.

Table E-22
Comparison of Estimates of Annual Water Use in the Retail Industry

End Use	Modeled End Use	GED-derived Use
	(TAF)	
Kitchen	n/a	7.8
Restrooms	22.5	36.6
Cooling	n/a	41.7
Landscaping	33.7	45.9
Other	n/a	20.6
Total		**153**

Estimate of Potential Savings

By applying the conservation potential calculated in the end use studies (see Appendix D) to our GED-derived estimates of water use, we estimated potential water savings (shown in Table E-23).

Table E-23
Potential Water Savings in Grocery Stores (2000)

Grocery End Use	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
		Low	High	Best	Low	High	Best
Restroom	5.9	51%	51%	51%	3.0	3.0	3.0
Cooling	16.9	9%	41%	26%	1.6	7.0	4.3
Landscaping	1.0	38%	53%	50%	0.4	0.5	0.5
Other	7.6	0%	25%	10%	0.0	1.9	0.8
Kitchen	3.1	20%	20%	20%	0.6	0.6	0.6
Total	**34.5**	**16%**	**38%**	**27%**	**5.6**	**13.1**	**9.2**

Table E-24
Potential Water Savings in the Other Retail Stores (2000)

Misc. Retail End Use	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
		Low	High	Best	Low	High	Best
Restroom	30.7	44%	51%	51%	51%	15.7	15.7
Cooling	24.8	7%	9%	41%	26%	2.4	10.3
Landscaping	44.9	47%	38%	53%	50%	16.9	23.7
Other	13.0	0%	0%	25%	10%	0.0	3.2
Kitchen	4.7	20%	20%	20%	20%	0.9	0.9
Total	**118.1**	**28%**	**43%**	**37%**	**33.2**	**50.9**	**43.4**

Schools (SIC codes 8219, 9382)

There are 8,330 public and 4,370 private schools in California, including elementary, middle, high, continuing, and vocational schools. Total enrollment (public and private) was 4.73 million in elementary and middle schools, 1.85 million in high schools, and 2.20 million in other[3] types of schools (CDE 2002, California Postsecondary Education Commission 2002).

Table E-25
Employment and Water Use in Schools (2000)

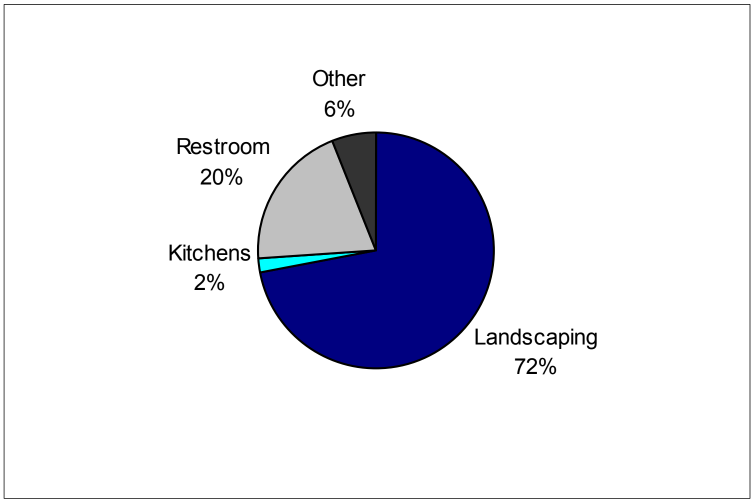
Sub-industry	SIC	GED[1,2]	Employees	Annual Use (TAF)
K-12		308	1,009,130	214.6
Other		190	280,200	36.7
Total			**1,289,300**	**251.3**

[1] Based on a 225-day year.
[2] Note that the GED coefficients estimated for 1995, were decreased by 20% to obtain the GED coefficients for 2000 for the commercial sector.

Although most schools use water for restrooms, cooling and heating, irrigation, and kitchens, the percentage of water consumption devoted to different end uses varies among schools. The most significant difference appears to result from the large use of irrigation water in schools with athletic fields. High schools generally have more irrigated athletic field area per student than elementary schools or other types of schools. Because the end use percentages can vary greatly among the different types of schools, we analyzed water use in elementary/middle schools, high schools, and other schools separately (see Figures E-8 and E-9).[4]

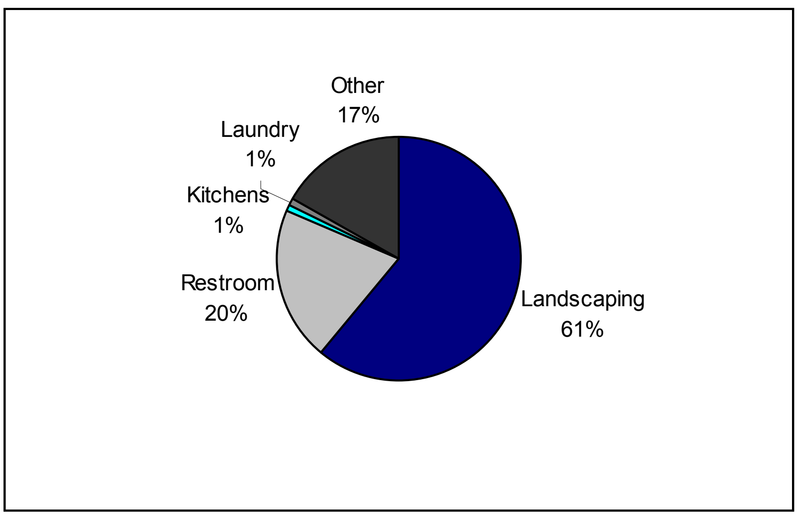
[3] Other types of schools, as referred to herein, include colleges, universities, trade schools, and other non-K-12 schools.
[4] In some cases we had enough data to also analyze elementary and high schools separately.

Figure E-8
Water Use, by End Use, in K-12 Schools



Source: Calculated from MWD audit data of 149 schools (MWD 2002).

Figure E-9
Water Use, by End Use, Other Schools



Source: Calculated from MWD audit data of selected non-K-12 schools (MWD 2002).

Comparison of GED-derived Estimate to Modeled Water Use

We modeled water use in schools using published estimates of restroom visits by students and staff, irrigated turf area, cooling requirements, etc. We converted our GED-derived estimate of water use per employee into water use per student per day and then compared it to that predicted by the water use model. The end use calculations in the GED-derived estimate are from Figures E-8 and E-9 and the model's assumptions are derived from the end-use data in Appendix D. Table E-26 shows the results.

Table E-26
Modeled Water Use per Student

End Uses	Unit Measuring Area or Volume of Use	Area or Volume	Unit Measuring Frequency of Use	Frequency of Use	Total gal/ student/ day
Elementary and Middle Schools					
Irrigation[1]	irrigated acres/student	0.004	gal/acre/school day	varies	24.3
Toilet[2]	gpf	3.00	visits/day	2.11	6.3
Urinal[3]	gpf	1.60	visits/day	1.01	1.6
Faucet Use[4]	gpf	0.11	flushes/day	3.12	0.3
Kitchen	gal/meal	9.91[5]	meals/day/student	0.4[6]	4.0
Other[7]					2.0
Total					**38.5**
High Schools					
Irrigation[1]	irrigated acres/student	0.008	gal/acre/school day	varies	55.6
Toilet[2]	gpf	3.00	visits/day	2.11	6.3
Urinal[3]	gpf	1.60	visits/day	1.01	1.6
Faucet Use[4]	gpf	0.11	flushes/day	3.12	0.3
Kitchen	gal/meal	9.91[5]	meals/day/student	0.4[6]	4.0
Other[7]					4.0
Total					**71.8**
Other Schools					
Irrigation	irrigated acres/student	0.002	gal/acre/school day	varies	6.9
Toilet[8]	gpf	3.00	visits/day	1.03	3.1
Urinal[9]	gpf	1.60	visits/day	0.39	0.6
Faucet Use	gpf	0.11	min/day	0.96	0.1
Kitchen	gal/meal	9.91	meals/day/student	0.4	4.0
Other					1.0
Total					**15.7**

1

2 Assuming that each K-12 student and staff uses the toilet 1.95 times per day (see Appendix D) and a student-staff ratio of about 11.8 (based on student enrollment obtained from the Educational Demographics Office (2002) and employment data from California Employment Development Department (2002), we calculated 2.11 daily toilet visits per K-12 student.

3 Assuming that each K-12 student and staff uses urinals 0.94 times per day (see Appendix D) and a student-staff ratio of about 11.8 (Based on Student Enrollment obtained from the Educational Demographics Office (2002) and Employment Data from California Employment Development Department (2002)), we calculated 1.01 daily urinal visits per student.

4 Faucet use was based on the number of daily toilet and urinal flushes reported above.

5 Average gal/meal was obtained from the model in Appendix D.

6 The USDA estimated that there were about 489 million school meals served in 2000 (about 2.7 million meals per day). The total enrollment in California's public and private schools is about 6.6 million, implying about 40 percent of students have cafeteria meals.

7 Other use is estimated at 5 percent of total use and includes cooling, pools, etc.

8 Assuming that each non K-12 student uses the toilet 0.86 times per day and staff uses the toilet 1.95 times per day and a student-staff ratio of 11.8, we calculated 1.03 daily visits per non K-12 student.

9 Assuming that each non K-12 student uses urinals 0.31 times per day and staff uses them 0.94 times per day and a student-staff ratio of 11.8, we calculated 0.39 daily visits per student.

Table E-27
Comparison of Estimates of Water Use in Typical Schools

	GED-Based Estimate[1]	Modeled Estimate
	(gal/student/day)	
Elementary and middle schools	48.1	38.5
High schools	87.4	71.8
Other schools	30.5	15.8

[1] Based on the assumption that elementary and middle school students use 55 percent of the water used by high schools students (see Table E-26), we converted elementary and middle students into 2.60 million "additional" high school students. We then divided total K-12 water use (215 TAF) by the number of high school students plus the "additional" high school students to yield 87.43 gallons/high school student/school day. Then, we took 55 percent of the high school use in gal/student/day to get gallons/K-8 student/day. For gallons/other student/day, we divided total other use by the number of other students and then by the number of school days.

Estimate of Potential Savings

By applying the conservation potential calculated in the end-use studies (see Appendix D) to our GED-derived estimates of water use, we estimated potential water savings (shown in Table E-28 and E-29).

Table E-28
Potential Water Savings in K-12 Schools (2000)

K-12 End Uses	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
		Low	High	Best	Low	High	Best
Landscaping	154.5	38%	53%	50%	58.1	81.6	77.1
Kitchens	4.3	20%	20%	20%	0.9	0.9	0.9
Restroom	42.9	45%	45%	45%	19.4	19.4	19.4
Other	12.9	0%	25%	10%	0.0	3.2	1.3
Total K-12	**214.6**	**36%**	**49%**	**46%**	**78.3**	**105.1**	**98.6**

Table E-29
Potential Water Savings in Other Schools (2000)

Other Schools End Uses	Water Use (TAF)	Conservation Potential (percent)			Conservation Potential (TAF)		
		Low	High	Best	Low	High	Best
Landscaping	26.4	38%	53%	50%	9.9	14.0	13.2
Kitchens	8.8	45%	45%	45%	4.0	4.0	4.0
Restroom	0.4	20%	20%	20%	0.1	0.1	0.1
Laundry	0.4	42%	66%	54%	0.2	0.2	0.2
Other	0.7	0%	25%	10%	0.0	0.2	0.1
Total Higher and Special-Ed.	**36.7**	**39%**	**50%**	**48%**	**14.1**	**18.4**	**17.5**

Appendix F

Details of Industrial Water Use and Potential Savings, by Sector

Meat Processing (SIC code 201)

The Meat Processing industry includes establishments primarily engaged in packing meat, manufacturing sausages and other prepared meat products, and poultry slaughtering and processing. Table F-1 shows water-use coefficients and total estimated water use in this sector in 2000. Figure F-1 shows water use in this sector by end use. Most water goes to processing meat, though a substantial amount is also used for cooling.

Table F-1
Employment and Water Use in the Meat Processing Industry (2000)

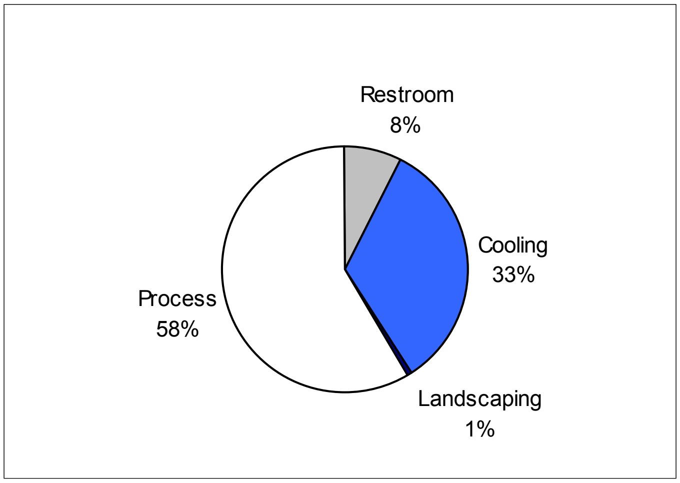
Sub-industry	SIC code	Employees	GED[1,2]	Water Use (TAF)
Poultry processing	2015	7,110	1,365	6.7
Animal (except poultry) slaughtering	2011	4,170	1,477	4.3
Seafood (estimated)	2011	2,790	772	1.5
Meat processed from carcasses	2013	4,930	772	2.6
Total	**201**	**19,000**	**1,149**	**15.1**

[1] Based on a 225-day year.
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector.

Water Use

Meat Processing plants use water primarily for sanitizing animal holding areas, scalding, meat washing, chilling, waste fluming, and cleaning and disinfecting equipment. The industry is heavily regulated and in 1998 it implemented new regulations, called Hazardous Analysis Critical Control Points (HACCPs), which specify the minimum amount of water required for specific operations, such as scalding and chilling. Due primarily to these regulations, water-use intensity (gallons of water per animal or bird processed) has actually increased since the late nineties (Woodruff 2000).

Figure F-1
Water Use, by End Use, in the Meat Processing Industry



Source: Calculated from MWD audit data of two meat-processing plants (MWD 2002).

Process Water Conservation Potential in Poultry Processing

While qualitative information on process water use and potential savings in the Meat Processing industry was available, quantitative data on water use for sanitation, chilling, and scalding and penetration rates were limited.

Sanitation

Information on potential sanitation savings in poultry processing included:

- Poultry plants in California are largely located in the Central Valley where water and sewer charges are comparatively low. Data from one case study indicated that while significant savings are possible from basic improvements in housekeeping techniques, these are not economical in the absence of higher wastewater charges (North Carolina Cooperative Extension 1999).
- Some plants are still using water extremely inefficiently because plant managers do not want to risk implementing water conservation measures at the expense of having the plant shut down under the 1998 HACCP regulations (Woodruff 2000). Consequently, the productivity of water use in this sector has actually declined in recent years.
- Potential savings from good housekeeping appear to be moderate in California's Meat Processing Industry (Lelic, personal communication, 2002).

Based on the information listed above, we assumed that potential savings from various sanitation measures could range anywhere from 20 to 80 percent, although the sources seemed to point toward the lower end of this range. Consequently, we chose 40 percent as our best estimate of typical savings per site.

Chilling and Scalding

In addition to savings from sanitation, some poultry processing plants are using bubbled accelerated floatation (BAF), ultra-filtration, ozone treatment, and recycling for the clean up and recycling of poultry chilling and scalding water. Chilling and scalding water use can be decreased by up to 80 percent with these techniques and (Carawan and Sheldon 1989), to remain conservative in our estimates; we assumed 70 percent per site. The penetration rate of these technologies was estimated at 30% based on the results of the 1997 CIFAR Survey (Pike 1997). The survey indicated that water reuse technologies averaged about 25% in the "All" Category. Since Fruit and Vegetable Processors had much higher penetration rates, meat and poultry were estimated to have lower penetration rates.

Process Water Savings in the Meat Processing Industry

We used the above information about poultry processing to calculate potential process water savings in the Meat Processing industry as a whole, as shown below in Table F-2

Table F-2
Potential Process Water Savings at a Meat Processing Plant (2000)

Process Sub-end Use	Measure	Sub-end Use (x percent)[2]	Site Savings (c percent)	Penetration Rate (p percent)	Savings Potential (s percent)[5]
Sanitation	Good housekeeping	(60%)	40%[3]	(40%[3,4])	29%
Chilling	Recirculate water	(10%)	70%[6]	(20%[7])	65%
Scalding	Recirculate water	(10%)	No Savings	N/A	N/A
Utility		(20%)	No Savings	N/A	N/A
Total process savings potential		**100%**	**23%[8]**		

[1] Note that savings in the a meat processing plant are taken from our estimate of savings in a poultry processing plant.
[2] This breakdown is a guess – no data was available.
[3] Estimated from conversations with Lelic (2002).
[4] Estimated from the general industry feeling (conveyed by Woodward (2002) and the industry literature) that HACCP regulations are preventing the implementation of some of these measures.
[5] Percent Savings Potential = Savings * (1-Penetration)/ (1- Savings*Penetration Rate)
(See Appendices C and D for derivation)
[6] Estimated from data presented by the North Carolina Cooperative Extension (1999).
[7] Estimated based on overall application of reuse of cooling water, rinse, wash water etc. from the 1997 CIFAR Survey
[8] Σx% * s%. (See Appendices C and D for derivation)

Estimate of Potential Water Savings

The conservation potential for common end uses was calculated in the end use studies (see Appendix C) and then applied to our GED-derived estimate of water use to get potential water savings for these end uses. To get the conservation potential for the Meat Processing industry's process water use, we used data from poultry processing (see Table F-1 above). A sensitivity analysis was applied to our best guess penetration rates to obtain a high and low estimate.

Table F-3
Potential Water Savings in the Meat Processing Industry (2000)

End Use	Water Use (TAF)	Conservation Potential (percent)			Potential Savings (TAF)		
		Low	High	Best	Low	High	Best
Process	8.8	14%	29%	25%	1.2	2.5	2.2

Cooling	5.0	9%	41%	26%	0.5	2.1	1.3
Restroom	1.1	49%	49%	49%	0.6	0.6	0.6
Landscaping	0.1	38%	53%	50%	0.0	0.1	0.1
Total	**15.1**	**15%**	**35%**	**27%**	**2.3**	**5.2**	**4.1**

Comparison with Industry Benchmarks

To crosscheck our estimate of conservation potential, we estimated the amount of water necessary to process one animal and compared it to industry efficiency benchmarks from the North Carolina Department of Environment and Natural Resources (NCDENR et al. 1998). Unfortunately, we had benchmarks for only cattle and broilers and we had to estimate water requirements for processing hogs, sheep, and turkeys. We made the following assumptions[1]: processing a hog required about one-fifth the water used to process one head of cattle; processing a sheep required about one-eighth the water used to process one head of cattle; and processing turkeys required twice as much water per bird as broilers. When we compared our calculated use to what is considered efficient water use industry-wide (see Table F-4 below), we found that total water use in California's Meat Processing industry could be reduced by 33 to 50 percent if all plants operate at the maximum level of efficiency.

Table F-4
Comparison of Estimated Water Use to Efficient Water Use in Meat Processing

Sub-industry	**Water Use in 1995 (TAF)**	**Production [1]**	**Efficient Water Use (gal/head)**	**Estimated Water Use (gal/head)**
Poultry	Broiler – 6.5 Turkey – 1.2 Chicken – 0.4	22 Mn Turkey 235 Mn Broilers 13 Mn Chicken	Gal / Bird [2] Broiler – 6.0 Turkey – 12.0	Gal / Bird Broiler – 9.0 Turkey – 18.0
Animal Slaughter	Beef Cattle – 1.8 Hogs/Pigs – 0.25 Sheep – 0.05	1.9 Mn Cattle 1.2 Mn Hogs 0.38 Mn Sheep	Gal/ Head 150 [3]	Gal/Head Cattle –300 Hogs – 60 Sheep – 40

[1] California Agricultural Statistical Services 1995
[2] Woodruff (2000) states that under the new health guidelines it is unlikely that water use can return to the 4 gal/bird efficiency benchmark mentioned in the North Carolina CII Water Efficiency Manual (1998) and that a benchmark of 6 gal/bird is more realistic
[3] NCDENR et al. 1998

[1] We based these assumptions on the ratio of their average weights (National Agricultural Statistics Service 2000).

Dairy Products (SIC code 202)

Industry Description

The Dairy industry includes establishments primarily engaged in manufacturing: butter; cheese; dry, condensed, and evaporated milk;[2] ice cream and frozen dairy desserts; and special dairy products. SIC code 202 covers only milk processing plants and not dairy farms.

Table F-5
Employment and Water Use in the Dairy Products Industry (2000)

Sub-industry	SIC code	Employment	GED[1,2]	Water Use (TAF)
Creamery butter	2021	540	5,319	2.0
Cheese, natural and processed	2022	4,200	2,078	6.0
Dry, condensed products	2023	2,380	1,071	1.8
Ice cream and frozen desserts	2024	2,350	1,071	1.7
Fluid milk	2026	6,540	1,292	5.8
Total	**202**	**16,010**	**1,568**	**17.3**

[1] Based on a 225-day year.
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector.

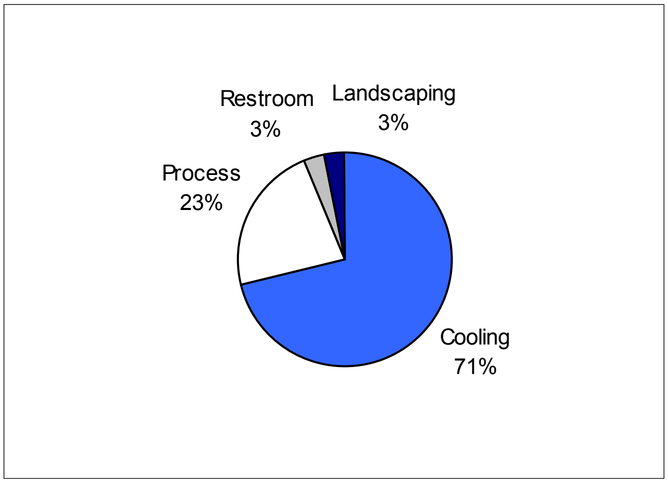
Water Use

The Dairy industry uses water primarily for cooling and, to a lesser degree, for the following process uses (see Figure F-2):

- Sanitize equipment and work areas (industry sanitation standards require that all equipment in contact with a fluid food product must be cleaned every 24 hours);
- Heat and boil milk and milk products;
- Product cooling.

[2] This includes plants that pasteurize, homogenize, add vitamins to, and bottle fluid milk for wholesale or retail distribution.

Figure F-2
Water Use, by End Use, in the Dairy Products Industry



Source: Calculated from MWD audit data of three dairy processing plants (MWD 2002).

Process Water Conservation Potential

California's Dairy industry has not been surveyed since the 1970s and, therefore, actual penetration rates of various water conservation technologies were not available. All penetration rate information obtained for the Dairy industry was estimated from discussions with industry experts and various reports (see Table F-6 below).

Table F-6
Process Water Savings in a Dairy Processing Plant

Measure	Process Water Saved (percent)	Penetration Rate
Eliminate continuous running of carton cleaning water		Most plants[1]
Recirculate carton cleaning water		
Recirculate carton cooling water		
Reverse osmosis of pre-rinse effluent to recover by-product and water	4%[2]	Potential for most plants[2]
Optimize process runs		Most plants[1]
Collect tank acid rinse water to use as pre-wash in next cleaning cycle		No plants (too expensive)[2]
Reuse cow water in nondairy operations like cooling towers and boilers	25%[3]	
Use a reverse osmosis system to upgrade the "cow water" to potable quality	50-60%[3]	Few plants (expensive)
Reverse osmosis to recover water from whey		Few plants

[1] Bruhn, personal communication, 2002.
[2] CIFAR (1995b).
[3] Estimated from data presented in Pequod Associates (1992).

Table F-7
Potential Process Water Savings in the Dairy Processing Industry (2000)

Sub-end Use	**Measure**	**Sub-end Use (x percent)[1]**	**Savings (c percent)**	**Best Est. Penetration Rate (p percent)[2]**	**Savings Potential[3] (s percent)**
Carton washing	Eliminate continuous flow, recirculate carton cleaning and washing water	7%	(30%)[4]	90%	4%
Cold storage	Use cow water	3%	25%	70%	30%
Utilities	Use cow water	35%	25%	70%	30%
Sanitation of equipment, filling room, receiving[6]	Recycle dilute rinses, optimize runs to clean less often, upgrade cow water through reverse osmosis to replace potable water	50%	(10%)[4] (10%)[4] 60%[5]	20% 70% 20%	28%
Consumptive	none	5%	0%		
Total process savings potential = Σ x% * s%[7]		**100%**	**25%**		

[1] Estimated from data presented in Carawan et al. (1979) and Danish EPA (1991)
[2] All penetration rates are developed from the qualitative information described in Table F-6. Thus 90% = "Very High/Most Plants", 70% = "High", 20% = "Low"
[3] Percent Savings Potential = Technology Savings * (1-Technology Penetration Rate)/ (1-Savings*Penetration Rate)
[4] Estimate from MnTAP 1994b.
[5] Calculated from data presented in Pequod Associates (1992).
[6] These technologies are complementary, so the overall savings are additive.
[7] see Appendices C and D for derivation

By applying penetration rates from various case studies, the range of the savings in process water was estimated to be between 19 and 28 percent.

Estimate of Potential Water Savings

The conservation potential for common end uses was calculated in the end use studies (see Appendix C) and then applied to our GED-derived estimate of water use to get potential water savings for these end uses. We used data from Table F-7 above for the estimate of potential process water savings (Table F-8).

Table F-8
Potential Water Savings in the Dairy Processing Industry (2000)

	Water Use (TAF)	**Conservation Potential (percent)**			**Potential Savings (TAF)**		
End Use		**Low**	**High**	**Best**	**Low**	**High**	**Best**
Cooling	12.3	9%	41%	26%	1.2	5.1	3.2
Process	4.0	20%	28%	25%	0.8	1.1	1.0
Restroom	0.5	49%	49%	49%	0.3	0.3	0.3

Landscaping	0.5	38%	53%	50%	0.2	0.3	0.3
	17.3	**14%**	**39%**	**27%**	**2.4**	**6.8**	**4.7**

Comparison with Industry Benchmarks

Our estimate of conservation potential in the Dairy industry was crosschecked against industry benchmarks of water use per gallon of milk produced (Table F-9).

Table F-9
Water Use per Gallon of Milk Produced

Water Use	**Gal/gal of Milk[1,2]**	
	1970's	**1990's**
Efficient	2.28	0.5-1.0[3]
Median	3.35	1.4-2.6
High	9.74	

[1] COWI 1991 (reported in liters)
[2] Using 1 gallon of water = 3.78 liters, 1 gallon of milk = 3.9 kg
[3] Bough and Carawan 1992; NC Division of Pollution Prevention and Environmental Assistance 1998 (http://www.p2pays.org/ref/01/0069206.pdf).

About 660 million gallons of milk were used to produce fluid milk in 2000 (California Dairy Forum 2000). From the GEDs we estimated that about 5,750 AF of water was used in fluid milk manufacturing in that year and this translates to roughly 2.8 gallons of water per gallon of milk produced. Given this water consumption, potential water savings could be as high as 65 percent, indicating that our estimate of 16 percent in 2000 is possibly a conservative estimate.

Preserved Fruits and Vegetables (SIC 203)

Industry Description

The Preserved Fruits and Vegetables industry includes processing fresh produce in the following ways: canning (SIC codes 2032 and 2033); dehydration (SIC code 2034); freezing (SIC codes 2037 and 2038); and pickling (SIC code 2035). Fruit and vegetable canning (SIC code 2033) accounts for half of the water used by SIC code 203. Tomato processors constitute the single largest sub-industry, using an estimated 30 percent of the industry's total water use. Peaches, olives, apricots, and pears are among the most important fruits and vegetables processed. Table F-10 shows water coefficients and total water use in SIC code 203. Figure F-3 shows water use by end use. Most water goes to process requirements.

Table F-10
Employment and Water Use in the
Preserved Fruits and Vegetables Industry (2000)

Sub-industry	SIC code	GED[1,2]	Employees	Water Use (TAF)
Preserved Fruit and Vegetables	203	2,487	40,500	69.5

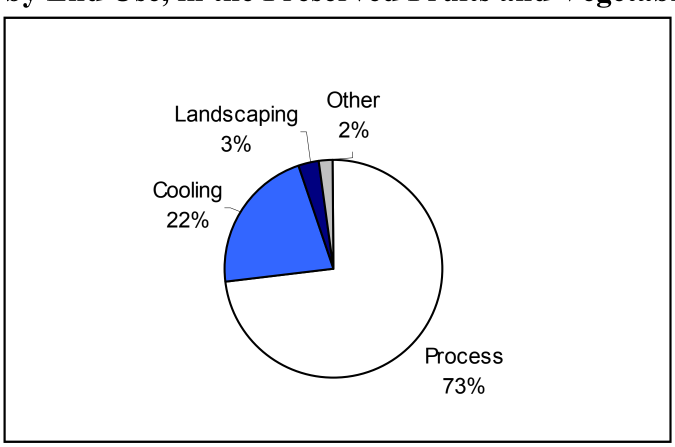
[1] Average across all regions, based on a 225-day year.
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector.

Water Use

Process water is used in the Fruit and Vegetables industry to:

- Clean fruits and vegetables;
- Move produce into the plant;
- Sanitize the peeling, dicing, and other equipment;
- Move waste into the sewers; and
- Sanitize floor and storage areas.

Figure F-3
Water Use, by End Use, in the Preserved Fruits and Vegetables Industry



Source: Calculated from MWD data of one fruit and vegetable processing plant (MWD 2002).

Process Water Conservation Potential

A 1997 report by the California Institute of Food and Agriculture appears to be the best and most recent indicator of penetration rates of water efficient technologies in this industry (Pike 1997). Although the survey is not a random sample, it presented the most comprehensive indicator of penetration rates.[3] The survey showed that fruit and vegetable canning plants have already implemented several conservation measures (see Table F-11).

Table F-11
Implementation of Process and Cooling Water Conservation Technologies at a Fruit and Vegetable Cannery

Measure	Percent Implementing Measure between 1994 and 1997
Process Water	
Self-closing nozzles	42%
Reuse non-contact cooling water	58%
Recycle steam condensate	48%
Reduce wastewater to recapture product	32%
Sanitize reconditioned water for contact use	18%
Reuse rinse water	25%
Cooling Water	
Eliminate single pass cooling	42%
Improve cooling tower efficiency	25%
Change to air cooling	8%

Source: Pike 1997

We applied the findings on conservation technologies in canneries, as shown in Table F-11, to the entire Processed Fruit and Vegetable industry (see Table 4.C.3.3 below).

Table F-12
Potential Process Water Savings in the Preserved Fruit and Vegetables Industry

Sub-end Use	Measure		Savings[1]	Penetration Rate[2]	Potential
Cleaning of produce and equipment	Self-closing nozzles	75%	(30%)	42%	20%
	Reduce wastewater to recapture product		(10%)	32%	7%
	Sanitize reconditioned water for contact use		(10%)	18%	8%
	Reuse rinse water		(10%)	25%	8%

[3] Response to the survey was low (six percent) which leads to the possibility of a self-selection bias. Also, a key survey question ("which efficiency measures have been implemented in the last three years?") would have excluded the plants that implemented measures subsequent or prior to the survey period.

	Membrane filtration of wastewater for reuse		(20%)	0%	20%
	Combined[3]				*22%*
Utilities/Boilers		25%			
Recycle steam condensate			(50%)	48%	34%
Combined		**100%**	**29%**		

[1] There were no reliable estimates available of amount of savings from the different technologies. This is our best guess based on information from similar technology in other sectors.
2 Pike 1997
[3] The first technology is complementary with the other technologies while the others are exclusive. Only some will be applicable at a given plant.

According to Yates (2002), penetration of the conventional technologies listed in the table above (except membrane filtration) is now as high as 90 percent. We performed a sensitivity analysis on the penetration rates to include this information and found that the overall savings vary between 9 and 35 percent using a reasonable range of penetration rates.

Estimate of Potential Water Savings

The conservation potential for common end uses was calculated in the end use studies (see Appendix C) and then applied to our GED-derived estimate of water use to get potential water savings for these end uses. We used data from Table F-12 above for the estimate of potential process water savings (Table F-13).

Table F-13
Potential Water Savings in the Preserved Fruit and Vegetable Industry (2000)

End Use	**Water Use (TAF)**	**Conservation Potential (percent)**			**Potential Savings (TAF)**		
		Low	**High**	**Best**	**Low**	**High**	**Best**
Process	50.8	9%	35%	25%	4.5	17.6	12.8
Cooling	15.3	9%	41%	26%	1.5	6.3	3.9
Landscaping	2.1	38%	53%	50%	0.78	1.1	1.0
Other[1]	1.4	0%	25%	10%	0.0	0.3	0.1
	69.5	**10%**	**37%**	**26%**	**6.8**	**25.4**	**18.0**

[1] Assumed range

Beverages (SIC code 208)

Industry Description

The Beverage industry includes establishments primarily engaged in manufacturing: malt beverages; malt; wines, brandy, and brandy spirits; distilled and blended liquors; bottled and canned soft drinks and carbonated waters; and flavoring extracts and syrups.[4] There are 609 establishments under SIC code 208 in California and of these, 391 are wineries, 69 are malt breweries, 87 manufacture soft drinks, and the rest make flavored syrups. Table F-15 shows total water coefficients and use. Figure F-4 shows water by end use.

Table F-15
Employment and Water Use in the Beverage Industry (2000)

Sub-industry	SIC code	Employment	GED[1,2]	Water Use (TAF)
Malt beverages	2082	5,030	6,756	23.5
Malt	2083	60	204	0.0
Wines, brandy, and brandy spirits	2084	20,210	1,211	16.9
Distilled and blended liquors	2085	490	329	0.1
Bottled and canned soft drinks	2086	10,070	1,990	13.8
Flavoring syrups	2087	1,940	1,705	2.3
Total Beverage Industry	**208**	**37,800**	**2,169**	**56.6**

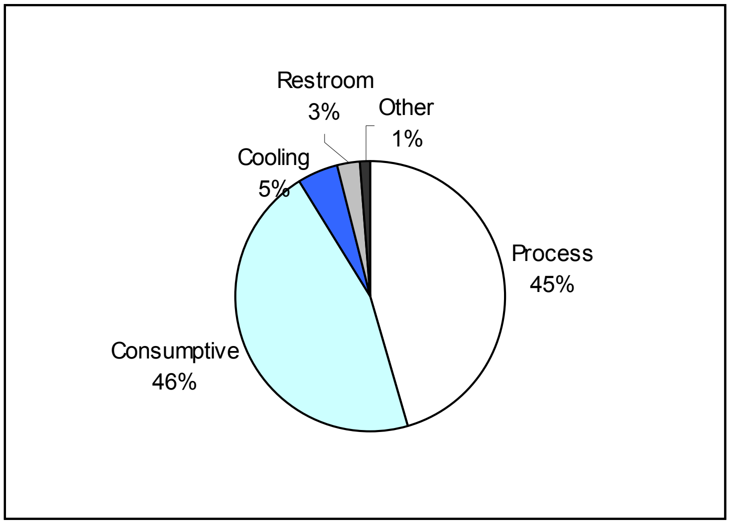
[1] Based on a 225-day year
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector.

Water Use

The Beverage industry uses process water use for:
- The final product;
- Bottle washing;
- Refrigeration;
- Equipment cleaning and cleaning-in-place (C-I-P); and
- Boilers (for pasteurization and sterilization).

[4] This industry does not include fruit juices, which are classified under Fruit and Vegetable Processing (SIC code 203).

Figure 4
Water Use, by End Use, in the Beverage Industry



Source: Calculated from MWD audit of five beverage plants (MWD 2002).

Process water use includes consumptive use, i.e. water included in the final product. We assume that half of the process water use is incorporated into the final product.

Process Water Conservation Potential

A 1997 report by the California Institute of Food and Agriculture Research was the best and most recent indicator of penetration rates (Pike 1997). Although the survey is not a random sample, it offers the only available indicator of penetration rates (Table F-16).[5] The survey showed that wineries have implemented only some conservation measures.

Table F-16
Implementation of Process and Cooling Water Conservation Technologies in Wineries

Measure	**Percent Implementing Measure between 1994 and 1997**
Process Water	
Separate wastewater streams	37%
Self-closing nozzles	18%
Reuse non-contact cooling water	9%
Reduce wastewater to recapture product	9%
Sanitize reconditioned water for contact use	--
Reuse rinse water	18%
Cooling Water	
Eliminate single pass cooling	10%

[5] See footnote 4 above.

Source: Pike 1997

While most of the earlier efforts were focused on efficiency improvements, such as the introduction of self-closing nozzles and adjusting nozzle flow to their rated capacity, reusing rinse water is gaining more popularity. Discharges that can potentially be reused in the beverage industry include: final rinses from tank cleaning; keg washers; fermenters; bottle and can soak and rinse water; cooler flush water; filter backwash; and pasteurizer and sterilizer water. Areas of possible reuse are: first rinses in wash cycles; can shredder; bottle crusher; filter backflush; caustic dilution; boiler makeup; refrigeration equipment defrost; equipment cleaning; and floor and gutter wash.

Table F-17
Potential Process Water Savings in the Beverage Industry

Measure	**Savings[1]**	**Penetration Rate[2]**	**Potential[3]**
Self-closing nozzles	(30%)	25%	24%
Separate wastewater streams	(5%)	40%	3%
Reuse non-contact cooling water	(20%)	10%	18%
Reduce wastewater to recapture product	(20%)	10%	18%
Reuse rinse water	(20%)	20%	17%
Combined			**27%**

[1] There were no reliable estimates for this figures, these are simply our best guess
[2] These penetration rates are the same rates shown in Table F-16, adjusted upwards to account for some increased penetration from 1997 to 2000
[3] The first technology is complementary with the other technologies while the others are exclusive, only some will be applicable at a given plant.

By performing a sensitivity analysis on the penetration rates we found that the potential for saving process water varied between 19 and 31 percent.

Estimate of Potential Water Savings

The conservation potential for common end uses was calculated in the end use studies (see Appendix C) and then applied to our GED-derived estimate of water use to get potential water savings for these end uses. We used data from Table F-17 above for the estimate of potential process water savings.

Table F-18
Potential Water Savings in the Beverage Industry

End Use	**Water Use (TAF)**	**Conservation Potential (percent)**			**Potential Savings (TAF)**		
		Low	**High**	**Best**	**Low**	**High**	**Best**
Consumptive	(25.8)	N/A	N/A	N/A	0.0	0.0	0.0
Process	(25.8)	19%	31%	27%	4.9	7.9	7.0
Cooling	2.8	9%	41%	26%	0.3	1.2	0.7
Restroom	1.7	49%	49%	49%	0.8	0.8	0.8

Other[1]	0.6	0%	25%	10%	0.0	0.1	0.1
	56.5	**11%**	**18%**	**15%**	**6.0**	**10.1**	**8.6**

[1] Assumed Range

Textile Industry (SIC code 22)

Industry Overview

The Textile industry is a relatively new industry in California. In the past three decades, the industry has grown into a $5 billion business located primarily in southern California. The industry is comprised of diverse, fragmented groups of establishments that receive and prepare fibers, transform the fibers into yarn, and then dye or finish the yarn into fabric. Table F-19 shows employment, water coefficients, and total use in the Textile sector.

Table F-19
Employment and Water Use in the Textile Industry (2000)

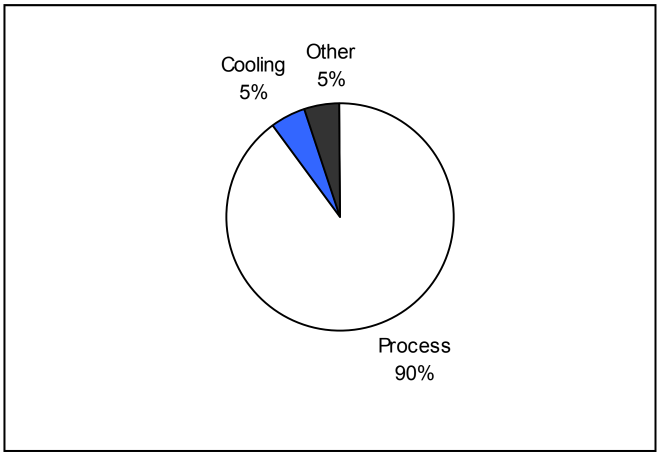
Sub-industry	**SIC code**	**Employment**	**GED[1,2]**	**Water Use (TAF)**
Broad, narrow, knit fabric mills	221, 224	3,180	299	0.7
Knitting mills	225	11,800	1,651	13.5
Textile finishing	226	4,020	910	2.5
Carpets	227	3,200	2,805	6.2
Yarn and thread	228	940	2,805	1.8
Misc. textile goods	229	4,060	2,328	6.5
	22	**27,200**	**1,660**	**31.2**

[1] Average across all regions, based on a 225-day year.
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector.

Water Use

Due to data constraints, an end use breakdown for the textile industry was unavailable. Based on our study of end uses, we assumed that since reasonable restroom and kitchen use would not exceed 50 gallons per employee per day, at least 90 percent of the water use must be for process and cooling. Conversations with Textile industry experts indicated that the residual hot water from the cooling process is reused in various processes (usually dye baths) (Demanyovich 1990). We assumed that only five percent of overall water is used in cooling (Figure F-5).

Figure 5
Water Use, by End Use, in the Textile Industry



Source: Estimate based on interviews

The stages of textile manufacturing that use the most water are the "wet processing" steps, which involve transforming undyed, unprocessed fabric known as "greige" into the finished product through four broad stages:

- Fabric preparation (chemically treating the greige to remove impurities, improve strength and dye uptake, and enhance the appearance of the fabric);
- Dyeing;
- Printing; and
- Finishing.

In each stage, water is used to either make chemical baths or to wash out excess chemicals after processing. The amount of water used varies greatly among mills and depends on each mill's specific processing operations and equipment.

Table F-20
Water Use by Processing Category in the Textile Industry

Processing Category	Minimum (gal/lb)	Median (gal/lb)	Maximum (gal/lb)
Wool	13.3	34.1	78.9
Woven	0.6	13.6	60.9
Knit	2.4	10.0	45.2
Carpet	1.0	5.6	19.5
Stock/yarn	0.4	12.0	66.9
Non woven	0.3	4.8	9.9
Felted fabrics	4.0	25.5	111.8

Source: NCDENR 1998

Process Water Savings

Because of the high variability in water use, calculating detailed penetration rates and savings from individual technologies for this sector proved nearly impossible. Instead, we used the case study information provided below in Table F-21 to estimate penetration rates.

Table F-21
Process Water Savings in the Textile Industry

End Use	Type	Technology	Savings	Penetration
Preparation: scouring[1]	Reuse	Reuse of bleach, mercerizing[2] rinse water		
Preparation: desizing[3]	Reuse	Reuse of scouring, jet-weaving, bleach, mercerizing rinse water		
		Membrane filtration of desizing water[4]		Pilot stage
Continuous dyeing	Recycling	Countercurrent washing	20-50% of dyeing water use[5]	
	Efficiency	Use of automatic shutoff valves	20% of dyeing water use[6]	Probably high[7]
	Reuse	Reuse of rinse water from dyeing for dye bath makeup	50%[8]	Only 2 out of 60 firms as of 2002.[9]
VAT dyeing	Efficiency	Avoiding overflow rinsing	20-70% of dyeing water use[6]	
Carpet dyeing	Reclaimed water	Use of reclaimed water in carpet dyeing		Only 3-4 mills in CA in 2000[10]
Sanitation	Reuse	Reuse of colored wash water for cleaning floors and equipment in the print shop		

[1] Scouring: a cleaning process to remove impurities from fiber and yarn through washing with alkaline solutions.
[2] Mercerizing: chemical treatment of cotton and cotton/polyester fabrics to improve dye uptake and luster of the fabric.
[3] Desizing: sizing is the application of starches and materials, called sizes, to improve the quality of the fabric. Once sizing is completed, the fabric is desized, which involves treating the fabric with enzymes to breakdown the starches and then washed it.
[4] Ministry of Environment and Energy, Danish Environmental Protection Agency 2001
[5] Estimated from data presented in Asnes (1984).
[6] Estimated from data presented in NCDNRCD (2002).
[7] This technology has been around for a long time, but the textile industry is a relatively new industry in California (it emerged in the 1980s) so it is likely that most plants already have auto shut off valves in their continuous process lines.
[8] Estimated from conversation with Templeton (2002).
[9] Demanyovich 2002
[10] State Water Resources Control Board 2002

Using our best judgment of the penetration rates and the breakup of water use between the different sub-end uses, we estimated savings potential for each sub-end use (as shown in Table F-22).

Table F-22
Potential Process Water Savings in the Textile Industry (2000)

Process Sub-end Use	Measure	Portion of Process Use (percent)[1]	Savings (percent)	Penetration Rate (percent)	Savings Potential (percent)
Preparation	Reuse of scouring, bleach and mercerizing water	15%			33%
Dyeing	Reuse of rinse water from dyeing for dye bath make-up; use of reclaimed water in carpet dyeing; avoiding bath overflow	52%	50%[2] 100% 50%[3]	5%[4] 5%[5] 50%[6]	56%[7]
Printing		6%			10%[8]
Washing	Counter current washing, spray rinsing	27%	30%[3]	50%[6]	18%
Total Process		**100%**		**39%**	

[1] Estimated from flow rates provided in NCDENR et al. (1998).
[2] Estimated from conversation with Templeton (2002).
[3] Estimated from data in Table F-21 above.
[4] Estimated from conversation with Demanyovich (2002).
[5] Estimated from State Water Resources Control Board data (CSWRCB 2002).
[6] No data on penetration rates were available, 50 percent assumed.
[7] Carpet mills account for about 15 to 20 percent of the water use (we assumed reclaimed water applied). The other technologies were assumed to be applicable to all fabric and yarn mills.
[8] This is an assumption. Similar technologies such as reusing equipment wash water are possible at the printing stage.

We estimate that process water use savings range between 32 and 44 percent. Membrane filtration of the various waste streams could further increase the conservation potential.

Estimate of Potential Water Savings

We used data from Table F-22 above for the estimate of potential process water savings and we assumed that restroom water use comprised the majority of other use (see F-23 for total savings).

Table F-23
Potential Water Savings in the Textile Industry (2000)

End Use	Annual Use (TAF)	Conservation Potential (percent)			Potential Savings (TAF)		
		Low	High	Best	Low	High	Best
Process	21.8	32%	44%	39%	8.5	11.7	10.4
Cooling	6.2	9%	41%	26%	0.1	0.6	0.4
Other	3.1	49%	49%	49%	0.7	0.7	0.7
	31.2	**32%**	**45%**	**39%**	**9.4**	**13.1**	**11.5**

Crosscheck

NCDENR et al. (1998) estimated that "a reduction of 10-30 percent can be accomplished by taking fairly simple measures" like fixing leaks, turning off running hoses, and saving cooling water when the machinery is shut down. Dr. Robert

Demanyovich (2002) of RJD technologies, an expert in the textile industry, judged the overall savings to be somewhere between 20 to 50 percent.

Paper and Pulp (SIC codes 261,262, 263)

Paper and Pulp mills are very water-intensive facilities. Pulp facilities (SIC 261) convert wood products to pulp, which is then transported via pipe or truck to another manufacturing facility to be transformed into paper or paperboard. Integrated facilities produce pulp and paper in the same facility.[6] Table F-24 shows estimated California water use in this sector. Figure F-6 shows end use of water in pulp and paper mills from representative plants out of state. We assume comparable water uses here and urge state-specific data be collected.

Table F-24
Employment and Water Use in the Paper and Pulp Industry (2000)

Sub-industry	SIC code	GED[1,2]	Employees	Water Use (TAF)
Pulp Mills	261	12,590	370	3.2
Paper Mills	262	5,260	2,240	8.1
Paperboard Mills	263	10,320	1,500	10.2
Total			**4,110**	**22.0**

[1] Average across all regions and based on a 225-day year.
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector.

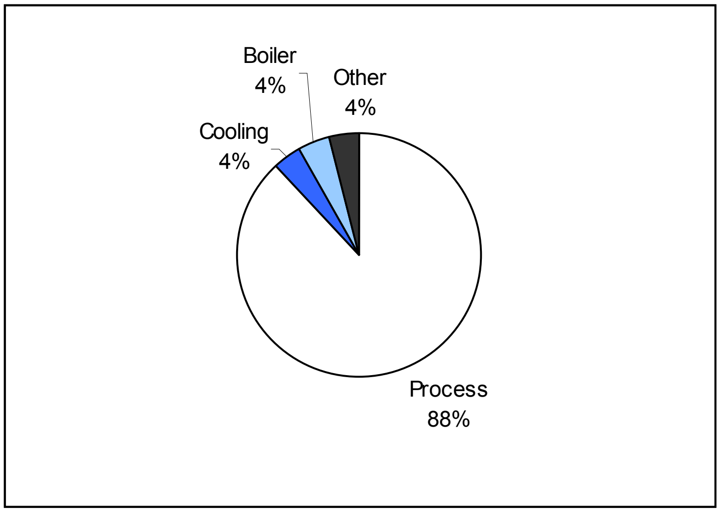
Water Use

The Paper and Pulp industry uses process water for the following purposes:

- **Pulping** – Digesting the raw material (wood) by chemical or mechanical means to release cellulose fibers by breaking the bonds that hold the fibers together;
- **Pulp Processing** – Removing impurities, preparing the fiber for manufacture of paper and bleaching the fiber to improve brightness; and
- **Paper/Paperboard Manufacturing** - Applying a watery suspension of cellulose fibers to a screen to drain the water and leave behind the fiber to form a sheet.

[6] Facilities that convert paperboard to boxes and cartons are also classified under SIC 26 but they are not included herein because they are significantly less water intensive.

Figure 6
Water Use, by End Use, in the Paper and Pulp Industry



Source: Texas Water Resources Control Board 1996

Process Water Savings

The average water use in the Paper and Pulp industry decreased from 15,000 gallons/ton of paper produced in the 1980s to about 2,500 gallons/ton today. Information about current conservation potential in this industry is relatively modest (see Table F-25).

Table F-25
Process Water Savings Paper and Pulp Plants

Technology	Process Water Saved (percent)	Penetration Information Available
Partial recycling of process water	20-40%	CDWR data (1995) indicate that between 40-50% of the plants surveyed practiced some kind of water recirculation.
Closed loop systems	80-90%	As far as we can determine, only one plant in 2000, Louisiana Pacific, had a closed-loop system, but there is an industry trend towards closed-loop systems.
Reclaimed water use	100%	The Pacific Crest Paper Mill in Southern California currently uses reclaimed water from the Irvine Ranch Water District for process water use.

This overall savings potential estimate was mostly based on the assumption that the Paper and Pulp industry can save considerable amounts of water by moving towards closed loop systems and increasing recycling of water. The development of new membrane filtration technologies is increasingly making this move a viable alternative. In the best case we assumed that a third of the plants will implement closed-loop systems and reduce water use by 70 percent. In the low conservation scenario, we assume that only 10 percent of the plants will be able to do so.

Estimate of Potential Water Savings

We used data from Table F-25 above for the estimate of potential process water savings (summarized in F-26).

Table F-26
Potential Water Savings in the Paper and Pulp Industry (2000)

	Water Use (TAF)	Conservation Potential (percent)			Potential Savings (TAF)		
End Use		**Low**	**High**	**Best**	**Low**	**High**	**Best**
Process	19.4	(16%)	(49%)	(34%)	3.1	9.5	6.6
Cooling	0.9	9%	41%	26%	0.1	0.4	0.2
Boiler	0.9	0%	10%	5%	0.0	0.1	0.0
Other	0.9	20%	40%	30%	0.2	0.4	0.3
	22.0	**(15%)**	**(47%)**	**(33%)**	**3.4**	**10.3**	**7.2**

Fabricated Metals (SIC code 34)

Industry Overview

The Fabricated Metals industry (SIC code 34) includes facilities that machine, clean, treat, coat, and paint metal parts. Machining operations involve using tools that travel on the surface of the metal to shear, etch, or cut it. Metal cleaning, a process found in virtually all fabricated metal industries, consists of chemically stripping the metal of old paint, oxidation, or plating. Water is used primarily for rinsing components after the various chemical processes and in preparing chemical baths.

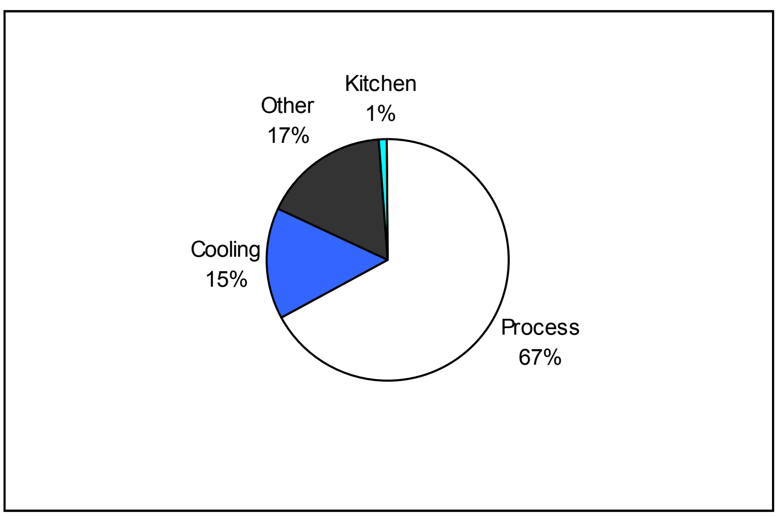
Individual facilities may perform one or more of these functions, either for third parties or as part of a larger manufacturing process. Southern California supports the largest Fabricated Metals industry in the United States due to the region's aircraft and electronics industries. Table F-27 shows total estimated water use in the Fabricated Metals sector of California in 2000. Figure F-7 shows water by end use in this sector; again, more extensive end use data should be collected.

Table F-27
Employment and Water Use in the Fabricated Metals Industry (2000)

Industry	SIC code	GED[1]	Employees	Water Use (TAF)
Fabricated Metals	34	215	132,600	19.7

[1] Average across all regions, based on a 225-day year.
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector. See earlier information.

Figure F-7
Water Use, by End Use, in the Fabricated Metals Industry



Source: This was calculated from MWD audit data of an aircraft parts manufacturer (MWD 2002).

Process Water Savings

A 1994 survey of 318 metal finishers across the U.S. provided background information on the penetration of water conservation technologies (NCDENR et al., 1998). We applied the national averages found in these studies to California (Table F-28).[7]

Table F-28
Process Water Savings in the Fabricated Metals Industry

Measure	Process Water Savings (percent)	Penetration Rate in 1994 (percent) [1]
Flow restrictors	n/a	70%
Counter current rinsing	50-60%[2]	68%
Manually turn of rinse water when not in use	n/a	66%
Agitated rinse tanks	n/a	58%
Spray rinses	60%[3]	39%
Reactive or cascade rinses	50%[3]	24%
Conductivity controllers	40%[3]	16%
Flow-meters	n/a	12%
Timer rinse controls	40%[3]	11%
Acid recovery systems	50%[4]	(40%)
Best Estimate of overall process water savings		**33%[5]**

[1] NCDENR et al. (1998).
[2] Estimated from data provided by the City of San Jose, 1992 (b).
[3] Estimated from data provided by the US EPA 1994.
[4] A case study from the Office of Technical Assistance (OTA 2002) shows a savings of more than 90 percent of process water. We assume that an average of 50 percent can be saved and a penetration rate of 40 percent for this technology.
[5] To obtain the best estimate we assumed that spray rinses and cascade rinses were complementary technologies with about 50 percent market share each. We also assumed that acid recovery systems could be applied to 50 percent of the metal finishing facilities and that timer rinse controls and conductivity controllers can be implemented at all facilities.

Estimate of Potential Water Savings

The conservation potential for common end uses was calculated in the end use studies (see Appendix C) and then applied to our GED-derived estimate of water use to get potential water savings for these end uses. We used data from Table F-28 above for the estimate of potential process water savings (Table F-29).

[7] Detailed 2001 resource recovery information, by state, can be purchased from the National Metal Finishers Association, but the cost of the data exceeded our resources.

Table F-29
Potential Water Savings in the Fabricated Metals Industry (2000)

End Use	Water Use (TAF)	Conservation Potential (percent)			Potential Savings (TAF)		
		Low	High	Best	Low	High	Best
Process	13.2	25%	42%	33%	3.3	5.5	4.4
Cooling	3.0	9%	41%	26%	0.3	1.2	0.8
Other	3.3	43%	51%	50%	1.5	1.7	1.7
Kitchen	0.2	20%	20%	20%	0.0	0.0	0.0
Total	**19.7**	**26%**	**43%**	**35%**	**5.0**	**8.5**	**6.8**

Crosscheck

The Fabricated Metals industry has created a National Metal Finishing Strategic Goals Program, which aims to reduce water use by 50 percent compared to 1992 levels. The status for California in 2000 indicates that 65 percent of the goal has been met for water efficiency (National Metal Finishing Strategic Goals Program 2000). These findings imply about a 25-percent reduction in current water use is possible.

High Tech Industry (SIC codes 357, 36, 38)

Industry Overview

There is no standard definition of the High Tech industry. In this report, we adopted the definition used by the Portland Water Bureau (Boyko et al. 2000) and included the following sub-industries: computers and office equipment (SIC code 57); electronic equipment and components (except computer equipment) (SIC code 36); and measuring, analyzing, and controlling instruments (SIC code 38). Table F-30 lists total employment and estimated water use in the High Tech industry in 2000.

Table F-30
Employment and Water Use in the High Tech Industry (2000)

Sub-industry	SIC code	GED[1]	Employees	Water Use (TAF)
Semiconductor devices	3674	356	61,540	15.1
PCB manufacture and assembly	3672, 3679	405	77,790	21.8
Computer and office equipment	357	88	95,000	5.8
Rest of high tech	Rest of 36,38	156	300,592	32.4
Total High Tech	**357,36,38**	**203**	**534,930**	**75.0**

[1] Based on a 225-day year
[2] The GEDs estimated for 1995, were decreased by 6% to obtain the GED coefficients in 2000, for the industrial sector. See earlier discussion.

Semiconductor devices (SIC code 3674) and printed circuit board manufacturing and assembly (SIC codes 3672 and 3679) use about half of the water used in the High Tech industry. Semiconductor manufacturing consists of growing silicon crystals and then cutting and polishing them into thin silicon wafers. Hundreds of integrated circuits are then etched onto the wafer in an ultra-clean environment. A printed wiring board (PWB) or printed circuit board (PCB) is a device that provides electrical interconnections and a surface for mounting electrical components. The production process consists of etching patterns of conductive material, usually copper, onto a non-conductive base. After each step of surface preparation, electroplating, pattern masking, and etching, water is used for rinsing. The rest of the High Tech industry includes facilities that manufacture and assemble various electrical, electronic, and communication components.

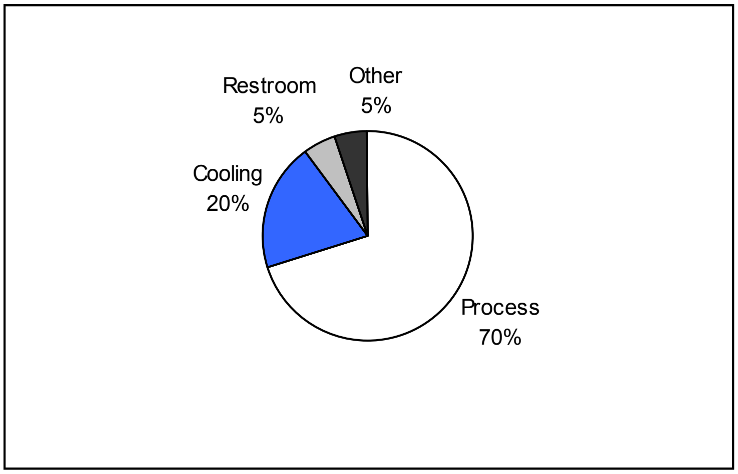
Water Use

Process water use comprises most of the High Tech industry's water use (60 to 80 percent), cooling uses 20 to 30 percent, and the rest is domestic and irrigation use (Figure F-8). Process water is used for:

- Passing potable city water through a reverse osmosis membrane to remove impurities, producing ultra-purified water (UPW)[8];
- Rinsing and tool cleaning (water of an extremely high purity is used to rinse components after they are treated with solvents and acids); and
- Scrubbing (water is used to remove polluting gases from exhaust air).

[8] Typically, 1,400 to 1,600 gallons of potable water produce 1,000 gallons of UPW.

Figure F-8
Water Use, by End Use, in the High Tech Industry



Source: City of San Jose 1992 (h)

Process Water Savings

In 1994, SEMATECH, a semiconductor industry association, conducted an assessment of the status of water conservation in the semiconductor industry, determined future requirements, and established standard terminology and metrics to characterize water consumption in the industry. This study was the best source of penetration rate information available.

Table F-31
Process Water Savings in the Semiconductor Industry

End Use	Process Water Saved (percent)[1]	Penetration Rate (percent)[1]	Penetration Data Year
Improve efficiency by modifying rinse tools	5-10%	80%	1994
Cascade rinsing/ spray rinses	Up to 60%[2]	50%[3]	
Rinse optimization	25-50%[4,5]	40%[5]	2000
Recycle UPW by selecting cleanest rinse streams	50%[6]	39%	1994
Reuse rinse effluent in wet scrubbers	5%[7]	70%	1994
Improve efficiency of UPW production unit	5-15%	20-30%	
Best Estimate of Overall Conservation Potential			**40-70%**

[1] Unless otherwise indicated, all water savings and penetration information were obtained from SEMATECH (1994).
[2] City of San Jose 1992(h)
[3] The SEMATECH (1994) survey reveals that about 50 percent of the facilities use wet decks with dump rinsers with the remaining evenly split between cascade rinsers and spray rinsers.
[4] Chiarello (2000) estimates savings of 25 to 80 percent in process water use using rinse optimization.
[5] Based on our conversation with Rosenblum (2002), typical savings appeared to be around 25 percent while the penetration rate was about 40 percent.
[6] The survey estimates that about half the facilities recycling water recover 70 percent of the UPW consumed and half recover about 30 percent. Topical Reports (2000) estimates UPW recovery at 40 to 50 percent.

[7] Scrubbers consume about 5 to 10 percent of process water in semiconductor fabrication. The SEMATECH (1994) survey also indicated that almost 70 percent of facilities surveyed reused wafer rinse water in cooling towers and scrubbers, replacing almost all the fresh water use in these applications.

The semiconductor industry has been a pioneer in water conservation and many technologies developed for this industry have been adopted by other High Tech industries. Indeed, recent studies indicate that comparable opportunities exist for the application of semiconductor industry water conservation technologies, such as rinse optimization, reuse of reverse osmosis backwash, and recycling UPW rinse water, to the Printing Wiring Board and Computer Components industries, yielding savings of 40 to 50 percent. Because data on conservation potential were not available for the other High Tech sub-industries, we assumed that the process water savings and penetration rates estimated for the semiconductor industry are applicable to the entire industry.

By varying the penetration rates from Table F-31 above, we obtained a range of 29 to 53 percent possible savings in process water Table F-32).[9]

Table F-32
Potential Process Water Savings in the High Tech Industry (2000)

Sub-end Use[1]	Portion of Process Use (percent)	Measure	Savings from Measure[2]	Best Est. Penetration Rates[3]	Potential Savings
Rinsing	80%	Improve efficiency by modifying rinse tools	10%	90%	1%
		Cascade rinsing/spray rinses	50%	60%	29%
		Rinse optimization	40%	50%	25%
		Recycle UPW by selecting cleanest rinse streams	50%	50%	33%
		Reuse rinse effluent in wet scrubbers	5%	80%	1%
Scrubbers	10%	Reuse rinse effluent in wet scrubbers	5%	80%	1%
UPW Production	10%	Improve efficiency of UPW production unit	10%	40%	6%
Total Conservation Potential[4]			**43%**		

[1] This break-up of sub-end uses is our best guess.
[2] See Table F-29 above for the ranges and sources from which these percentages were taken.
[3] SEMATECH 1994. Because the SEMATECH study is from 1994 and the High Tech industry adopts new technologies quickly, we increased the penetration rates slightly.
[4] In estimating the total conservation potential, rinse optimization is considered to be the same as recycling, since it involves recycling of selected rinses. The rinsing measures are assumed to be complementary, i.e. they can all be simultaneously applied.

[9] If dry cleaning technologies become feasible in the future, then reductions in water needs by as much as 50-80 percent of current use are possible. A high estimate of technical potential is based on the assumption that dry cleaning techniques become technically feasible in the next few years.

Estimate of Potential Water Savings

The conservation potential for common end uses was calculated in the end use studies (see Appendix C) and then applied to our GED-derived estimate of water use to get potential water savings for these end uses. We used data from Table F-32 above for the estimate of potential process water savings (Table F-33).

Table F-33
Potential Water Savings in the High Tech Industry (2000)

End Use	Water Use	Conservation Potential (percent)			Conservation Potential (TAF)		
	(TAF)	Low	High	Best	Low	High	Best
Process	52.5	29%	53%	43%	15.2	27.8	22.6
Cooling	15.0	9%	41%	26%	1.4	6.2	3.9
Restroom	3.8	49%	49%	49%	1.8	1.8	1.8
Other	3.8	0%	25%	10%	0.0	0.9	0.4
Total	**75.0**	**25%**	**49%**	**38%**	**18.6**	**36.6**	**28.7**

Crosscheck

The literature expects the semiconductor industry to significantly decrease water use over the next decade. Specifically, producing an 8-inch wafer disc, which used about 30 gal/in^2 in 1997, was expected to use 10 gal/in^2 in 2000 and 6 gal/in^2 by the end of 2003 (Allen and Hahn 1999, NRTS 2001, and SEMATECH 1994).[10] This expectation indicates that the savings of 37 percent that we have indicated are feasible. However, it is important to keep in mind that the benchmarks set by the NTRS are goals for the industry to strive to achieve, and not necessarily technically achievable at the current time.

Boyko et al (2000) estimate the overall savings to be much lower (about six percent), although specific case studies mentioned in the study achieved savings of 17 percent. Their estimates, however, include only simple low cost measures and exclude savings from rinse optimizations and recycling of UPW rinses.

[10] In the semiconductor industry, gallons per square inch (g/in^2) appears to be a standard metric of measuring water use. Typically wafer disc sizes are 8-inch/200mm for older versions or 12-inch/300mm for newer versions.

Petroleum Refining (SIC code 291)

Industry Description

SIC code 291 includes establishments primarily engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, and lubricants, through fractionation or straight distillation of crude oil, redistillation of unfinished petroleum derivatives, cracking, or other processes.

In 2000, there were 22 operational refineries in California (Petroleum Supply Annual 2000) employing about 9,900 people. Data from 13 of these facilities were included in the 1995 CDWR survey (Table F-34).

Table F-34
Employment and Water Use in the Petroleum Refining Industry (2000)

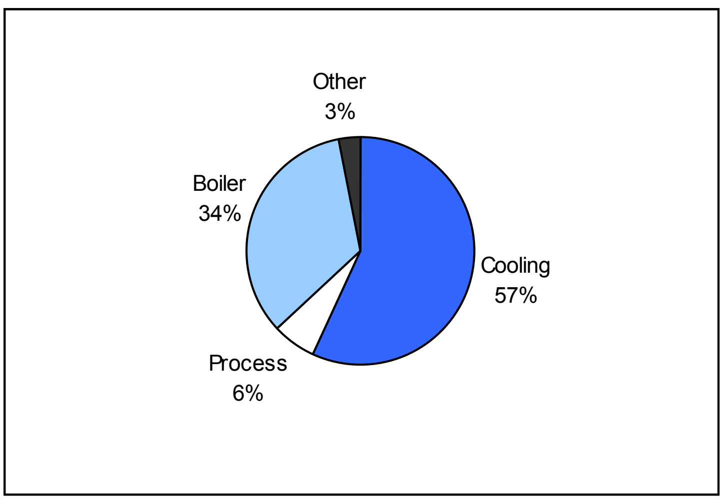
Industry	SIC code	GED	Employees	Water Use (TAF)
Petroleum Refining	291	14,676	9,890	84.1*

* Excludes 11.1 TAF of reclaimed water

Water Use

Refineries use water primarily in high and low-pressure boilers to produce steam and in cooling towers. Overall, water use in this industry has decreased considerably since the 1995 CDWR survey and six refining facilities from the survey are no longer operational.[11]

Figure F-9
Water Use, by End Use, in the Petroleum and Coal Industry



Source: AWWA Annual Conference Proceedings 1996

Process Water Savings

Recent water conservation efforts in the refining industry have focused on:

- Optimization using software algorithms;

[11] This finding is consistent with a national trend of moving refineries overseas.

- Reusing of secondary effluent; and
- Replacing freshwater for cooling tower makeup and boilers with treated reclaimed water.

The first two measures have typically reduced water use by 5 to 12 percent (estimated from Wilbur et al. 2002) but the primary trend for water conservation likely involves increasing the use of reclaimed water.

Of the 22 operational facilities in 2000, four facilities (the ARCO facility in Carson, the two Chevron facilities - El Segundo and Richmond, and the Exxon-Mobil facility in Torrance) use some reclaimed water for cooling. The Exxon Mobil facility also uses reclaimed water for boiler use and, consequently, has cut its freshwater use by 98 percent (Schaich 2001). The others have reduced water use by an estimated 40 to 60 percent (based on how much water was replaced by reclaimed water)

The refining sector is increasingly open to the idea of using highly treated reclaimed water in their cooling towers because of the added benefit of improved reliability of supply (and hence operations) during droughts. It is also a cost-effective option for both the refineries and local water agencies.

No industry-wide surveys of water use in this industry are available. While refineries could technically replace all cooling, process, and boiler water with reclaimed water, we assume a more realistic replacement estimate of 85 percent of cooling and boiler water and a penetration rate of 20 percent in 2000 (4 out of 22 refineries).

Estimate of Potential Water Savings

Table F-35
Potential Water Savings in the Petroleum and Coal Industry

End Use	Water Use (TAF)	Conservation Potential (percent)			Savings Potential (TAF)		
		Low	High	Best	Low	High	Best
Cooling	48.0	50%	100%	80%	24.0	48.0	38.4
Process	5.0	0%	0%	0%	0.0	0.0	0.0
Boiler	28.6	50%	100%	80%	14.3	28.6	22.9
Other	2.5	20%	50%	40%	0.5	1.3	1.0
Total	**84.1**	**46%**	**93%**	**74%**	**38.8**	**77.9**	**62.3**

Crosscheck

Water use in the refining sector varies considerably from 20 to 60 gallons/barrel of oil. This range probably indicates the potential magnitude for efficiency improvements.

APPENDIX J: HOUSING ELEMENT WATER SUPPLY ASSESSMENT

Menlo Park Municipal Water District and California Water Service Company Bear Gulch District

Water Supply Assessment for the City of Menlo Park Housing Element Update

GHD
3/20/2013

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B. SFPUC Projected Water Supply Reliability

Key Acronyms and Abbreviations

ABAG	Association of Bay Area Governments
ACDD	Alameda Creek Diversion Dam
Act	Urban Water Management Planning Act
AFY	Acre-feet per year
BAWSCA	Bay Area Water Supply and Conservation Agency
BMP	Best Management Practice
CDD	City Distribution Division
CEQA	California Environmental Quality Act
CII	Commercial, Industrial and Institutional
City	City of Menlo Park
CUWCC	California Urban Water Conservation Council
DMM	Demand Management Measure
DPH	California Department of Public Health
ETo	Evapo-transpiration of common turf grass
gpcd	Gallons per capita per day
gpm	Gallons per minute
ISA	Interim Supply Allocation
ISG	Individual Supply Guarantee
ISL	Interim Supply Limitation
IWSAP	Interim Water Shortage Allocation Plan
LEED	Leadership in Energy and Environmental Design
MCL	Maximum contaminant level
MGD	Million gallons per day
MID	Modesto Irrigation District
MOU	Memorandum of Understanding
MPMWD	Menlo Park Municipal Water District
PEIR	Program Environmental Impact Report
psi	pounds per square inch
RWS	Regional Water System
SB 610	Senate Bill 610
SBx7-7	Water Conservation Act of 2009
SCVWD	Santa Clara Valley Water District
SFPUC	San Francisco Public Utilities Commission
TID	Turlock Irrigation District
UWMP	Urban Water Management Plan
WCIP	Water Conservation Implementation Plan
WQB	Water Quality Bureau
WS&TD	Water Supply and Treatment Division
WSA	Water Supply Assessment
WSAP	Water Shortage Allocation Plan
WSIP	Water Supply Improvement Program

1 Introduction

This Water Supply Assessment (WSA) has been prepared to assist the City of Menlo Park (City) and the California Water Service Company (Cal Water) in satisfying the requirements of Water Code Section 10910 et. seq. - Water Supply Planning to Support Existing & Future Uses.

The Menlo Park Municipal Water District (MPMWD) and California Water Service Company (Cal Water) are water suppliers for portions of the City of Menlo Park (City). The City is preparing an update to its Housing Element and is the lead agency under the California Environmental Quality Act (CEQA). Both CEQA and the California Water Code require a lead agency to consider water supply and demand as part of the development review process.

1.1 Requirements for a WSA

The requirement to prepare a WSA was established in 2002 by Senate Bill (SB) 610, which emphasizes the interrelationships between land use and water supply planning, and requires the incorporation of water supply and demand analysis at the earliest possible stage in the land use planning process. The stated intent of SB 610 is to strengthen the process by which local agencies determine the adequacy and sufficiency of current and future water supplies to meet current and future demands.

SB 610 amended the California Public Resources Code to incorporate Water Code findings within the CEQA process for certain types of projects. SB 610 added Water Code Sections 10910, 10911, 10912, 10913, and 10915 (Water Supply Planning to Support Existing and Planned Future Uses), which describe when a WSA needs to be prepared and the required elements of that WSA. The WSA is then used as an informational document to support the CEQA process. SB 610 also amended Water Code Section 10631 (the Urban Water Management Planning Act) to create a clear relationship between an agency's Urban Water Management Plan (UWMP) and subsequent WSAs and to allow the UWMP to serve as a foundational document for the analysis in the WSA.

Water Code Section 10910 et. seq. defines the "projects" that require a WSA and the lead agency's responsibilities related to the WSA. A WSA is required for:

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- A proposed hotel or motel, or both, having more than 500 rooms;
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area;

- A mixed-use development that includes one or more of the uses described above;
- A development that would demand an amount of water equivalent to or greater than the amount of water required by a 500-dwelling-unit project; and
- For lead agencies with fewer than 5,000 water service connections, any new development that will increase the number of water service connections in the service area by ten percent or more.

A WSA must provide:

- a description of all relevant water supply entitlements, water rights, and/or water contracts;
- a description of the available water supplies, in normal, dry and multiple dry years, and the infrastructure, either existing or proposed, to deliver the water; and
- an analysis of the demand placed on those supplies, by the project, and relevant existing and planned future uses in the area for at least a 20-year period.

The lead agency may incorporate the water suppliers' UWMP by reference, if the supplier included the proposed development's demands in the UWMP.

While water supply is clearly an important consideration in approval of a development, nothing in SB 610 prevents a lead agency from approving a proposed project even in the face of information concluding that there is not sufficient water supply for build-out of the project. However, where the description of existing water supply entitlements, water rights, and/or water contracts shows insufficient water supplies to serve the proposed project, as well as existing and planned uses over the 20-year planning horizon, additional information is required to describe how and where sufficient supplies may be obtained. Such information must include the estimated costs, financing methods, and regulatory approvals needed to obtain new supplies, as well as a projected time frame for obtaining them.

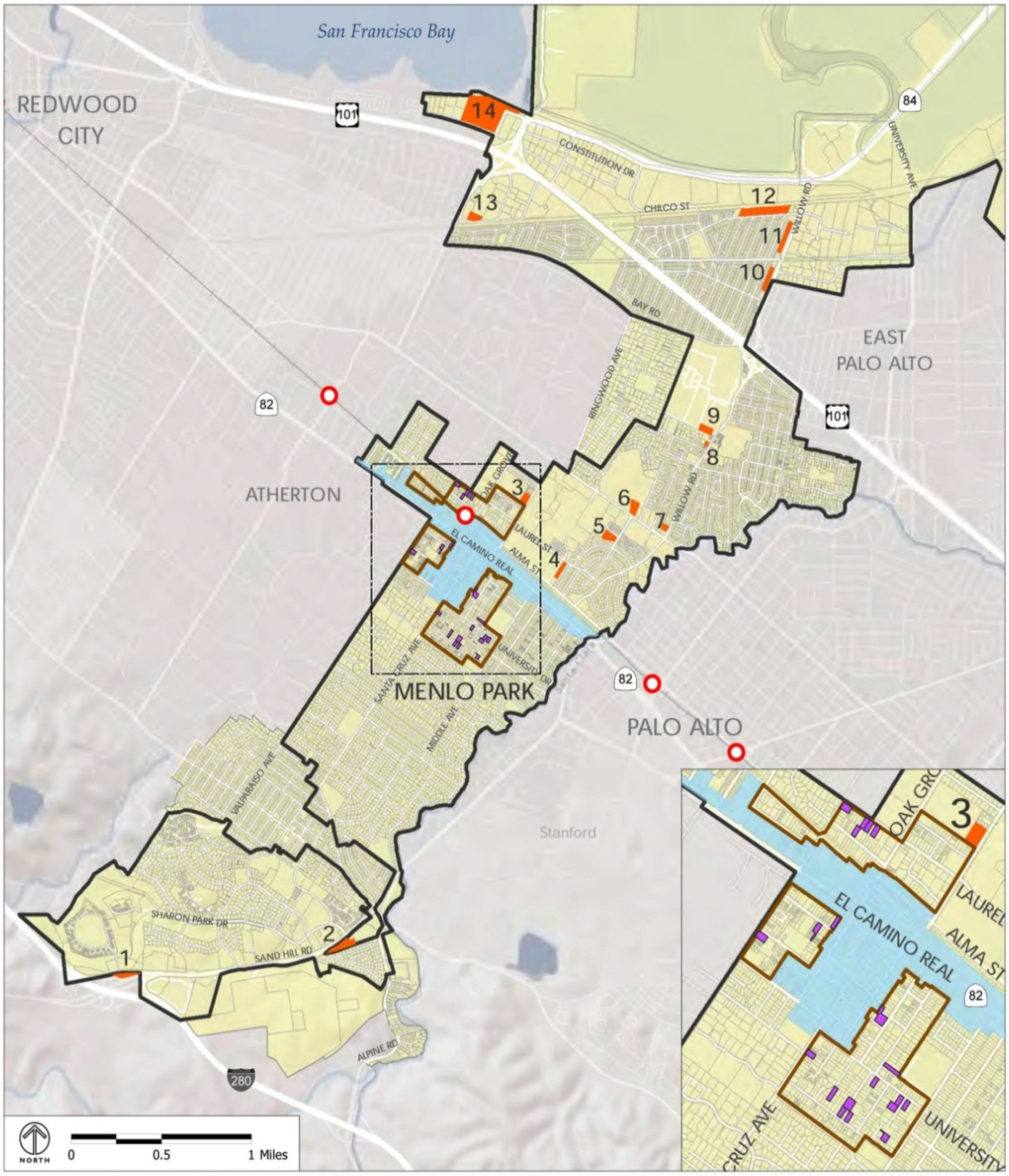
1.2 Summary of the Project

This WSA considers the proposed Housing Element Update for the City (Project). The Project involves the accommodation of up to 1,318 new dwelling units within the City by 2035. The City plans to accommodate these new units by:

- Amending its Zoning Ordinance to accommodate up to 900 housing units on 14 sites throughout the City;
- Implementing programs to accommodate 118 infill units in the downtown area; and
- Implementing programs to allow for the development of up to 300 second units on existing single family residential parcels.

Figure 1.1 illustrates the location of the 14 sites proposed for rezoning.

WATER SUPPLY ASSESSMENT FOR THE CITY OF MENLOW PARK
HOUSING ELEMENT UPDATE



Source: City of Menlo Park; The Planning Center | DC&E, 2012; ESRI 2010; FHA 2002.

- CalTrain Stations
- Lots with Additional Housing Unit Potentia
- Potential Sites to be Studied for Rezoning to Higher Density
- Infill Areas around Downtown
- El Camino Real/Downtown Specific Plan
- City Limits
- Sphere of Influence

FIGURE 1.1
HOUSING ELEMENT LOCATION MAP

The Project includes sites within both the MPMWD service area and Cal Water service area. Two of the proposed rezoning sites, Hamilton Avenue East and Haven Avenue, are anticipated to be redeveloped by 2015. The remaining growth will be accommodated over the build out period. Table 1.1 outlines the sites under consideration, the water service area in which the sites are located, the current land use at the site, the maximum number of units proposed at each site, and the year in which completion is anticipated. Table 1.1 illustrates that more than the potential 900 units have been identified on the 10 rezoning sites located in the MPMWD service area. Because the City is proposing to limit the total number of units on the rezoned sites to 900 units, City policy will limit the total number of new units in the MPMWD service area associated with the Project.

Table 1.1 – Proposed Housing Units Resulting from Implementation of the Proposed Housing Element Update

Site Number	Site Name	Water Service Area	Existing Use	Number of New Units Proposed	Year of Completion
2	Hewlett Foundation	Cal Water	Vacant	98	2035
4	401-445 Burgess Dr	Cal Water	Office: Multi-Story	16	2035
5	8 Homewood Pl	Cal Water	Office: Single Story	25	2035
13	Main Post Office	Cal Water	Post Office Slated for Closure	76	2035
NA	Downtown Infill	Cal Water	Single/Multifamily Residential	118	2035
NA	West Menlo 2nd Units	Cal Water	Single Family Residential	40	2035
Total Units with Identified Sites in Cal Water Service Area				**373**	
NA	Additional 2nd Units	Cal Water	Single Family Residential	145	2035
Total Units Proposed in Cal Water Service Area				**518**	
1	I-280 and Sand Hill (Banana Site)	Menlo Park	Vacant	52	2035
3	Corpus Christi	Menlo Park	Vacant	30	2035
6	St. Patrick's Seminary	Menlo Park	Vacant	25	2035
7	125-135 Willow Rd	Menlo Park	Office: Multi-Story	10	2035
8	555 Willow	Menlo Park	Restaurant	8	2035
9	Veterans Affairs Clinic	Menlo Park	Vacant	60	2035
10	MidPen's Gateway Apts	Menlo Park	Multifamily Residential	42	2035
11	MidPen's Gateway Apts	Menlo Park	Multifamily Residential	36	2035
12	Hamilton Ave East	Menlo Park	Light Industrial and Vacant	216	2015
14	Haven Ave	Menlo Park	Light Manufacturing, Storage, and Vacant	464	2015
Total Units with Identified Sites in MPMWD Service Area				**943**	
NA	Additional 2nd Units	Menlo Park	Single Family Residential	115	2035
Total Units Proposed in MPMWD Service Area				**1058**	

The City estimates that each new unit will house 2.55 persons on average and the population increase associated with the project is 3,361 persons.

1.3 Scope of Analysis

This WSA describes the relationship between the future demands associated with the Project in both MPMWD's and Cal Water's service areas and the availability of water supply under different climatic conditions. This WSA has been prepared to assist the City in evaluating the impacts of the Project on the water supply.

Specifically, this WSA:

- Provides information on MPMWD's and Cal Water's water supply that is consistent with Water Code Sections 10620 et. seq. (the Urban Water Management Act) and 10910 et. seq. (Water Supply Planning to Support Existing and Planned Future Uses);
- Provides information on current water demands and projected water demands based on the City's Housing Element Update and the water demands associated with the proposed units in the Update; and
- Compares water supplies and water demands for the normal, single dry and multiple dry years.

1.3.1 Urban Water Management Plans

MPMWD adopted its "2010 UWMP" on June 14, 2011. The UWMP, which is incorporated by reference, can be found at http://www.menlopark.org/departments/pwk/MP_2010_UWMP_Final.pdf.

Cal Water adopted its "2010 UWMP" for the Bear Gulch district on June 24, 2011. The UWMP, which is incorporated by reference, can be found at (https://www.calwater.com/your_district/uwmp/bg/2010_Urban_Water_Management_Plan_(BG).pdf)

Each UWMP conforms to the requirements of the Urban Water Management Planning Act and includes:

- A description of the water service area including climate, current and projected population and other demographic factors that affect water management planning;
- A description and quantification of the existing and planned water sources;
- A description of the reliability and vulnerability of the water supply to seasonal or climatic shortages in the average water year, single dry water year and multiple dry water year;
- Contingency plans including demand management and conjunctive use potential;
- A description of current and projected water demands among all user classes in 5-year increments;
- A description of all water supply projects and water supply programs that may be undertaken by MPMWD, Cal Water, their wholesale supplier the San Francisco Public Utilities Commission (SFPUC) and their regional representative, the Bay Area Water Supply and Conservation Agency (BAWSCA).

In order to comply with the requirements of the Water Conservation Act of 2009 (SBx7-7) both UWMPs include a "baseline" water use and water use targets for 2015 and 2020. These targets, which are expressed as water use in gallons per capita per day (gpcd) will be used to validate each water suppliers' compliance with SBx7-7 requirements to reduce water use by 20 percent from the baseline by 2020.

The targets, which are discussed in detail in Chapter 4 of this WSA, effectively serve to cap future demands.

1.3.2 Previous Water Supply Assessments

Three previous WSAs have been prepared for the MPMWD and Cal Water Service Areas.

The Menlo Gateway WSA was prepared to support a 2009 Environmental Impact Report (EIR) for a 15.9 acre mixed used project in the MPMWD service area. This WSA predated MPMWD's 2010 UWMP and the demands documented in the Menlo Gateway WSA were included in MPMWD's 2010 UWMP.

The Water Supply Assessment for the El Camino Real/Downtown Specific Plan Project was prepared in April 2011 to support an EIR for a specific plan covering approximately 130 acres in the City's downtown core in the Cal Water service area. This WSA predated Cal Water's 2010 UWMP and the demands documented in the El Camino Real/Downtown Specific Plan were included in Cal Water's 2010 UWMP.

The Water Supply Assessment for the Menlo Park Facebook Campus Project was completed in November 2011 to support an EIR for the redevelopment of two sites, totaling 79 acres, for a corporate campus in the MPMPW service area. This WSA was developed after the completion of MPMWD's 2010 UWMP but it concluded that the planned demands were consistent with and included in the non-residential demand allowance projected in the 2010 UWMP.

1.4 Structure of this Report

This report is structured to facilitate the presentation of information required by the Water Code and to outline the analysis necessary to evaluate the sufficiency of water supply to meet planned growth.

Table 1.2 – Index of SB 610 Requirements

Required Element	Location in Documents
Description of Service Area	Section 2.1
Population Projections in 5-year Increaments	Table 2.1
Description and Quantification of Water Supplies	Section 3.1 and 3.2
Description of Supply Reliability to Climate Conditions	Section 3.1 and 3.2
Description of Contingency Plans	*
Description of Demand Management Potential	Section 4.5
Projection of Water Demands in 5-year Increments	Tables 4.3, 4.5, and 5.1-5.6
Description of Projects & Programs Undertaken to Meet Demands	Section 5.2
Description of Demand Management Measures Employed	*
Determination of Supply Sufficiency under Normal, Single & Multiple Dry Years	Section 5.1
Identification of Water Supply Entitlements & Rights and water received under rights	Section 3.0
Information related to capital outlay programs for financing delivery of water supply	Section 5.2
Information on permits needed and regulatory requirements associated with water supply	Section 5.3
* Demand Managment and Contingency Planning discussion incorporates the MPMWD and Cal Water 2010 Urban Water Management Plans as allowed by SB 610	

2 Water Service Area

The City is located in the San Francisco Bay Area, in San Mateo County, approximately halfway between San Francisco and San Jose. The city is bordered by Atherton and Redwood City to the north, East Palo Alto to the east, Woodside to the west and Palo Alto and Portola Valley to the south. The city covers approximately 18 square miles, of which approximately 12 square miles consist of San Francisco Bay and wetlands. The City reports its 2012 population as 32,513 people. There are 12,388 households in Menlo Park, with an average household size of 2.55 people.[1]

The City is served by two primary water purveyors, MPMWD and Cal Water. Figure 2.1 illustrates the service area of each utility.

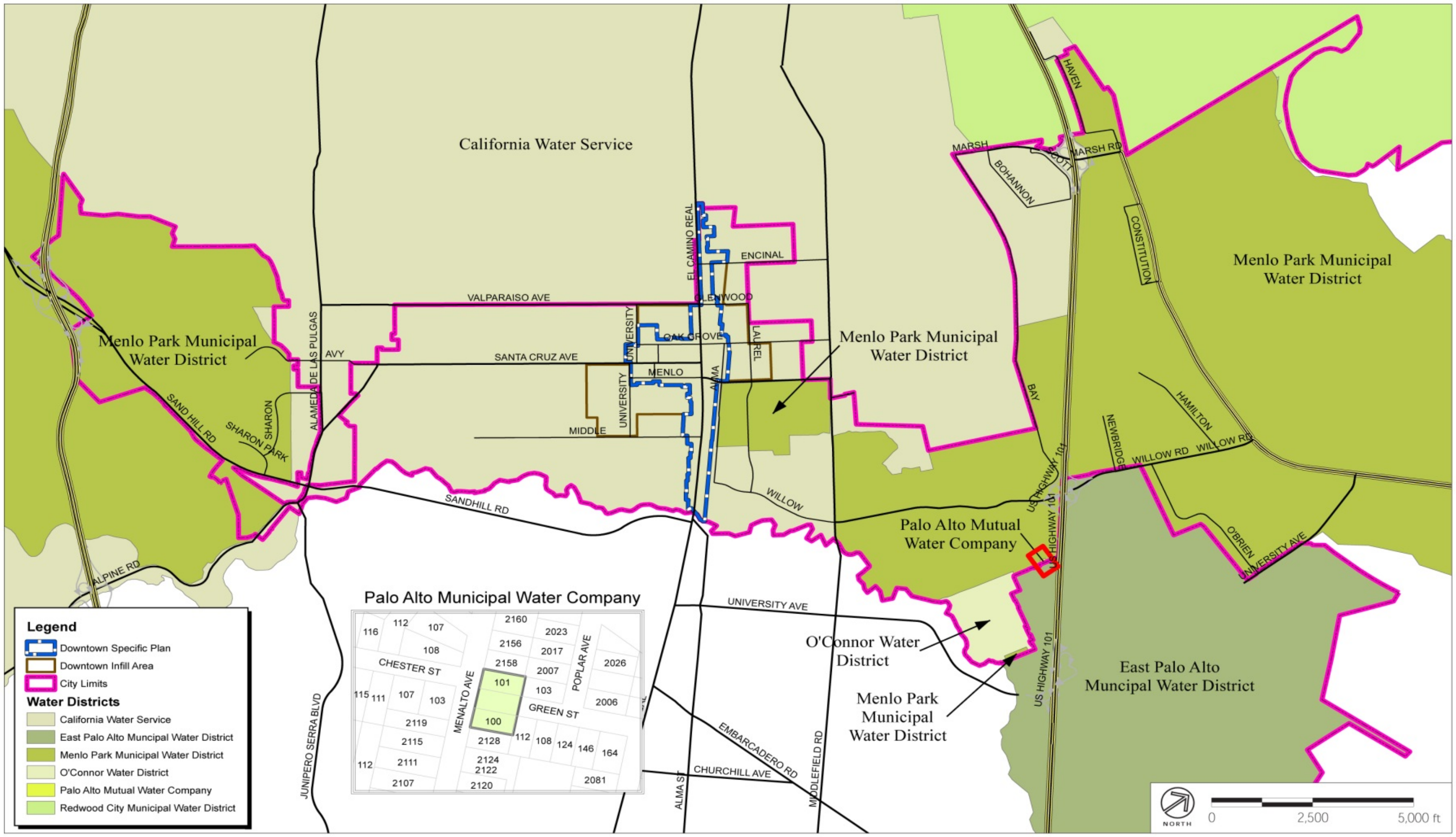
MPMWD's service area includes approximately 40 percent of the City's population and is divided into four zones:

- The Lower Zone is located north and east of El Camino Real and serves primarily residential and small commercial land uses. The zone includes the Belle Haven, Bay Road, and Willows neighborhoods.
- The High Pressure Zone is located in northern Menlo Park between Highway 101 and the Bayfront Expressway and serves primarily industrial land uses. It includes the Bohannon Industrial Park and Tyco Properties. The high pressure zone is hydraulically disconnected from the other zones with inter-tie capabilities.
- The Upper Pressure Zone is located in western Menlo Park and is geographically and hydraulically disconnected from other zones. It serves primarily the residential Sharon Heights neighborhood, the Sharon Heights Golf Course and the SLAC National Accelerator Lab.
- The Business Park Zone is located along O'Brien Drive between Willow Road and University Avenue. It serves primarily light industrial land uses.

The Cal Water service area includes the remaining portion of the City of Menlo Park as well as the communities of Atherton, Portola Valley, Woodside, and adjacent unincorporated portions of San Mateo County.

[1] State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties, and the State, January 2011 and 2012, with 2010 Benchmark. Sacramento, California, May 2012.

WATER SUPPLY ASSESSMENT FOR THE CITY OF MENLO PARK
HOUSING ELEMENT UPDATE



Source: City of Menlo Park, The Planning Center | DC&E, 2012

FIGURE 2.1
WATER DISTRICT MAP

2.1 Population

The City is essentially built-out and future population growth is assumed to be associated with redevelopment projects within the existing urban footprint, such as those anticipated by the Project. The United States Census has reported the City's 2000 population as 30,781 persons and its 2010 population as 32,077 persons. As noted above, the City reports its 2012 population at 32,513 persons.

2.1.1 Comparison to 2010 UWMPS

The City's population is covered in two 2010 UWMPs:

- MPMWD's UWMP, which covers a portion of the City, and
- Cal Water's UWMP which covers its Bear Gulch District, a service area much larger than the City.

In its 2010 UWMP, MPMWD estimated its 2010 service population was 14,198 (about 40 percent of the total City population). This population figure was used to establish MPMWD's water use targets. Total projected water demand was calculated based on projections of both residential and non-residential growth. MPMWD's demand projections assumed a very modest residential growth rate of 0.42 percent annually and a strong growth in the Commercial-Industrial-Institutional (CII) sectors. The 2010 UWMP explicitly included estimates for near term, largely commercial, development projects including:

- Menlo Gateway (the Bohannon Project) for which the City has an approved WSA;
- GM Site – Sun and Facebook Project for which the City has an approved WSA;
- Business Park, which is included within the general non-residential growth analysis; and
- Hamilton Avenue East, which is included within the general residential growth allowance and which is one of the fourteen developments that are the subject of this WSA.

The remaining residential growth contemplated by the Project, was not specifically planned for in MPMWD's 2010 UWMP.

Because Cal Water's service area is much larger than the City, it is difficult to directly correlate Cal Water's population projections to the planned City growth. In its 2010 UWMP, Cal Water projected that population in its service area would grow from 57,254 persons in 2010 to 64,573 in 2035. This is an annual growth rate of 0.51 percent per year, which is higher than the growth rate used in the City's UWMP. While Cal Water did not specifically delineate planned projects within its UWMP growth projections, it did acknowledge that growth in the Menlo Park portion of its service area was expected to consist of redevelopment to multifamily uses. This is consistent with the Water Supply Assessment for the City's El Camino Real /Downtown Specific Plan, which was prepared concurrently with the Cal Water UWMP.[2]

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[2] California Water Service Company, 2010 Urban Water Management Plan Bear Gulch District, June 2011

2.1.2 Population Used in the this WSA

Because of the different service area limits, the UWMPs do not provide for straight forward projection of the City's projected population. However, other City and regional planning documents do provide projections about planned growth in the City as a whole. Table 2.1 illustrates population projections for the City's service area based on projections from the Association of Bay Area Governments (ABAG).

Table 2.1 – City Population: Current and Projected

Population – Current and Projected							
	2010	**2015**	**2020**	**2025**	**2030**	**2035**	**Data Source**
City Limits	31,700	33,434	34,600	35,900	37,200	38,500	*Association of Bay Area Governments 2009*
Note: 2015 Projections assume the completion of the proposed Hamilton & Haven Projects							

These projections equate to an annual growth rate of 0.8 percent, which is higher than the projections in either MPMWD's or Cal Water's UWMP. This likely reflects the fact that at least some of the growth anticipated by ABAG and the Housing Element Update was not included in the UWMP projections.

2.2 Climate

The project area has a Mediterranean climate characterized by cool, wet winters and warm, dry summers. Rainfall averages 15.2 inches per year (measured at Palo Alto) and is generally concentrated in the wet season from late October to early May. Cal Water's Bear Gulch UWMP notes that average rainfall of 29.5 inches is measured at Woodside, illustrating the range of rainfall across that service area. Table 2.2 presents the base climate data for the City, which is brought forward from MPMWD UWMP.

TABLE 2.2 – CLIMATE

	Standard average ETo*, in	Average rainfall, in	Average temperature, °F
January	1.48	3.23	48.1
February	1.88	2.88	51.3
March	3.35	2.22	53.7
April	4.74	0.99	56.6
May	5.36	0.37	60.7
June	6.25	0.08	65.0
July	6.74	0.02	66.5
August	5.99	0.05	66.6
September	4.52	0.18	65.5
October	3.43	0.71	60.6
November	1.82	1.86	53.5
December	1.48	2.69	48.1
Annual	**47.04**	**15.28**	**58.0**
* ETo, or evapotranspiration, is the loss of water from evaporation and transpiration from plants.			
Rain and temperature values from Palo Alto CA NOAA Station #046646 over 1951 to 2004			
Evapotranspriation values are from Union City CIMIS station # 171			

3 Water Supply

This section provides an overview of the water supplies for MPMWD and Cal Water. The City and County of San Francisco's Regional Water System (RWS), operated by the San Francisco Public Utilities Commission (SFPUC), is the major water supply source for both the MPMWD and Cal Water's Bear Gulch District. The RWS supplies twenty-six wholesale customers as well as the City and County of San Francisco. The "Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County" (July 2009, hereinafter "2009 Water Supply Agreement") governs this relationship. The most recent supply allocation document developed under the 2009 Water Supply Agreement is included in Appendix A.

Cal Water's Bear Gulch District also sources surface water from within its watershed, while MPMWD is actively working to develop a groundwater supply that will add emergency reliability to its overall supply portfolio. Tables 3.1 and 3.2 provide a summary of existing and planned water supply sources in acre-feet per year (AFY), as outlined in the UWMPs for MPMWD and Cal Water. Each supply is discussed in detail below.

Table 3.1 – MPMWD Existing and Planned Sources of Water in AYF

Wholesale Sources	Contracted Volume	2015	2020	2025	2030	2035
San Francisco Public Utilities Commission*	4,993.0	4,993.0	4,993.0	4,993.0	4,993.0	4,993.0
BAWSCA Long Term Strategy	-	-	-	-	-	-
Groundwater Supplies**	-	-	-	-	-	-
Totals	**4,993.0**	**4,993.0**	**4,993.0**	**4,993.0**	**4,993.0**	**4,993.0**

*From Appendix A to the Agreement for Water Supply between San Francisco PUC and Wholesale

** Groundwater will be developed as an "emergency supply" in accordance with California Department of Public Health requirements which means the supply can be used for 5 consecutive days and no more than 15 days total in a year.

Table 3.2 – Cal Water Existing and Planned Sources of Water in AFY

Wholesale Sources	2010 Actual	2015	2020	2025	2030	2035
San Francisco Public Utilities Commission	11,824	12,579	11,362	11,715	12,088	12,483
Supplier produced groundwater	-	-	-	-	-	-
Supplier surface diversions	1,084	1,260	1,260	1,260	1,260	1,260
Other	-	-	-	-	-	-
Totals	**12,908**	**13,839**	**12,622**	**12,975**	**13,348**	**13,743**

Reference: Table 4.1-1, 2010 UWMP Bear Gulch District

3.1 San Francisco Public Utilities Commission Regional System

The SFPUC Regional Water Supply (RWS) is predominantly from the Sierra Nevada, delivered through the Hetch Hetchy aqueducts, but also includes treated water produced by the SFPUC from its local watersheds and facilities in Alameda and San Mateo Counties. The amount of imported water available to the SFPUC's retail and wholesale customers is constrained by hydrology, physical facilities, and the institutional parameters that allocate the water supply of the Tuolumne River. Due to these constraints, the SFPUC is very dependent on reservoir storage to firm-up its water supplies.

The SFPUC serves its retail and wholesale water demands with an integrated operation of local Bay Area water production and imported water from Hetch Hetchy. In practice, the local watershed facilities are operated to capture local runoff.

3.1.1 Water System Improvement Plan

In order to enhance the ability of the SFPUC water supply system to meet identified service goals for water quality, seismic reliability, delivery reliability, and water supply, the SFPUC has undertaken the Water System Improvement Program (WSIP), approved October 31, 2008. The WSIP will deliver capital improvements aimed at enhancing the SFPUC's ability to meet its water service mission of providing high quality water to customers in a reliable, affordable and environmentally sustainable manner. The WSIP includes a total delivery reliability goal of 265 MGD of supply with no greater than 20 percent rationing in any one year of a drought.

In approving the WSIP, SFPUC's five-member governing commission (Commission) adopted a Phased WSIP Variant for water supply that was analyzed in its CEQA document. This Phased WSIP Variant established a mid-term water supply planning milestone of 2018 when the Commission is scheduled to reevaluate water demands through 2030. At the same meeting, the Commission also imposed the Interim Supply Limitation (ISL), which limits the volume of water that the member agencies and San Francisco can collectively purchase from RWS to 265 MGD, until at least 2018. Although the Phased WSIP Variant included this mid-term water supply planning milestone, it also included full implementation of all proposed WSIP improvement projects to insure that the public health, seismic safety, and delivery reliability goals were achieved as soon as possible.

According to the WSIP Regional Projects Quarterly Report for the first quarter of 2012/13, all planning activities have been completed, with environmental, design and construction work at 92 percent, 96 percent, and 62 percent complete respectively.

3.1.2 2009 Water Supply Agreement

The business relationship between San Francisco and its wholesale customers is largely defined by the 2009 Water Supply Agreement, which replaced the Settlement Agreement and Master Water Sales Contract that expired in June 2009. The 2009 Water Supply Agreement addresses the rate-making methodology used by San Francisco in setting wholesale water rates for its wholesale customers, and water supply and water shortages for the RWS. The 2009 Water Supply Agreement has a 25-year term and is supplemented by Individual Water Supply Contracts.

As described above, the approved WSIP includes an ISL, to limit sales from the San Francisco RWS watersheds to an annual average of 265 MGD through 2018. The 2009 Water Supply Agreement provides for a 184 MGD “Supply Assurance” (expressed on an annual average basis) to SFPUC’s wholesale customers and an 81 MGD “Supply Assurance” to San Francisco. These assurances are subject to reduction, to the extent and for the period made necessary by reason of water shortage, due to drought, emergencies, or by malfunctioning or rehabilitation of the RWS. Although the wholesale customers did not agree to the ISL, the 2009 Water Supply Agreement provides a framework for administering the ISL, which is discussed below.

3.1.2.1 Individual Supply Guarantees

MPMWD’s Individual Supply Guarantee (ISG), as described in the 2009 Water Supply Agreement and its contract, is 4.465 MGD (or approximately 4,993 AFY).

Cal Water has three services areas that receive water from the RWS. These are the South San Francisco District, the Mid-Peninsula District and the Bear Gulch District. Cal Water’s ISG is for all three districts and totals 35.68 MGD (39,967 AFY) in normal hydrologic years. The amount available to the Bear Gulch District in any given year varies, and depends on the availability of local supplies both in Bear Gulch and in the other Cal Water districts[3]. In its 2010 UMWP, Cal Water indicated that the Bear Gulch District will receive between 11.45 and 12.85 MGD or about one third of the ISG.

Although the 2009 Water Supply Agreement and accompanying Water Supply Contracts expire in 2034, the Supply Assurance (which quantifies San Francisco’s obligation to supply water to its individual wholesale customers) survives its expiration and continues indefinitely.

Each agency’s UWMP provides additional discussion on the supply contracts.

3.1.2.2 Interim Supply Allocations

The Interim Supply Allocations (ISAs) refer to each individual wholesale customer’s share of the ISL. On December 14, 2010, the Commission established each agency’s ISA through 2018. In general, the Commission based the allocations on the lesser of the projected fiscal year 2017-18 purchase projections or the ISGs. The ISA’s are effective only until December 31, 2018, and do not affect the Supply Assurance or the ISGs.

MPMWD’s ISA is 4.1 MGD or approximately 4,590 AFY.

[3] California Water Service Company, 2010 Urban Water Management Plan Bear Gulch District, June 2011

Cal Water's ISA is 35.68 MGD, to be shared amongst its Bear Gulch, South San Francisco, and Mid-Peninsula Districts[4].

As stated in the Agreement, the wholesale customers do not concede the legality of some of the Commission's actions, including establishment of the ISA, and expressly retain the right to challenge these provisions, if and when imposed, in a court of competent jurisdiction.

3.1.3 Water Shortage Allocation Plan

The 2009 Water Supply Agreement includes a Water Shortage Allocation Plan (WSAP) that addresses shortages of up to 20 percent of system-wide use. The Tier One Shortage Plan allocates water from the RWS between San Francisco and the wholesale customers, during system-wide shortages of 20 percent or less. The WSAP also anticipated a Tier Two Shortage Plan, adopted by the wholesale customers, which would allocate the available water from the RWS among the wholesale customers.

3.1.3.1 Tier One Drought Allocations

The Tier One Shortage Plan replaced the prior Interim Water Shortage Allocation Plan, adopted in 2000, which also allocated water for shortages up to 20 percent. The Tier One Plan also allows for voluntary transfers of shortage allocations between the SFPUC and any wholesale customer and between wholesale customers themselves. In addition, water "banked" by a wholesale customer, through reductions in usage greater than required, may also be transferred. Table 3.3 illustrates the Tier One Plan Allocations.

Table 3.3 Tier 1 Drought Reductions

Level of System Wide Reduction in Water Use Required	Share Available	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The Tier One Plan will expire in 2034 at the end of the term of the Agreement, unless extended by SFPUC and the wholesale customers.

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[4] California Water Service Company, 2010 Urban Water Management Plan Bear Gulch District, June 2011

3.1.3.2 Tier Two Drought Allocations

The wholesale customers have negotiated and adopted the Tier Two Plan, the second component of the WSAP, which allocates the collective wholesale customer share among each of the 26 wholesale customers. This Tier Two allocation is based on a formula that takes multiple factors for each wholesale customer into account, including:

- The ISG;
- Seasonal use of all available water supplies; and
- Residential per capita use.

The water made available to the wholesale customers collectively, will be allocated among them in proportion to each wholesale customer's Allocation Basis, expressed in MGD, which in turn is the weighted average of two components:

1. The wholesale customer's ISG that is fixed and stated in the Agreement;
2. The Base/Seasonal Component, which is variable and calculated using the monthly water use for three consecutive years prior to the onset of the drought for each of the wholesale customers for all available water supplies.

The second component is accorded twice the weight of the first fixed component in calculating the Allocation Basis. Minor adjustments to the Allocation Basis are then made to ensure a minimum cutback level, a maximum cutback level, and a sufficient supply for certain wholesale customers.

The Allocation Basis is used in a fraction, as numerator, over the sum of all wholesale customers' Allocation Bases to determine each wholesale customer's Allocation Factor. The final shortage allocation for each wholesale customer is determined by multiplying the amount of water available to the wholesale customers collectively under the Tier One Plan, by the wholesale customer's Allocation Factor.

The Tier Two Plan requires that the Allocation Factors be calculated by BAWSCA each year in preparation for a potential water shortage emergency. As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. However, for long-term planning purposes, each wholesale customer shall use as its Allocation Factor, the value identified in the Tier Two Plan when adopted. The Tier Two Plan will expire in 2018 unless extended by the wholesale customers.

3.1.4 Reliability of the Regional Water System

The SFPUC has historically met demand in its service area in all year types from its watersheds, including the Tuolumne River watershed, the Alameda Creek watershed and the San Mateo County watersheds. In general, 85 percent of the supply comes from the Tuolumne River through Hetch Hetchy Reservoir and the remaining 15 percent comes from the local watersheds through the San Antonio, Calaveras, Crystal Springs, Pilarcitos and San Andreas Reservoirs. The adopted WSIP retains this mix of water supply for all year types.

The WSIP includes the following water supply projects to meet dry-year demands, with no greater than 20 percent system-wide rationing in any one year:

- Restoration of Calaveras Reservoir capacity
- Restoration of Crystal Springs Reservoir capacity
- Westside Basin Groundwater Conjunctive Use
- Water Transfer with Modesto Irrigation District (MID) / Turlock Irrigation District (TID)

The SFPUC has provided a projection of water supply reliability. The "Projected System Supply Reliability Based on Historical Hydrologic Period" (letter from P. Kehoe dated February 22, 2010), presents the projected RWS supply reliability under a range of hydrologic conditions and takes into account the impacts of climate change as SFPUC currently understands them.[5] This letter is included in Appendix B.

The reliability projections assume that the wholesale customers purchase 184 MGD from the RWS through 2030 and that SFPUC implements the dry-year water supply projects included in the WSIP. The projections represent the wholesale share of available supply during historical water year types per the Tier One Water Shortage Allocation Plan (WSAP). The projections do not reflect any potential impact to RWS yield from the additional fishery flows required as part of Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project, which are described below.

SFPUC has translated these dry year projections into reductions to the total 184 MGD water supply available to its wholesale customers. SFPUC's projections indicate that a 10 percent system-wide reduction in supply will occur in a single dry year and a 20 percent system-wide reduction will occur in multiple dry years. This is slightly higher than the mathematical relationship between predicted "average" and "dry years" and reflects some ability to manage dry conditions through system storage.

Table 3.4 illustrates the anticipated reductions in service reliability that could be experienced by MPMWD and Cal Water's Bear Gulch district when wholesale supplies are reduced during single dry and multiple dry water years.

[5] See MPMWD UWMP for additional discussion.

Table 3.4 - SFPUC Regional Water System Reliability

Water Supply Sources	Average/Normal Water Year Supply	Single-Dry Water Year	Multiple-Dry Water Years		
			Year 1	Year 2	Year 3
San Francisco PUC (to customers) (AFY)	206,121	170,946	170,946	148,429	148,429
Percent of Average/Normal Year	100%	83%	83%	72%	72%
MPMWD supply (AFY)	4,993	4,141	4,141	3,596	3,596
MPMWD Percent of Average/Normal Year	100%	83%	83%	72%	72%
Cal Water Bear Gulch (AFY)	14,069	11,523	11,523	11,535	11,064
Cal Water Bear Gulch Percent of Average/Normal Year	100%	82%	82%	82%	79%
Note: Cal Water information from Table 5.2-3 of 2010 UWMP. Reflects the portion of Cal Water's ISG allocated to Bear Gulch					

3.1.4.1 Impact of Recent SFPUC Actions on Dry Year Reliability of SFPUC Supplies

When it adopted the project specific approvals for the Calaveras Dam Replacement Project and the Lower Crystal Springs Dam Improvements Project, which are part of the WSIP, the SFPUC committed to providing fishery flows below Calaveras Dam and Lower Crystal Springs Dam, as well as bypass flows below Alameda Creek Diversion Dam (ACDD). Together, the fishery flow schedules represent a potential decrease in available average annual water supply of 7.4 MGD or 3.9 MGD on Alameda Creek and 3.5 MGD on San Mateo Creek. This could slightly increase the SFPUC's dry-year water supply needs and may result in a need for additional reductions in demand, increases in rationing, or a supplemental supply, each of which are described below. If these supply reductions do occur, they would be temporary. Completion of the WSIP in 2018 will result in design reliability and no more than 20 percent shortfalls.

The potential shortfall related to the fishery flow schedule for the Lower Crystal Springs Dam Improvements Project could begin in 2013. The potential shortfall related to the fishery flow schedule for the Calaveras Dam Replacement Project could begin in 2015.

3.1.4.2 Increase in Supply Rationing

The adopted WSIP provides for a dry year water supply program that, when implemented, would result in system-wide rationing of no more than 20 percent. The Programmatic Environmental Impact Report (PEIR) for the WSIP identified the following drought shortages during the design drought; 3.5 out of 8.5 years at 10 percent rationing and 3 out of 8.5 years at 20 percent.

If the SFPUC did not develop a supplemental water supply in dry years to offset the effects of the fishery flows on water supply, rationing would increase during dry years. If the SFPUC experiences a drought between 2013 and 2018, in which rationing would need to be imposed, rationing would increase by approximately 1 percent in shortage years. Basically reduced flows for fisheries could require supply rationing to increase from 20 percent to 21 percent if the maximum design drought occurs between the years 2013 and 2018. After 2018, completion of the WSIP would provide for the reliability goal of system-wide supply rationing of no more than 20 percent.

3.1.4.3 Supplemental Supply

The SFPUC may be able to manage the water supply loss associated with the fishery flows through the following actions and considerations:

- Development of additional conservation and recycling;
- Development of additional groundwater supply;
- Water transfers from MID or TID;
- Increase in Tuolumne River supply;
- Revising the Upper Alameda Creek Filter Gallery Project capacity[6]; and
- Development of a desalination project.

3.1.4.4 Meeting the Level of Service Goal for Delivery Reliability

The SFPUC has stated a commitment to meeting its contractual obligation to its wholesale customers of 184 MGD and its delivery reliability goal of 265 MGD with no greater than 20 percent rationing in any one year of a drought. The Commission is working closely with its staff to develop strategies for meeting the service goal for delivery reliability. In Resolution No. 10-0175 adopted by the Commission on October 15, 2010, staff was directed to provide information on how SFPUC has the capability to attain its water supply levels of service and contractual obligations. This directive was in response to concerns expressed by the Commission and the Wholesale Customers regarding the effect on water supply of the instream flow releases required as a result of the Lower Crystal Springs Dam Improvement Project and the Calaveras Dam Replacement Project.

While, the SFPUC has a projected shortfall of available water supply to meet its Level of Service goals and contractual obligations, the SFPUC has stated that current decreased levels of demand keep this from being an immediate problem. In the near future, the SFPUC must resolve these issues. Various activities are underway by the SFPUC to resolve the shortfall problem.

SFPUC has reported regularly on future water supply and demand balances, most recently in its 2012 Water Supply Development Report (December 3, 2012). In that report, SFPUC documented that it had implemented the Harding Park Recycled Water Project and was nearing completion on its Sharp Park Recycled Water Project, bringing new nonpotable water supplies into the service area. The 2012 Water Supply Report also documents planning progress made by BAWSCA.

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[6] The adopted WSIP included the Alameda Creek Fishery Enhancement project, since renamed the Upper Alameda Creek Filter Gallery (UACFG) project, which had the stated purpose of recapturing downstream flows released under a 1997 California Department of Fish and Game MOU. Implementation of the UACFG project was intended to provide for no net loss of water supply as a result of the fishery flows bypassed from ACDD and/or released from Calaveras Dam. At the time the PEIR was prepared, the UACFG was described in the context of recapturing up to 6,300 AF per year. The UACFG will undergo a separate CEQA process in which all impacts associated with the project will be analyzed fully.

The 2012 Water Supply Development Report indicates that projected demands can be met with available supplies and will total less than 265 MGD in 2035. While this report supports the near-term reliability of the system, SFPUC continues to acknowledge the need to develop alternative supply strategies to make up for the instream flow reductions losses and to meet long-term demands beyond the 2018 ISL deadline.

3.2 Bay Area Water Supply and Conservation Agency

BAWSCA was created on May 27, 2003, to represent the interests of the 26 agencies that purchase water on a wholesale basis from the San Francisco RWS. MPMWD and Cal Water are both members of BAWSCA, which is the only entity that has the authority to directly represent the needs of the wholesale customers that depend on the RWS. BAWSCA also has the authority to coordinate water conservation, water supply and water recycling activities for its member agencies; acquire water and make it available to other agencies on a wholesale basis; finance projects, including improvements to the RWS; and build facilities jointly with other local public agencies or on its own to carry out the agency's purposes. There are two significant BAWSCA activities that impact the Cal Water and MPMWD's water supply and demand projections; the Water Conservation Implementation Plan (WCIP) and the Long Term Reliable Water Supply Strategy.

3.2.1 Water Conservation Implementation Plan

In September 2009, BAWSCA completed the WCIP (http://bawsca.org/docs/WCIP_FINAL_Report.pdf). The WCIP includes 37 potential demand management activities, including 32 existing measures and five new measures that were defined and developed as part of the WCIP. It is an implementation plan for BAWSCA and its member agencies to attain the water use efficiency goals that BAWSCA's member agencies committed to in 2004 as part of the Program Environmental Impact Report (PEIR) for the WSIP. The WCIP also identifies how BAWSCA member agencies can use water conservation as a way to continue to provide reliable water supplies to their customers through 2018 given the SFPUC's 265 MGD ISL. The WCIP included development of a mathematical model for each BASWCA member agencies conservation program.

Both MPMWD and Cal Water are working with BASWSC to implement water conservation programs. Water conservation efforts support the ISL commitments and allow each supplier to meet the 2020 water use target adopted with the 2010 UWMPs.

3.2.2 Long Term Reliable Water Supply Strategy

BAWSCA is developing the Long-Term Reliable Water Supply Strategy (BAWSCA Strategy) to meet the projected water needs of its member agencies and their customers through 2035 and to increase their water supply reliability under normal and drought conditions. The BAWSCA Strategy is proceeding in three phases.

Phase I was completed in 2010 and defined the magnitude of the water supply issue and the scope of work for the BAWSCA Strategy. The original schedule for the Strategy identified January 2013 as the end of the planning phase. As a result of the significant changes in projected water demands and supply needs, which directly impact the results necessary from the Strategy, the schedule for completing the Strategy has been revised. On July 3, 2012, BAWSCA released the Strategy Phase II A document which presented the results of the work to date including the following three recommended actions for consideration by the BAWSCA Board:

- Complete the Reprogrammed Phase II A work and other identified work to complete the Strategy;
- Develop a plan for a pilot water transfer with East Bay Municipal Utility District or Santa Clara Valley Water District; and
- Update the demand and water conservation projections for BAWSCA member agencies using a common methodology.

The BAWSCA Board adopted the necessary recommendations at its meeting in September 2012. The current schedule shows completion of the Strategy by December 2014. The development and implementation of the BAWSCA Strategy will be coordinated with the BAWCSA member agencies and will be adaptively managed to ensure that the goals of the BAWSCA Strategy (increased normal and drought year reliability) are efficiently and cost-effectively being met.

3.3 Groundwater

MPMWD does not currently use groundwater, but is currently evaluating several well sites in order to supplement its emergency potable and fire water supply. As discussed in its 2010 UWMP, MPMWD has conducted a series of preliminary studies and is actively pursuing the development of a well-field that could produce up to 3,000 gallons per minute (GPM) (approximately 4.32 MGD). MPMWD plans to permit the supply as an active well field for emergency use under California Department of Public Health's rules. Emergency supplies can be used for five (5) consecutive days and for less than 15 days per year. MPMWD anticipates this supply would help it address short term service interruptions, but would not provide long-term additional supply volume. MPMWD's 2010 UWMP provides additional detail on the geology of the groundwater basin and studies regarding safe yield of the basin.

Cal Water does not have any groundwater wells that supply water to the Bear Gulch District.

3.4 Surface Water

Surface water supplies approximately five precent of the Bear Gulch District's water requirements. It is collected from the Bear Gulch Creek, which drains a 1,500 acre watershed owned by Cal Water, through two diversion facilities and is stored in Bear Gulch Reservoir prior to use. This surface water is treated at the outlet of the Bear Gulch Reservoir prior to entry into the distribution system.

The Bear Gulch Reservoir relies on rainfall and surface runoff as its water supply. During dry periods, the reservoir will not replenish and this is reflected in the fact that annual production from the reservoir ranges from a high of 2,812 AF (916 MG) to a low of 319 AF (103 MG) per year. Table 3.5 illustrates the reliability of the Bear Gulch water supply as documented in Cal Water's 2010 UWMP.

Table 3.5 – Cal Water Surface Water Supply Reliability

Supply Reliability – Current Water Sources					
Water Supply Sources	**Average/Normal Water Year Supply**	**Single-Dry Water Year**	**Multiple-Dry Water Years**		
			Year 1	**Year 2**	**Year 3**
Supplier-produced surface water (AFY)	1,260	351	609	609	609
Percent of Average/Normal Year	**100%**	**28%**	**48%**	**48%**	**48%**
Reference: Table 5.2-3, 2010 UWMP Bear Gulch District					

4 Water Demands

This section provides an overview of the water demand baseline and water delivery targets presented within the MPMWD and Cal Water 2010 UWMPs, and the demand projections associated with the Project.

4.1 MPMWD's UWMP Water Demand Projection

In its 2010 UWMP, MPMWD developed demand projections taking into account anticipated growth patterns and the per capita demand reduction requirements of The Water Conservation Act of 2009 (SBx7-7). SBx7-7 became effective on January 1, 2010 and requires each urban water supplier to develop a baseline per capita water use (baseline) and 2015 and 2020 water use targets. The targets generally reflect a 10 percent and 20 percent reduction from the baseline, respectively.[7]

In its 2010 UWMP, MPMWD:

- Defined baseline use as 262 gallons per capita per day (gpcd), based on water use in the period from 1996 until 2005;
- Adopted a 2015 interim target of 236 gpcd; and
- Adopted a 2020 target of 210 gpcd.

In its 2010 UWMP, MPMWD acknowledged that water use in its CII class was significantly below 2005 levels, likely reflecting the effects of economic recession. The 2010 UWMP assumed that CII demands would return to 2005 levels by 2015, reflecting planned development and economic growth. Because SBx7-7 requires overall demand reductions by 2015 and 2020, MPMWD developed a water conservation strategy that balanced meeting its water use targets while acknowledging the need for economic growth.

To meet its 2015 water use targets, MPMWD calculated that it needed to achieve 0.25 MGD in demand reductions from 2005 level. MPMWD is planning on achieving a 10 percent reduction in demand for its residential customer classes and a 2 percent savings in its landscape class to meet this target.

In order to meet its 2020 water use targets, MPMWD calculated it needed to achieve 0.62 MGD in demand reductions from 2005 levels. MPMWD is planning on achieving an additional 9 percent reduction in demand for its residential customer classes, an additional 10 percent savings in its landscape class and a 9 percent savings in its CII class between 2015 and 2020, to meet the target.

MPMWD's current demand model demonstrates that MPMWD is on track to achieve 0.36 MGD in savings, from 2005 levels, due to building code changes and its existing demand management program, illustrating that MPMWD will not only meet but exceed its 2015 target. MPMWD's 2010 UWMP

[7] There are four methods for calculating water use targets and the methods may yield different results. MPMWD's 2010 UWMP provides a detailed discussion of the baseline and target calculation.

indicated the need to identify three or four additional BASWCA programs to participate in between 2015 and 2020 to achieve the 2020 target. Because the BAWSCA program includes 37 demand management measures, MPMWD has a range of proven strategies to work with. The UWMP also identified the need to increase spending by approximately 1 percent per year to meet the targets. MPWMD will use BAWSCA's regional reporting process to track demand management progress on an annual basis.

Table 4.1 illustrates MPMWD's demand projections as outlined in its 2010 UWMP. The table illustrates that within its 2010 UWMP, MPMWD planned on very modest residential growth. It anticipated only 59 new single family accounts and 24 new multifamily accounts over the 25 year planning period.

Table 4.1- MPMWD Demand Projections from 2010 UWMP

	2010		2015		2020		2025		2030		2035	
Water Use Sectors	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY
Single family	3,390	1,171.0	3,401	1,053.9	3,413	959.0	3,425	962.4	3,437	965.7	3,449	969.1
Multi-family	183	333.0	187	299.7	192	272.7	197	279.6	202	286.7	207	293.9
CII*	448	1,366.0	474	1,867.0	496	1,680.3	520	1,742.9	544	1,808.2	570	1,876.7
Landscape	121	436.0	121	428.0	126	400.0	126	400.0	126	400.0	126	400.0
Other	6	85.0	5	96.3	5	87.7		86.8		88.6		90.5
Total	**4,148**	**3,391.0**	**4,188**	**3,744.9**	**4,232**	**3,399.7**	**4,268**	**3,471.7**	**4,309**	**3,549.2**	**4,352**	**3,630.2**

* Commercial, Industrial, Institutional/Govermental sectors

4.2 Cal Water's UWMP Water Demand Projection

Cal Water's 2010 UWMP also took into account the requirements of SBx7-7. In its 2010 UWMP for the Bear Gulch district, Cal Water:

- Computed a baseline use of 238 gallons per capita per day (gpcd), based on water use in the period from 2000 until 2009;[8]
- Adopted a 2015 interim target of 214 gpcd; and
- Adopted a 2020 target of 190 gpcd.[9]

In order to calculate future demands, Cal Water multiplied the SBx7-7 targets by the projected population within its Bear Gulch Service area. This resulted in gross future water demand projections. In order to estimate how these demands would be spread across the various water use sectors, Cal Water

[8] Table 3.3-10: California Water Service Company, 2010 Urban Water Management Plan Bear Gulch District, June 2011

[9] Table 3.3-12: California Water Service Company, 2010 Urban Water Management Plan Bear Gulch District, June 2011

used the ratio of individual deliveries for each class of demand (e.g. residential, CII, landscape), to the total historic deliveries. This ratio was applied to the total adjusted baseline demand resulting in the projected deliveries.

Table 4.2 illustrates Cal Water's demand projections for 2015, 2020 and beyond as outlined in its 2010 UWMP. The table illustrates that Cal Water did plan for some increased demand within its residential sector. In particular, the demand in the multi-family residential sector is expected to increase by 200 AFY or over 87 percent over the next 20 years.

Table 4.2 Cal Water Demand Projections from 2010 UWMP

	2010		2015		2020		2025		2030		2035	
Water Use Sectors	**# of Accounts**	**Deliveries AFY**	**# of Accounts**	**Deliveries AFY**	**# of Accounts**	**Deliveries AFY**	**# of Accounts**	**Deliveries AFY**	**# of Accounts**	**Deliveries AFY**	**# of Accounts**	**Deliveries AFY**
Single family	16,781	10,629	16,944	11,067	17,325	10,042.0	17,714	10,267.0	18,111	10,503.0	18,518	10,748.0
Multi-family	80	232	85	339	93	330.0	101	361.0	111	395.0	121	433.0
CII	1,484	1,610	1,561	1,997	1,626	1,859	1,694	1,951	1,766	2,048	1,841	2,153
Commercial	*1,367*	*1,309*	*1,430*	*1,599*	*1,482*	*1,471.0*	*1,537*	*1,525.0*	*1,593*	*1,581.0*	*1,651*	*1,640.0*
Industrial	*1*	*4*	*1*	*4*	*1*	*4.0*	*1*	*4.0*	*1*	*4.0*	*1*	*4.0*
Institutional	*116*	*297*	*130*	*394*	*143*	*384.0*	*156*	*422.0*	*172*	*463.0*	*189*	*509.0*
Landscape	-	-	-	-	-	-	-	-	-	-	-	-
Other	24	19	26	89	25	77	24	74	24	72	23	70
Sub-total *	**18,369**	**12,490**	**18,616**	**13,492**	**19,069**	**12,308**	**19,533**	**12,653**	**20,012**	**13,018**	**20,503**	**13,404**
System losses **		417		347		315		323		331.0		339
Total ***		**12,907**		**13,839**		**12,623**		**12,976**		**13,349**		**13,743**
** Reference: Tables 3.3-2 to 3.3-6, 2010 UWMP Bear Gulch District*												
*** Reference: Table 3.4-1, 2010 UWMP Bear Gulch District*												
**** Corresponds to "BG Demand" values in Table 5.2-4, 2010 UWMP Bear Gulch District*												

4.3 Project Specific Water Demand Projections

4.3.1 Unit Water Demands

In its recent El Camino Real-Downtown Specific Plan EIR, the City and Cal Water considered a Water Supply Assessment for this mixed used proposal that included a number of new multifamily dwelling units, similar to the proposed Project. In this recent EIR, the City and Cal Water used a multifamily residential demand of 112 gallons per day per dwelling unit (gpd/DU) based on Santa Clara County data for multifamily units. [10] Because the proposed Project is very similar to the El Camino Real-Downtown Specific Plan EIR, the same multifamily demand will be applied. This demand factor is equivalent to 0.1255 AFY for each new unit.

[10] Water Supply Assessment for California Water Service Company Bear Gulch District and City of Menlo Park – El Camino Real/Downtown Specific Plan Project (Atkins, 2011)

4.3.2 Project Implementation Scenarios

As described in Section 1, the City has identified more potential housing sites than are required to implement the proposed Housing Plan Element. In order to bracket the water supply implications of the Project, two implementation scenarios have been developed.

- Scenario 1: This scenario has the maximum impact on MPMWD's water service area. It assumes 1,015 new units in the MPMWD service area including 900 units as a result of rezoning and 115 second units. The remaining 303 units required to fully implement the proposed Housing Element would be located in the Cal Water Service Area.

- Scenario 2: This scenario has the maximum impact on Cal Water's service area. It assumes 518 new units in the Cal Water service area including 215 as a result of rezoning, 118 in the downtown infill area, 40 second units in the West Menlo area and 145 additional second units throughout the Cal Water service area (185 second units total). The remaining 800 units required to fully implement the Housing Element would be located in the MPMWD service area.

Both scenarios assume buildout of the proposed Hamilton Avenue East and Haven sites by 2015. This would add 680 units to the MPMWD service area by 2015. The remaining units are assumed to develop at a constant rate between 2015 and 2035.

Both scenarios assume that the new demands on the Hamilton Avenue East and Haven sites are "offset" to some extent by the existing water uses that will be replaced. The Hamilton Avenue East site has an existing demand of 1.0 AFY which will help offset the project demands of 27.1 AFY.[11] The Haven site has an existing demand of 8.2 AFY which will help offset the total Project demands of 58.2 AFY[12]. Because the pattern of the remaining development proposed by the Project cannot be accurately predicted, no other "offsets" are included in the demand calculations, which results in a conservative prediction of demand.

Table 4.3 illustrates the demands associated with each scenario in each service area. Table 4.4 distributes the demand increases over the planning period from 2010 to 2035.

[11] Hamilton Ave East demand is calculates as 0.1255 AFY/unit x 216 units = 27.1 AFY total

[12] Haven demand is calculated 0.1255 AFY/unit x 464 units = 58.2 AFY total

Table 4.3 – Water Demands for Each Planning Scenario

Site Name	Number of New Units Proposed	Demand per New Unit (AFY)	Total Demand per Proposed Development (AFY)	Offsets for UWMP Planning or Existing Use	Total New Demand for Project (AFY)
Scenario 1 - Maximum Demand on MPMWD					
MPMWD Service Area					
Hamilton Ave East	216	0.1255	27.1	1.0	26.1
Haven Ave	464	0.1255	58.2	8.2	50.0
Remaining New Units	335	0.1255	42.0	0	42.0
Totals for MPMPWD	**1015**		**127.4**	**9.2**	**118.2**
Cal Water Service Area					
Total New Units	303	0.1255	38.0	0	38.0
Totals for Cal Water	**303**		**38.0**	**0.0**	**38.0**
Total Demand for Scenario 1					**156.2**
Scenario 2 - Maximum Demand on Cal Water					
MPMWD Service Area					
Hamilton Ave East	216	0.1255	27.1	1.0	26.1
Haven Ave	464	0.1255	58.2	8.2	50.0
Remaining New Units	120	0.1255	15.1	0	15.1
Totals for MPMPWD	**800**		**100.4**	**9.2**	**91.2**
Cal Water Service Area					
Total New Units	518	0.1255	65.0	0	65.0
Totals for Cal Water	**518**		**65.0**	**0.0**	**65.0**
Total Demand for Scenario 2					**156.2**

Table 4.4 – Project Implementation Scenarios

	2010		2015		2020		2025		2030		2035	
	# of New Units	Deliveries AFY	# of New Units	Deliveries AFY	# of New Units	Deliveries AFY	# of New Units	Deliveries AFY	# of New Units	Deliveries AFY	# of New Units	Deliveries AFY
Scenario 1 - Maximum Demand on MPMWD												
MPMWD Service Area	-	-	680	76.1	765	87.4	850	98.7	935	110.0	1,015	118.2
Cal Water Service Area	-	-	-	-	75	9.4	150	18.8	225	28.2	303	38.0
Totals	**-**	**-**	**680**	**76.1**	**840**	**96.8**	**1,000**	**117.6**	**1,160**	**138.3**	**1,318**	**156.2**
Scenario 2 - Maximum Demand on Cal Water												
MPMWD Service Area	-	-	680	76.1	710	79.3	740	82.4	770	86.2	800	91.2
Cal Water Service Area	-	-	-	-	130	16.3	260	32.6	390	48.9	518	65.0
Totals	**-**	**-**	**680**	**76.1**	**840**	**95.6**	**1,000**	**115.0**	**1,160**	**135.1**	**1,318**	**156.2**

4.4 Comparison to the 2010 UWMP

The estimated Project demands were compared against the 2010 UWMP demand forecasts for each water supplier, in order to determine whether sufficient allowance was made in the UWMPs for the additional residential water demands associated with the Housing Element Update developments.

4.4.1 MPMWD

In its 2010 UWMP, MPMWD projected a small increase in the residential sector including 59 new single family accounts and 24 new multifamily accounts. Multifamily accounts are not "submetered" meaning that one account can serve multiple dwelling units. However, as explained above, the 2010 UWMP also employed a strategy of achieving significant reductions in residential unit demands in order accommodate planned nonresidential growth and still meet the adopted SBx7-7 targets. Specifically, the UWMP projected that demands in the multifamily sector would fall from 333 AFY in 2010 to 294 AFY in 2035, representing a decrease of 39 AFY or approximately 12 percent.

In order to understand if the project demands can be accommodated within the multifamily sector allowance in the UWMP, the following methodology was employed:

- The existing multifamily demand of 333 AFY per year was reduced by 10 percent between 2010 and 2015 and an additional 9 percent between 2015 and 2020 consistent with the conservation plan adopted with UWMP[13];
- The 2020 demand projection for existing multifamily units was then held constant until 2035, reflecting the fact that no additional conservation measures were programed during this time;
- The projected Project demands for the period from 2015 through 2035 were then added to the reduced existing multifamily demands, creating the total projected demand for the multifamily class.

The total demand was then compared to the UWMP allocation. Table 4.5 outlines this calculation and illustrates that under both scenarios, the Project results in greater water demand in the multifamily sector than was anticipated in the UWMP.

[13] MPMWD's water conservation plan is described in Chapter 6 of its 2010 UWMP

Table 4.5 MFR Water Demand Comparison MPMWD Service Area

	2010		2015		2020		2025		2030		2035	
Water Use Sectors	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY	# of Accounts	Deliveries AFY
Scenario 1 - Maximum Demand on MPMWD												
Total UWMP Multi-family Allocation	183	333.0	187	299.7	192	272.7	197	279.6	202	286.7	207	293.9
Existing MFR accounts	183	333.0	183	299.7	183	272.7	183	272.7	183	272.7	183	272.7
Project Water Demands		-		76.1		87.4		98.7		110.0		118.2
Total Existing & Project Demands		333.0		375.8		360.2		371.5		382.8		390.9
UWMP Allocation less Existing & Project Demands		-		(76.1)		(87.5)		(91.9)		(96.1)		(97.0)
Scenario 2 - Maximum Demand on Cal Water												
Total UWMP Multi-family Allocation	183	333.0	187	299.7	192	272.7	197	279.6	202	286.7	207	293.9
Existing MFR accounts	183	333.0	183	299.7	183	272.7	183	272.7	183	272.7	183	272.7
Project Water Demands		-		76.1		79.3		82.4		86.2		91.2
Total Existing & Project Demands		333.0		375.8		352.0		355.1		358.9		363.9
UWMP Allocation less Existing & Project Demands		-		(76.1)		(79.3)		(75.5)		(72.2)		(70.0)

4.4.2 Cal Water

The Cal Water 2010 UWMP for the Bear Gulch district projected growth in deliveries associated with the multifamily sector from 232 AFY (0.21 MGD) in 2010 to 433 AFY (0.39 MGD) by 2035, an increase of 201 AFY. As illustrated in Table 4.4, the Project will increase demands in the Cal Water service area by 38 to 65 AFY by 2035, depending on how the Project implementation pattern develops. This can be accommodated within the planning allowance in the UMWP.

4.4.3 Conclusion

Regardless of the implementation scenario, the proposed Project demands appear to be easily accommodated within the nonresidential growth allowance included in Cal Water's 2010 UWMP. However, the proposed Project demands exceed the demands projected for the nonresidential sector in MWPMD's 2010 UWMP and will represent an increase in demands upon that system of 70 to 97 AFY.

5 Sufficiency Analysis & Conclusions

5.1 Sufficiency Analysis

SB 610 requires that the Lead Agency make findings related to supply sufficiency under the normal, single dry and multiple dry year planning scenarios.

The adopted WSIP provides for a dry year water supply program that, when implemented, would result in system-wide rationing of no more than 20 percent. Based on the hydrologic record presented in Appendix B, the SFPUC projects a 10 percent system-wide reduction in supply will occur in a single dry year and a 20 percent system-wide reduction will occur in multiple dry years. As described in Section 3, these reductions are allocated according to a two part formula. The Tier One formula allocates reductions on a straight-line basis between the SFPUC and its wholesale customers. For example, in a Single Dry Year, SFPUC would receive a 10 percent reduction and the wholesale customers would receive a 10 percent reduction. The Tier Two formula, which is administered by BAWSCA, allocates the wholesale customer's reduced supply to each customer. This Tier Two allocation is based on a formula that takes multiple factors for each wholesale customer into account, including:

- Individual Supply Guarantee;
- Seasonal use of all available water supplies; and
- Residential per capita use.

As the wholesale customers change their water use characteristics (e.g., increases or decreases in SFPUC purchases and use of other water sources, changes in monthly water use patterns, or changes in residential per capita water use), the Allocation Factor for each wholesale customer will also change. Recent Tier Two calculations have indicated that MPWMD would receive slightly less water than a straight-line allocation would suggest (i.e., a 10 percent system wide reduction in the SFPUC supply would result in more than a 10 percent reduction for MPMWD).

5.1.1 MPMWD

The demands associated with the Housing Element Update do not fall within the demand projection allowance made in MPMWD's 2010 UWMP. Therefore, this chapter presents a revised analysis taking into account the additional water demands from the Project.

Comparisons of supply and demand under normal and single dry years are included in Tables 5.1 through 5.2 below. These tables illustrate both Project scenarios and demonstrate that the additional water demands associated with the Project will have only a small effect on the difference between supply and demand in the average and single dry years. In both these cases, the supply exceeds the demand, indicating that MPMWD will not experience water shortages in those years.

Table 5.1 - MPMWD Supply & Demand Comparison – Normal Year with Project

Supply and Demand Comparison – Normal Year per UWMP (AFY)

	2015	2020	2025	2030	2035
Supply Total	4,993	4,993	4,993	4,993	4,993
Demand Total	3,745	3,400	3,472	3,549	3,630
Difference (supply minus demand)	1,248	1,593	1,521	1,444	1,363
Difference as % of Supply	25%	32%	30%	29%	27%
Difference as % of Demand	33%	47%	44%	41%	38%

Supply and Demand Comparison – Normal Year per Housing Element Scenario 1

	2015	2020	2025	2030	2035
Supply Total	4,993	4,993	4,993	4,993	4,993
Demand Total	3,821	3,487	3,564	3,645	3,727
Difference (supply minus demand)	1,172	1,506	1,429	1,348	1,266
Difference as % of Supply	23%	30%	29%	27%	25%
Difference as % of Demand	31%	43%	40%	37%	34%

Supply and Demand Comparison – Normal Year per Housing Element Scenario 2

	2015	2020	2025	2030	2035
Supply Total	4,993	4,993	4,993	4,993	4,993
Demand Total	3,821	3,479	3,547	3,621	3,700
Difference (supply minus demand)	1,172	1,514	1,446	1,372	1,293
Difference as % of Supply	23%	30%	29%	27%	26%
Difference as % of Demand	31%	44%	41%	38%	35%

Table 5.2 - MPMWD Supply & Demand Comparison - Single Dry Year with Project

Supply and Demand Comparison – Single Dry Year per UWMP (AFY)					
	2015	**2020**	**2025**	**2030**	**2035**
Supply Total	4,141	4,141	4,141	4,141	4,141
Demand Total	3,745	3,400	3,472	3,549	3,630
Difference (supply minus demand)	396	741	669	592	511
Difference as % of Supply	10%	18%	16%	14%	12%
Difference as % of Demand	11%	22%	19%	17%	14%

Supply and Demand Comparison – Single Dry Year per Housing Element Scenario 1					
	2015	**2020**	**2025**	**2030**	**2035**
Supply Total	4,141	4,141	4,141	4,141	4,141
Demand Total	3,821	3,487	3,564	3,645	3,727
Difference (supply minus demand)	320	654	577	496	414
Difference as % of Supply	8%	16%	14%	12%	10%
Difference as % of Demand	8%	19%	16%	14%	11%

Supply and Demand Comparison – Single Dry Year per Housing Elemet Scenario 2					
	2015	**2020**	**2025**	**2030**	**2035**
Supply Total	4,141	4,141	4,141	4,141	4,141
Demand Total	3,821	3,479	3,547	3,621	3,700
Difference (supply minus demand)	320	662	594	520	441
Difference as % of Supply	8%	16%	14%	13%	11%
Difference as % of Demand	8%	19%	17%	14%	12%

Table 5.3 provides a summary of the multiple dry year supply and demand comparisons. The 2010 UWMP documented that water supply was adequate to meet demands in the first multiple dry year, but that in the second and third dry years MPMWD could experience a water shortage of up to 4 percent until the year 2015. After that point in time, the demand management required by SB x7-7 is generally sufficient to assure that demands do not exceed supply in the multiple dry year scenarios until after 2030. When the Project is taken into account, MPMWD could experience a water shortage of up to 6 percent (or 226 AFY) until the year 2015 in the second and third dry years, compared to the 4 percent (or 149 AFY) described in the 2010 UWMP. After that point, demand reductions are sufficient to ensure that in multiple dry years, demands do not exceed supply until after 2025. By 2035 in the multiple dry year scenarios, there may be a water shortage of up to 4 percent (or 132 AFY).

The demands applied in single and multiple dry years reflect the impacts of the MPMWD's conservation program, but not additional demand reduction that could be achieved by implementation of MPMWD's Drought Contingency Plan. This plan, which is described in the 2010 UWMP, outlines measures that will allow MPMWD to reduce demands by up to 50% in the case of drought or emergency. This plan will be implemented, if necessary, to manage the predicted shortages in multiple dry years.

Table 5.3- MPMWD Supply & Demand Comparisons - Multiple Dry Years with Project

Supply & Demand Comparison – Multiple Dry Year per UWMP (AFY)						
		2015	2020	2025	2030	2035
Multiple Dry Year First Year Supply	Supply Total	4,141	4,141	4,141	4,141	4,141
	Demand Total	3,745	3,400	3,472	3,549	3,630
	Difference (supply minus demand)	396	741	669	592	511
	Difference as % of Supply	10%	18%	16%	14%	12%
	Difference as % of Demand	11%	22%	19%	17%	14%
Multiple Dry Year Second Year Supply	Supply Total	3,596	3,596	3,596	3,596	3,596
	Demand Total	3,745	3,400	3,472	3,549	3,630
	Difference (supply minus demand)	(149)	196	124	46	(35)
	Difference as % of Supply	-4%	5%	3%	1%	-1%
	Difference as % of Demand	-4%	6%	4%	1%	-1%
Multiple Dry Year Third Year Supply	Supply Total	3,595.5	3,595.5	3,595.5	3,595.5	3,595.5
	Demand Total	3,744.9	3,399.7	3,471.7	3,549.2	3,630.2
	Difference (supply minus demand)	(149.4)	195.8	123.8	46.3	(34.7)
	Difference as % of Supply	-4%	5%	3%	1%	-1%
	Difference as % of Demand	-4%	6%	4%	1%	-1%

Supply & Demand Comparison – Multiple Dry Year per Housing Element Scenario 1						
		2015	2020	2025	2030	2035
Multiple Dry Year First Year Supply	Supply Total	4,141	4,141	4,141	4,141	4,141
	Demand Total	3,821	3,487	3,564	3,645	3,727
	Difference (supply minus demand)	320	654	577	496	414
	Difference as % of Supply	8%	16%	14%	12%	10%
	Difference as % of Demand	8%	19%	16%	14%	11%
Multiple Dry Year Second Year Supply	Supply Total	3,596	3,596	3,596	3,596	3,596
	Demand Total	3,821	3,487	3,564	3,645	3,727
	Difference (supply minus demand)	(226)	108	32	(50)	(132)
	Difference as % of Supply	-6%	3%	1%	-1%	-4%
	Difference as % of Demand	-6%	3%	1%	-1%	-4%
Multiple Dry Year Third Year Supply	Supply Total	3,595.5	3,595.5	3,595.5	3,595.5	3,595.5
	Demand Total	3,821	3,487	3,564	3,645	3,727
	Difference (supply minus demand)	(225.5)	108.3	31.9	(49.7)	(131.7)
	Difference as % of Supply	-6%	3%	1%	-1%	-4%
	Difference as % of Demand	-6%	3%	1%	-1%	-4%

Supply & Demand Comparison – Multiple Dry Year per Housing Element Scenario 2						
		2015	2020	2025	2030	2035
Multiple Dry Year First Year Supply	Supply Total	4,141	4,141	4,141	4,141	4,141
	Demand Total	3,821	3,479	3,547	3,621	3,700
	Difference (supply minus demand)	320	662	594	520	441
	Difference as % of Supply	8%	16%	14%	13%	11%
	Difference as % of Demand	8%	19%	17%	14%	12%
Multiple Dry Year Second Year Supply	Supply Total	3,596	3,596	3,596	3,596	3,596
	Demand Total	3,821	3,479	3,547	3,621	3,700
	Difference (supply minus demand)	(226)	116	48	(26)	(105)
	Difference as % of Supply	-6%	3%	1%	-1%	-3%
	Difference as % of Demand	-6%	3%	1%	-1%	-3%
Multiple Dry Year Third Year Supply	Supply Total	3,595.5	3,595.5	3,595.5	3,595.5	3,595.5
	Demand Total	3,821.0	3,479.0	3,547.2	3,621.4	3,700.2
	Difference (supply minus demand)	(225.5)	116.5	48.3	(25.9)	(104.7)
	Difference as % of Supply	-6%	3%	1%	-1%	-3%
	Difference as % of Demand	-6%	3%	1%	-1%	-3%

5.1.2 Cal Water

The growth anticipated by the Housing Element Update within Cal Water's Bear Gulch service area fall within the demand projection allowance made in the 2010 UWMP, and therefore this chapter summarizes the analysis developed for the 2010 UWMP.

Comparisons of supply and demand under normal, single dry and multiple dry years are included in Table 5.4 through 5.6 which are consistent with Tables 5.2-4 through 5.2-6 on pages 71-73 of Cal Water's 2010 UWMP for the Bear Gulch service area. The comparisons in the 2010 UWMP include Cal Water's three Peninsula Districts (Bear Gulch, Mid-Peninsula and South San Francisco) in aggregate; the supply-demand comparison is not exclusive to Cal Water's Bear Gulch area.

Cal Water's normal year supply and demand comparison shows that there is sufficient water available to meet demands through to 2030 with very modest shortages predicted in 2035.

Table 5.4 – Cal Water Supply & Demand Comparisons - Normal Year with Project

Supply and Demand Comparison – Normal Year (AFY)					
	2015	**2020**	**2025**	**2030**	**2035**
Supply Total	42,762	42,762	42,762	42,762	42,762
Demand Total	42,047	39,900	41,046	42,225	43,530
Difference (supply minus demand)	715	2,862	1,716	537	(768)
Difference as % of Supply	2%	7%	4%	1%	-2%
Difference as % of Demand	2%	7%	4%	1%	-2%

The singly dry year supply and demand comparison shows that there will be a water shortage in a single dry year. In the 2010 UWMP, the water demands were assumed to increase during a single-dry year due to maintenance of landscape and other high water uses that would normally be supplied by precipitation. Based on a 10 percent system-wide cutback in SFPUC supplies in a single-dry year, there would be a shortfall of 3,200 AF in 2015 and 3,100 AF in 2035. The 2010 UWMP notes however that historically SFPUC supplies have not been reduced this dramatically in the first year of a drought, and that under normal circumstances SFPUC has adequate carryover storage in the RWS to provide an increased level of service in single dry years. In addition, like MPMWD, Cal Water has developed a Water Shortage Contingency Plan, which allows it to implement measures that reduce demand up to 50%. This plan could be implemented to manage dry shortages as necessary.

Table 5.5 – Cal Water Supply & Demand Comparisons - Single Dry Year with Project

	2015	2020	2025	2030	2035
Supply Total	35,059	35,059	35,059	35,059	35,059
Demand Total	41,746	39,540	40,675	41,817	43,134
Difference (supply minus demand)	(6,687)	(4,481)	(5,616)	(6,758)	(8,075)
Difference as % of Supply	-19%	-13%	-16%	-19%	-23%
Difference as % of Demand	-16%	-11%	-14%	-16%	-19%

As shown in Table 5.6, there is a supply shortfall of about 1,900 AF as early as 2015 if a 10 percent system-wide reduction is required. If the cutback reaches 20 percent, Cal Water could see a shortfall of 7,900 AF beginning in 2016, and up to 9,700 AF in 2036. Cal Water indicates that it will manage these through a combination of customer demand reductions resulting from the implementation of the Water Shortage Contingency Plan, and the development of alternative supplies. Specifically, Cal Water's UWMP notes that the RWS often has "carry over" water that can be made available to its wholesale customers to buffer potential dry year cutbacks.

Table 5.6 – Cal Water Supply & Demand Comparison- Multiple Dry Years with Project

		2015	2020	2025	2030	2035
Multiple Dry Year First Year Supply	**Supply Total**	35,316	35,316	35,316	35,316	35,316
	Demand Total	37,212	35,362	36,379	37,451	38,582
	Difference (supply minus demand)	(1,896)	(46)	(1,063)	(2,135)	(3,266)
	Difference as % of Supply	-5%	0%	-3%	-6%	-9%
	Difference as % of Demand	-5%	0%	-3%	-6%	-8%
Multiple Dry Year Second Year Supply	**Supply Total**	28,522	28,522	28,522	28,522	28,522
	Demand Total	36,439	35,077	36,091	37,160	38,287
	Difference (supply minus demand)	(7,917)	(6,555)	(7,569)	(8,638)	(9,765)
	Difference as % of Supply	-28%	-23%	-27%	-30%	-34%
	Difference as % of Demand	-22%	-19%	-21%	-23%	-26%
Multiple Dry Year Third Year Supply	**Supply Total**	28,522	28,522	28,522	28,522	28,522
	Demand Total	35,404	34,548	35,552	36,610	37,762
	Difference (supply minus demand)	(6,882)	(6,026)	(7,030)	(8,088)	(9,240)
	Difference as % of Supply	-24%	-21%	-25%	-28%	-32%
	Difference as % of Demand	-19%	-17%	-20%	-22%	-24%

5.2 Capital Outlay and Permits Necessary to Accomplish the Program

Future water projects that will likely increase (improve) reliability of supplies for the City and Cal Water include:

- SFPUC's WSIP projects which are approved, funded, designed and scheduled to be complete by 2030;
- Projects that may develop through BAWSCA's Strategy which are scheduled to be identified and completed by 2018; and
- MPMWD's local groundwater development project which is scheduled to be completed by 2020.

While BAWSCA's Strategy and MPMWD's local groundwater program could result in additional water supply in the future, this WSA does not assume any water supply from these sources.

5.3 Regulatory Requirements for Delivery of Water Supply

MPMWD and Cal Water comply with all current regulatory standards. The suppliers will continue to monitor their systems in accordance with its permit from the California Department of Public Health.

5.4 Conclusions

5.4.1 MPMWD

MPMWD approved its 2010 UWMP on June 14, 2011. This document projected water supplies and demands from 2010 through 2035 and compared them under a range of hydrologic conditions.

In its 2010 UWMP, MPMWD projected that demands in the multifamily sector would decrease from 333 AFY in 2010 to 294 AFY in 2035, a decrease of 39 AFY. Demand in the single family sector was projected to decrease from 1,171 AFY in 2010 to 969 AFY in 2035, a decrease of 202 AFY. In total the Housing Element Update will add between 70 to 97 AFY in new multifamily residential demand, above and beyond what was projected in the 2010 UWMP. The actual amount of the increase will depend on the buildout pattern of the Project.

MPWMD's water supply is adequate to meet these new demands in normal and single dry years through the year 2035.

In its 2010 UMWP, MPMWD forecast that its water supply was adequate to meet demands in the first year of a multiple dry year period, but in the second and third dry years it projected a water shortage of up to 4 percent (or 149 AFY) until the year 2015. After that point in time, the demand management required by SB x7-7 would be generally be sufficient to assure that demands do not exceed supply in the multiple dry year scenarios until after 2030, when there will be a shortfall of 1 percent (or 35 AFY).

Taking into account the additional residential demands forecast in this WSA, water supply will be adequate to meet demands in the first multiple dry year, but in the second and third dry years MPMWD could experience a water shortage of up to 6 percent (226 AFY) until the year 2015. After that point in time, the demand management required by SB x7-7 would be generally sufficient to assure that demands do not exceed supply in the multiple dry year scenarios until after 2030, when there will be a shortfall of up to 4 percent (132 AFY).

These forecasts assume that "normal" demand patterns occur. The 2010 UWMP documented that MPMWD has a Water Shortage Contingency Plan (Municipal Code Chapter 7.34 Water Rationing) in place that allows it to achieve demand reductions of up to 50 percent. Therefore, the 4 to 6 percent reductions required to manage supply restrictions in multiple year droughts can be achieved by MPMWD.

Review of MPMWD's historic water delivery records indicate that in dry years, demand is depressed somewhat below "normal" levels, likely reflecting the impact of voluntary and at times, mandatory, water use reduction programs. Local groundwater (See section 3.3) could also help buffer against these anticipated shortages.

5.4.2 Cal Water

California Water Service Company approved its 2010 UWMP for the Bear Gulch District on June 24, 2011. This document projected water supplies and demands from 2010 through 2035 and compared them under a range of hydrologic conditions.

In its 2010 UWMP, Cal Water projected that demands in the multifamily sector would increase from 232 AFY in 2010 to 433 AFY in 2035, an increase of 201 AFY. Demand in the single family sector was projected to increase from 10,629 AFY in 2010 to 10,748 AFY in 2035, an increase of 119 AFY. The Housing Element Update projects will add between 38 and 65 AFY of demand to the Cal Water Service Area, which is well within the projected growth as described in the 2010 UWMP, taking into account per capita demand reductions.

Cal Water's normal year supply and demand comparison shows that there is sufficient water available to meet demands through to 2035. As per the 2010 UWMP, shortages are projected in the single and multiple dry years.

Cal Water's 2010 UWMP notes that under normal circumstances SFPUC has adequate carryover storage in the RWS to provide an increased level of service in single dry years. Like MPMWD, Cal Water has codified its Water Shortage Contingency Plan. In Cal Water's case, the Plan is codified and updated within its UWMP. Because it is a private water company, Cal Water implements its Water Shortage Contingency Plan through a California Public Utilities Commission (CPUC) process. Cal Water can make requests for "voluntary" water restrictions, which yield 10 percent demand reductions, directly to its customers in accordance with CPUC Rule 14.1. Like MPMWD, an analysis of Cal Water's historic data documents that these measures have proved sufficient to offset the system wide cutbacks during a drought period.

For mandatory restrictions, Cal Water will file a Tier 2 advice letter with the CPUC that describes the need for mandatory allocations as well as its methodology and plan for implementation. A public hearing is required during the 30 days following this filing and all customers in the affected district will be notified of the hearing. If, after the 30 day period, it is determined that mandatory allocations are necessary, Cal Water will file a Tier 1 advice letter with the CPUC, which would make mandatory allocations effective 5 days following the filing. Cal Water has the legal authority to implement mandatory allocations only after requesting from the CPUC that Tariff Rule 14.1, Mandatory Conservation Plan, be added to existing tariffs. *Section A. Conservation – Nonessential or Unauthorized Water Use* of Tariff Rule 14.1 identifies specific water use prohibitions.

Appendix A

WATER SUPPLY AGREEMENT

between

THE CITY AND COUNTY OF SAN FRANCISCO

and

WHOLESALE CUSTOMERS

in

ALAMEDA COUNTY, SAN MATEO COUNTY AND SANTA CLARA COUNTY

JULY 2009

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WHOLESALE WATER SUPPLY AGREEMENT

Introductory Statement

Both San Francisco, as the Regional Water System owner and operator, and its Wholesale Customers share a commitment to the Regional Water System providing a reliable supply of high quality water at a fair price, and achieving these goals in an environmentally sustainable manner.

Article 1. Parties, Effective Date, and Defined Terms

1.01 Definitions

The capitalized terms used in this Agreement shall have the meanings set forth in Attachment A.

1.02 Parties

The parties to this Agreement are the City and County of San Francisco and such of the following entities (all of which purchase water from San Francisco) as have executed this Agreement:

Alameda County Water District
California Water Service Company
City of Brisbane
City of Burlingame
City of Daly City
City of East Palo Alto
City of Hayward
City of Menlo Park
City of Millbrae
City of Milpitas
City of Mountain View
City of Palo Alto
City of Redwood City

City of San Bruno
City of San José
City of Santa Clara
City of Sunnyvale
Coastside County Water District
Estero Municipal Improvement District
Guadalupe Valley Municipal Improvement District
Mid-Peninsula Water District
North Coast County Water District
Purissima Hills Water District
Skyline County Water District
Stanford University
Town of Hillsborough
Westborough Water District

The entities listed above which have executed this Agreement shall be collectively referred to as the "Wholesale Customers."

1.03 Effective Date

A. Except as provided in subsection C, this Agreement shall become effective only when it has been approved by San Francisco and by each of the entities listed in Section 1.02 and when San Francisco and each of those entities (except for the City of Hayward) have entered into an Individual Water Sales Contract as provided in Section 9.01.

B. If San Francisco and all of the entities listed in Section 1.02 approve this Agreement and (except for the City of Hayward) an Individual Water Sales Contract on or before July 1, 2009, the effective date shall be July 1, 2009. If San Francisco and all of the entities listed in Section 1.02 approve this Agreement and (except for the City of Hayward) an Individual Water Sales Contract after July 1, 2009 but on or before September 1, 2009, the effective date shall be the date on which the last entity listed in Section 1.02 approves this Agreement and, if required, an Individual Water Sales Contract.

C. If by September 1, 2009 this Agreement has been approved by fewer than all of the entities listed in Section 1.02 or fewer than all of such entities (other than the City of Hayward) have entered into an Individual Water Sales Contract, but it has been approved by entities representing at least 75% in number and 75% of the water purchased from SFPUC by all listed agencies during FY 2007-08 (i.e., 173.39 MGD), then San Francisco shall have the option to waive the requirement in subsection A that all listed agencies have approved this Agreement and an Individual Water Sales Contract as a condition precedent to this Agreement and any Individual Water Sales Contract becoming effective. San Francisco shall have 60 days from September 1, 2009 (i.e., until October 31, 2009) within which to decide whether or not to waive the condition. If San Francisco decides to waive the condition, those listed agencies that have approved this Agreement and Individual Water Sales Contract before October 31, 2009 will be bound thereby and this Agreement and Individual Water Sales Contracts will become effective as to them, as of the date of San Francisco's waiver. For purposes of determining whether listed agencies that have approved this Agreement represent at least 75% of the water purchased during FY 2007-08, the quantity of water attributable to each listed entity shall be as set forth on Attachment B.

D. The provisions of Article 9 that apply to fewer than all Wholesale Customers (i.e., Sections 9.02 - 9.07) shall not become effective unless San Francisco and the entity to which the section applies have each approved (1) this Agreement, and (2) the underlying Individual Water Sales Contract, unless otherwise provided in Article 9. This provision does not affect the continued enforceability of provisions in those sections that derive from independently enforceable judgments, orders or agreements.

Article 2. Term; Amendments During Term

2.01 <u>Term</u>

The term ("Term") of this Agreement shall be twenty five (25) years. The Term shall begin on July 1, 2009, regardless of whether the Effective Date is before or after that date, and shall end on June 30, 2034. Except as provided in Article 9, the term of all Individual Water Sales Contracts shall also begin on July 1, 2009 and end on June 30, 2034.

2.02 <u>Extension and Renewal of Term</u>

A. In December 2031, the SFPUC may provide written notice to the Wholesale Customers that it is willing to extend the Term of this Agreement. Between January 1, 2032 and June 30, 2032, any Wholesale Customer may accept the SFPUC's offer to extend the Term by providing a written notice of extension to the SFPUC. If such notices of extension are received from Wholesale Customers representing at least two-thirds in number as of June 30, 2032 and seventy five percent (75%) of the quantity of water delivered by the SFPUC to all Wholesale Customers during fiscal year 2030-31, the Term shall be extended for another five (5) years ("First Extension Term"), through June 30, 2039. No party to this Agreement which does not wish to remain a party during the Extension Term shall be compelled to do so by the actions of other parties under this section.

B. In December 2036, the SFPUC may provide written notice to the Wholesale Customers that it is willing to extend the Term of this Agreement. Between January 1, 2037 and June 30, 2037, any Wholesale Customer may accept the SFPUC's offer to extend the Term by providing a written notice of extension to the SFPUC. If such notices of extension are received from Wholesale Customers representing at least two-thirds in number as of June 30, 2037 and seventy five percent (75%) of the quantity of water delivered by the SFPUC to all Wholesale Customers during fiscal year 2035-36, the Term shall be extended for another five (5) years ("Second Extension Term"), through June 30, 2044. No party to this Agreement which does not wish to remain a party during the Extension Term shall be compelled to do so by the actions of other parties under this section.

C. After the expiration of the Term, and, if applicable, the Extension Terms, this Agreement may be renewed by mutual consent of the parties, subject to any modifications thereof which may be determined at that time. If fewer than all of the parties desire to renew this Agreement beyond its Term, with or without modifications, the SFPUC and the Wholesale

Customers who wish to extend the Agreement shall be free to do so, provided that no party to this Agreement which does not wish to become a party to such a renewed Agreement shall be compelled to do so by the actions of other parties under this section.

2.03 Amendments

A. Amendments to Agreement; General

1. This Agreement may be amended with the written consent of all parties.

2. This Agreement may also be amended with the written consent of San Francisco and of Wholesale Customers representing at least two-thirds in number (i.e., 18 as of July 1, 2009) and seventy five percent (75%) of the quantity of water delivered by San Francisco to all Wholesale Customers during the fiscal year immediately preceding the amendment.

3. No amendment which adversely affects a Fundamental Right of a Wholesale Customer may be made without the written consent of that customer. Amendments to Article 5 which merely affect the allocation of costs between City Retail customers on the one hand and Wholesale Customers collectively on the other, and amendments to Articles 6 and 7 which merely alter budgetary, accounting and auditing procedures do not affect Fundamental Rights and may be made with the consent of parties meeting the requirements of Section 2.03.A.2.

4. When an amendment has been approved by San Francisco and the number of Wholesale Customers required in Section 2.03.A.2, San Francisco shall notify each of the Wholesale Customers in writing of the amendment's adoption. Notwithstanding any provision of law or this Agreement, any Wholesale Customer that claims that the amendment violates its Fundamental Rights under Section 2.03.A.3, shall have 30 days from the date San Francisco delivers the notice of its adoption in which to challenge the amendment's validity through a judicial action. If no such action is filed within 30 days, the amendment shall be finally and conclusively deemed to have been adopted in compliance with this section.

B. Amendments to Article 9

1. Notwithstanding the provisions of Sections 2.03.A.2 and 2.03.A.3, any provision of Article 9 which applies only to an individual Wholesale Customer may be amended with the written concurrence of San Francisco and the Wholesale Customer to which it applies;

provided that the amendment will not, directly or indirectly, adversely affect the Fundamental Rights of the other Wholesale Customers.

2. Before making any such amendment effective, San Francisco shall give notice, with a copy of the text of the proposed amendment, to all other Wholesale Customers. The Wholesale Customers shall have 30 days in which to object to the amendment on the ground that it is not permissible under this subsection. If no such objection is received by San Francisco, the proposed amendment shall become effective. If one or more Wholesale Customers object to the amendment, San Francisco, the individual Wholesale Customer with which San Francisco intends to effect the amendment, and the Wholesale Customer(s) which lodged the objection shall meet to discuss the matter.

3. If the dispute cannot be resolved and San Francisco and the Wholesale Customer involved elect to proceed with the amendment, either San Francisco or the Wholesale Customer shall give written notice of such election to each Wholesale Customer that has objected. Any Wholesale Customer that has objected to such amendment shall have 30 days from receipt of this notice within which to commence an action challenging the validity of such amendment, and such amendment shall be deemed effective as of the end of this 30-day period unless restrained by order of court.

C. **Amendments to Attachments**. The following attachments may be amended with the written concurrence of San Francisco and BAWSCA on behalf of the Wholesale Customers:

Attachment	Name
G	January 2006 Water Quality Notification and Communications Plan
J	Water Use Measurement and Tabulation
L-1	Identification of WSIP Projects as Regional/Retail
N-1	Balancing Account/Rate Setting Calculation Table
N-2	Wholesale Revenue Requirement Schedules
N-3	Schedule of Projected Water Sales, Wholesale Revenue Requirement and Wholesale Rates
P	Management Representation Letter

Amendments to these attachments shall be approved on behalf of San Francisco by the Commission and on behalf of BAWSCA by its Board of Directors, unless the Commission by resolution delegates such authority to the General Manager of the SFPUC or the Board of Directors by resolution delegates such authority to the General Manager/CEO of BAWSCA.

D. **Amendments to Individual Water Sales Contracts**. Individual Water Sales Contracts described in Section 9.01 may be amended with the written concurrence of San Francisco and the Wholesale Customer which is a party to that Individual Water Sales Contract; provided that the amendment is not inconsistent with this Agreement or in derogation of the Fundamental Rights of other Wholesale Customers under this Agreement.

Article 3. Water Supply

3.01 Supply Assurance

A. San Francisco agrees to deliver water to the Wholesale Customers up to the amount of the Supply Assurance. The Supply Assurance is for the benefit of the entities listed in Section 1.02, irrespective of whether or not they have executed this Agreement. Water delivered by San Francisco to Retail Customers shall not be included in the Supply Assurance. Until December 31, 2018, the foregoing commitment is subject to Article 4.

B. Both the Supply Assurance and the Individual Supply Guarantees identified in Section 3.02 are expressed in terms of daily deliveries on an annual average basis and do not themselves constitute a guarantee by San Francisco to meet peak daily or hourly demands of the Wholesale Customers, irrespective of what those peak demands may be. The parties acknowledge, however, that the Regional Water System has been designed and constructed to meet peak daily and hourly demands and that its capacity to do so has not yet been reached. San Francisco agrees to operate the Regional Water System to meet peak requirements of the Wholesale Customers to the extent possible without adversely affecting its ability to meet peak demands of Retail Customers. This Agreement shall not preclude San Francisco from undertaking to meet specific peak demand requirements of individual Wholesale Customers in their Individual Water Sales Contracts.

C. The Supply Assurance is perpetual and shall survive the expiration or earlier termination of this Agreement. Similarly, the Individual Supply Guarantees identified in Section 3.02 and/or the Individual Water Sales Contracts are perpetual and shall survive the expiration or earlier termination of this Agreement or the Individual Water Sales Contracts.

D. Notwithstanding the Supply Assurance established by this section, the Individual Supply Guarantees identified in Section 3.02 and the Individual Water Sales Contracts, the amount of water made available by San Francisco to the Wholesale Customers is subject to reduction, to the extent and for the period made necessary by reason of water shortage, Drought, Emergencies, or by malfunctioning or rehabilitation of facilities in the Regional Water System. Any such reduction will be implemented in accordance with Section 3.11. The amount of water made available to the Wholesale Customers may not be reduced, however, merely because the water recycling and groundwater projects which the WSIP envisions to be constructed within San Francisco, or the conservation programs intended to reduce water use by Retail Customers that are included in the WSIP, do not generate the yield or savings (10 MGD combined) anticipated by San Francisco.

3.02 Allocation of Supply Assurance

A. Pursuant to Section 7.02 of the 1984 Agreement, a portion of the Supply Assurance has been allocated among 24 of the 27 Wholesale Customers. These Individual Supply Guarantees are also expressed in terms of annual average metered deliveries of millions of gallons per day and are listed in Attachment C.

B. Three Wholesale Customers do not have Individual Supply Guarantees. The cities of San Jose and Santa Clara do not have an Individual Supply Guarantees because San Francisco has provided water to them on a temporary and interruptible basis as described in Sections 4.05 and 9.06. The City of Hayward does not have an Individual Supply Guarantee because of the terms of the 1962 contract between it and San Francisco, as further described in Section 9.03.

C. If the total amount of water delivered by San Francisco to Hayward and to the Wholesale Customers that are listed on Attachment C exceeds 184 MGD over a period of three consecutive fiscal years (i.e., July 1 through June 30), then the Individual Supply Guarantees of those Wholesale Customers listed on Attachment C shall be reduced pro rata so that their combined entitlement and the sustained use by Hayward does not exceed 184 MGD. The procedure for calculating the pro rata reduction in Individual Supply Guarantees is set out in Attachment D.

1. The provisions of this subsection C are not in derogation of the reservation of claims to water in excess of the Supply Assurance which are contained in Section 8.07. Nor do they constitute an acknowledgement by Wholesale Customers other than Hayward that San Francisco is obligated or entitled to reduce their Individual Supply Guarantees in the circumstances described herein. The provisions of this subsection C shall, however, be operative unless and until a court determines that its provisions violate rights of the Wholesale Customers derived independently of this Agreement.

2. The foregoing paragraph is not intended to and shall not constitute a contractual commitment on the part of San Francisco to furnish more water than the Supply Assurance to the Wholesale Customers or a concession by San Francisco that the provisions of this subsection violate any rights of the Wholesale Customers.

D. Notwithstanding the reservation of claims contained in Sections 3.02.C and 8.07, it shall be the responsibility of each Wholesale Customer to limit its purchases of water from San Francisco so as to remain within its Individual Supply Guarantee. San Francisco shall not be liable to any Wholesale Customer or be obligated to supply more water to any Wholesale Customer individually or to the Wholesale Customers collectively than the amount to which it or they are otherwise entitled under this Agreement due to the use by any Wholesale Customer of more water than the amount to which it is entitled under this Agreement.

E. San Francisco shall install such new connections between the Regional Water System and the distribution system of any Wholesale Customer that are necessary to deliver the quantities of water to which the Wholesale Customer is entitled under this Agreement. San Francisco shall have the right to determine the location of such connections, in light of the need to maintain the structural integrity of the Regional Water System and, where applicable, the need to limit peaking directly off of Regional Water System pipelines by a Wholesale Customer's individual retail customers, the need to ensure that a Wholesale Customer's individual retail customers have access to alternative sources of water in the event of a reduction in San Francisco's ability to provide them with water, and other factors which may affect the desirability or undesirability of a particular location. San Francisco's decisions regarding the location of new connections and the location, size and type of any new meters shall not be reviewable by a court except for an abuse of discretion or failure to provide a Wholesale Customer with connections and meters adequate to deliver the quantity of water to which it is entitled under this Agreement.

3.03 <u>Wholesale Customer Service Areas</u>

A. Each of the Individual Water Sales Contracts described in Section 9.01 will contain, as an exhibit, a map of the Wholesale Customer’s service area. A Wholesale Customer may not deliver water furnished to it by San Francisco outside the boundary of its service area without the prior written consent of San Francisco, except for deliveries to another Wholesale Customer on an emergency and temporary basis pursuant to Section 3.07.B.

B. If a Wholesale Customer wishes to expand its service area, it shall request San Francisco's consent to the expansion and provide information reasonably requested by San Francisco about the amount of water projected to be purchased from San Francisco to meet demand within the area proposed to be added to the service area.

C. San Francisco may refuse a Wholesale Customer's request to expand its service area on any reasonable basis. If San Francisco denies a request by a Wholesale Customer to expand its service area, or fails to act on the request for six months after it has been submitted, the Wholesale Customer may challenge San Francisco's denial or delay in court. Such a challenge may be based on the Wholesale Customers' claim, reserved in Section 8.07, that San Francisco is obligated under federal or state law to furnish water, included within its Individual Supply Guarantee, to it for delivery outside its then-existing service area and that it is entitled to enlarge its service area to supply water to such customers. San Francisco reserves the right to contest any such claim on any applicable ground. This subsection does not apply to San Jose and Santa Clara, whose maximum service areas are fixed pursuant to Section 9.06.

D. This section will not prevent San Francisco and any Wholesale Customer, other than San Jose and Santa Clara, from agreeing in an Individual Water Sales Contract or an amendment thereto that:

- the Wholesale Customer may expand its service area without subsequent San Francisco approval to a definitive size but no larger, or

- the Wholesale Customer will not expand its service area beyond its present limits without San Francisco approval

and waiving the provisions of this section with respect to any additional expansion.

E. If two or more Wholesale Customers agree to adjust the boundaries of their respective service areas so that one assumes an obligation to serve customers in an area that was previously within the service area of another Wholesale Customer, they may also correspondingly adjust their respective Individual Supply Guarantees. Such adjustments are not subject to the requirements of Section 3.04 and shall require only the consent of San Francisco and the Wholesale Customers involved, so long as the Supply Assurance and the Individual Supply Guarantees of other Wholesale Customers are not affected. Service area boundary adjustments that would result in the expansion of any California Water Service Company service areas are subject to the requirements of Section 9.02.D. Any adjustment of service area boundaries that would result in the supply of water in violation of this Agreement or the Act shall be void.

F. San Francisco acknowledges that it has heretofore consented in writing to deliveries of water by individual Wholesale Customers outside their service area boundaries and agrees that nothing in this Agreement is intended to affect such prior authorizations, which remain in full force and effect according to their terms. Such authorizations shall be identified in the Individual Water Sales Contracts.

3.04 Permanent Transfers of Individual Supply Guarantees

A. A Wholesale Customer that has an Individual Supply Guarantee may transfer a portion of it to one or more other Wholesale Customers, as provided in this section.

B. Transfers of a portion of an Individual Supply Guarantee must be permanent. The minimum quantity that may be transferred is 1/10th of a MGD.

C. Transfers of portions of Individual Supply Guarantees are subject to approval by the SFPUC. SFPUC review is limited to determining (1) whether a proposed transfer complies with the Act, and (2) whether the affected facilities in the Regional Water System have sufficient capacity to accommodate delivery of the increased amount of water to the proposed transferee.

D. The participants in a proposed transfer shall provide notice to the SFPUC specifying the amount of the Individual Supply Guarantee proposed to be transferred, the proposed effective date of the transfer, which shall not be less than 60 days after the notice is submitted to the SFPUC, and the Individual Supply Guarantees of both participants resulting from the transfer. The SFPUC may require additional information reasonably necessary to evaluate the operational impacts of the transfer. The SFPUC will not unreasonably withhold or delay its approval; if the SFPUC does not act on the notice within 60 days, the transfer will be deemed to have been approved.

E. Within 30 days after the transfer has become effective, both the transferor and the transferee will provide notice to the SFPUC and BAWSCA. By September 30 of each year during the Term, the SFPUC and BAWSCA will prepare an updated Attachment C to reflect transfers occurring during the immediately preceding fiscal year.

F. Amounts transferred will remain subject to pro rata reduction under the circumstances described in Section 3.02.C and according to the formula set forth in Attachment D.

3.05 Restrictions on Resale

Each Wholesale Customer agrees that it will not sell any water purchased from San Francisco to a private party for resale by such private party to others in violation of the Act.

Each Wholesale Customer also agrees that it will not sell water purchased from San Francisco to another Wholesale Customer without prior written approval of the SFPUC, except on a temporary and emergency basis as permitted in Section 3.07.B.2. The SFPUC agrees that it will not unreasonably withhold its consent to a request by a Wholesale Customer to deliver water to another Wholesale Customer for resale.

3.06 <u>Conservation; Use of Local Sources; Water Management Charge</u>

A. In order to support the continuation and expansion of water conservation programs, water recycling, and development of alternative supplies within the Wholesale Customers' service areas, the SFPUC will, if requested by BAWSCA, include the Water Management Charge in water bills sent to Wholesale Customers. The SFPUC will deliver all Water Management Charge revenue to BAWSCA monthly and shall deliver an annual accounting of Water Management Charge revenue to BAWSCA within 90 days after the end of each fiscal year. The SFPUC's obligations to collect and deliver Water Management Charge revenue to BAWSCA under this subsection are conditioned on BAWSCA's delivery to the SFPUC of an annual report describing the projects and programs on which Water Management Charge funds received from the SFPUC during the previous fiscal year were expended and an estimate of the amount of water savings attributable to conservation programs and of the yield of alternative supplies developed. This report will be due within 180 days after the end of each fiscal year during which Water Management Charge funds were received.

B. The SFPUC will work together with BAWSCA to explore ways to support water conservation programs, recycling projects, and conjunctive use alternatives outside the Wholesale Service Area, in particular projects and programs that have the potential to increase both flows in the lower Tuolumne River (downstream of New Don Pedro Reservoir) and water deliveries to the Regional Water System.

C. Each Wholesale Customer shall take all actions within its legal authority related to water conservation that are necessary to insure that the SFPUC (a) remains eligible for (i) state and federal grants and (ii) access to the Drought Water Bank operated by the California Department of Water Resources, as well as other Drought-related water purchase or transfer programs, and (b) complies with future legal requirements imposed on the Regional Water System by the federal government, the State, or any other third party as conditions for receiving funding or water supply.

D. San Francisco and each Wholesale Customer agree that they will diligently apply their best efforts to use both surface water and groundwater sources located within their respective service areas and available recycled water to the maximum feasible extent, taking into account the environmental impacts, the public health effects and the effects on supply reliability of such use, as well as the cost of developing such sources.

3.07 Restrictions on Purchases of Water from Others; Minimum Annual Purchases

A. Each Wholesale Customer (except for Alameda County Water District and the cities of Milpitas, Mountain View and Sunnyvale) agrees that it will not contract for, purchase or receive, with or without compensation, directly or indirectly, from any person, corporation, governmental agency or other entity, any water for delivery or use within its service area without the prior written consent of San Francisco.

B. The prohibition in subsection A does not apply to:

1. recycled water;

2. water necessary on an emergency and temporary basis, provided that the Wholesale Customer promptly gives San Francisco notice of the nature of the emergency, the amount of water that has been or is to be purchased, and the expected duration of the emergency; or

3. water in excess of a Wholesale Customer's Individual Supply Guarantee.

C. Alameda County Water District and the cities of Milpitas, Mountain View and Sunnyvale may purchase water from sources other than San Francisco, provided that San Francisco shall require that each purchase a minimum annual quantity of water from San Francisco. These minimum quantities are set out in Attachment E and shall also be included in the Individual Water Sales Contracts between San Francisco and each of these four Wholesale Customers. The minimum purchase requirement in these Individual Water Sales Contracts will be waived during a Drought or other period of water shortage if the water San Francisco makes available to these Wholesale Customers is less than its minimum purchase quantity.

3.08 Water Quality

A. San Francisco shall deliver treated water to Wholesale Customers (except Coastside County Water District, which receives untreated water from Crystal Springs and Pilarcitos Reservoirs) that complies with primary maximum contaminant level and treatment technique standards at the regulatory entry points designated in the San Francisco Regional Water System Domestic Water Supply Permit (currently Permit No. 02-04-04P3810001) issued by the California Department of Public Health (CDPH).

B. San Francisco will provide notice to the Wholesale Customers in accordance with the Water Quality Notification and Communications Plan (current version dated January 2006), attached hereto as Attachment G. San Francisco will regularly update its plan in consultation with the Wholesale Customers and the CDPH. The next update will be completed one year after the Effective Date and include expanded coverage of secondary maximum contaminant level exceedances and water quality communication triggers. The plan will note that the Wholesale Customers will receive the same notification no later than the San Francisco water system (currently Permit No. 02-04-01P3810011) except for distribution-related issues.

C. San Francisco and the Wholesale Customers will establish a Water Quality Committee. The Water Quality Committee will meet at least quarterly to collaboratively address water quality issues, such as Water Quality Notification and Communications Plan updates, regulatory issues, and water quality planning studies/ applied research. San Francisco and each Wholesale Customer will designate a representative to serve on the committee. There will be a Chair and Vice Chair position for the Water Quality Committee. The Chair and Vice Chair positions will be held by San Francisco and the Wholesale Customers and rotate between them on an annual basis.

3.09 Completion of WSIP

San Francisco will complete construction of the physical facilities in the WSIP by December 31, 2015. The SFPUC agrees to provide for full public review and comment by local and state interests of any proposed changes that delay previously adopted project completion dates or that delete projects. The SFPUC shall meet and consult with BAWSCA before proposing to the Commission any changes in the scope of WSIP projects which reduce their capacity or ability to achieve adopted levels of service goals. The SFPUC retains discretion to determine whether to approve the physical facilities in the WSIP until after it completes the CEQA process as set forth in Section 4.07.

3.10 Regional Water System Repair, Maintenance and Operation

A. San Francisco will keep the Regional Water System in good working order and repair consistent with prudent utility practice.

B. San Francisco will submit reports to its Retail and Wholesale Customers on the "State of the Regional Water System," including reports on completed and planned maintenance, repair or replacement projects or programs, by September of every even-numbered year, with reports to start in September 2010.

C. San Francisco will cooperate with any audit of the SFPUC's asset management practices that may be initiated and financed by BAWSCA or the Wholesale Customers. BAWSCA may contract with third parties to conduct the audits. San Francisco will consider the findings and recommendations of such audits and will provide a written response indicating agreement with the recommendations, or disagreement with particular recommendations and the reasons why, within 90 calendar days after receipt.

D. San Francisco will continue to operate its reservoirs in a manner that assigns higher priority to the delivery of water to the Bay Area and the environment than to the generation of electric power. The SFPUC, as the Regional Water System operator, is solely responsible for making day-to-day operational decisions.

3.11 Shortages

A. Localized Water Reductions. Notwithstanding San Francisco's obligations to deliver the Supply Assurance to the Wholesale Customers collectively and the Individual Supply Guarantees to Wholesale Customers individually, San Francisco may reduce the amount of water available or interrupt water deliveries to specific geographical areas within the Regional Water System service area to the extent that such reductions are necessary due to Emergencies, or in order to install, repair, rehabilitate, replace, investigate or inspect equipment in, or perform other maintenance work on, the Regional Water System. Such reductions or interruptions may be imposed by San Francisco without corresponding reductions or interruptions in the amount of water available to SFPUC water users outside the specific geographical area where reductions or interruptions are necessary, if the system's ability to supply water outside the specific geographical area has not been impaired. In the event of such a reduction or interruption, San Francisco will restore the supply of water to the specific geographical area as soon as is possible. Except in cases of Emergencies (during which oral notice shall be sufficient), San Francisco will give the affected Wholesale Customer(s) reasonable written notice of such localized reductions or interruptions, the reasons therefor, and the probable duration thereof.

B. System-Wide Shortages and SFPUC Response to Regional Emergencies. Following a major system emergency event, the SFPUC will work closely with its Wholesale Customers to monitor customer demand, including the demand source. In the event that any individual Wholesale Service Area or Retail Service Area customer's uncontrolled distribution system leaks could result in major water waste and endanger the supply provided by the Regional Water System as a whole, flow through some customer connections may need to be temporarily reduced or terminated. SFPUC will work closely with customers to assess the nature of the demand (e.g. fire-fighting versus leakage), so that public health and safety protection can be given top priority.

1. All emergencies that require use of non-potable source water will require use of chlorine, or other suitable disinfectant, if feasible.

2. San Francisco will use its best efforts to meet the seismic reliability and delivery reliability level of service goals adopted by the Commission in conjunction with the WSIP. San Francisco will distribute water on an equitable basis throughout the Regional Water System service area following a regional Emergency, subject to physical limitations caused by damage to the Regional Water System.

3. San Francisco's response to Emergencies will be guided by the then-current version of the ERRP. The SFPUC shall periodically review, and the Commission may amend, the ERRP to ensure that it remains an up-to-date and effective management tool.

4. The SFPUC will give the Wholesale Customers notice of any proposal to amend the ERRP in a manner that would affect them. The notice will be delivered at least thirty days in advance of the date on which the proposal is to be considered by the Commission and will be accompanied by the text of the proposed amendment.

C. Shortages Caused by Drought; Acquisition of Dry Year Supplies. Notwithstanding San Francisco's obligations to deliver the Supply Assurance to the Wholesale Customers collectively and the Individual Supply Guarantees to Wholesale Customers individually, San Francisco may reduce the amount of water available to the Wholesale Customers in response to Drought.

1. The Tier 1 Shortage Plan (Attachment H) will continue to be used to allocate water from the Regional Water System between Retail and Wholesale Customers during system-wide shortages of 20% or less.

2. San Francisco and the Wholesale Customers may negotiate in good faith revisions to the Tier 1 Shortage Plan to adjust for and accommodate anticipated changes due to demand hardening in the SFPUC's Wholesale and Retail Service Areas. Until agreement is reached, the current Tier 1 Shortage Plan will remain in effect.

3. The SFPUC will honor allocations of water among the Wholesale Customers ("Tier 2 Allocations") provided by BAWSCA or if unanimously agreed to by all Wholesale Customers. If BAWSCA or all Wholesale Customers do not provide the SFPUC with Tier 2 Allocations, then the SFPUC may make a final allocation decision after first meeting and discussing allocations with BAWSCA and the Wholesale Customers. For Regional Water System shortages in excess of 20%, San Francisco shall (a) follow the Tier 1 Shortage Plan allocations up to the 20% reduction, (b) meet and discuss how to implement incremental reductions above 20% with the Wholesale Customers, and (c) make a final determination of allocations above the 20% reduction. After the SFPUC has made the final allocation decision, the Wholesale Customers shall be free to challenge the allocation on any applicable legal or equitable basis.

4. San Francisco will use its best efforts to identify potential sources of dry year water supplies and establish the contractual and other means to access and deliver those supplies in sufficient quantity to meet a goal of not more than 20 percent system-wide shortage in any year of the design drought.

5. San Francisco will cooperate with BAWSCA to improve water supply reliability. As an example of such cooperation, San Francisco may invite a representative of BAWSCA to attend and participate in meetings with third parties for development of dry year water supplies. If San Francisco does not invite a BAWSCA representative to attend a specific scheduled meeting, it will promptly (within 30 days of any such meeting) provide BAWSCA with a written or oral report on the meeting, including any decisions reached at it, as well as information about planned subsequent meetings. Progress in securing dry year water supplies will be reported to the SFPUC and the BAWSCA board of directors during the first quarter of each calendar year.

3.12 <u>Wheeling of Water from Outside SFPUC System</u>

Subject to the Wheeling Statute, the SFPUC will not deny use of Regional Water System unused capacity for wheeling when such capacity is available for wheeling purposes during periods when the SFPUC has declared a water shortage emergency under Water Code Section 350 if the following conditions are met:

A. The transferor pays reasonable charges incurred by the SFPUC as a result of the wheeling, including capital, operation, maintenance, administrative and replacement costs (as such are defined in the Wheeling Statute).

B. Wheeled water that is stored in the Regional Water System spills first.

C. Wheeled water will not unreasonably: (1) impact fish and wildlife resources in Regional Water System reservoirs; (2) diminish the quality of water delivered for consumptive uses; or (3) increase the risk of exotic species impairing Regional Water System operations. The transferor may at its own expense provide for treatment to mitigate these effects.

D. Priority will be given to wheeling by Wholesale Customers or BAWSCA over arrangements for third-party public entities.

3.13 Limits on New Customers

A. New Wholesale Customers Prior to December 31, 2018. Until December 31, 2018, San Francisco will not enter into contracts to supply water to any entity other than a Wholesale Customer (whether permanent or temporary, firm or interruptible) unless:

1. It completes any necessary environmental review under CEQA of the proposed new wholesale water service obligations as provided in Section 4.07;

2. It concurrently completes any necessary environmental review under CEQA as provided in Section 4.07 and commits to make both San Jose and Santa Clara permanent customers with Individual Supply Guarantees equal to at least 9 MGD; and

3. This Agreement is amended to incorporate any commitments to proposed new wholesale customers and to San Jose and Santa Clara, and to address the effects, if any, of the new customer(s) on water supply reliability, water quality and cost to existing customers of the Regional Water System.

B. New Wholesale Customers After December 31, 2018. As of January 1, 2019, San Francisco will not enter into contracts to supply water to any entity other than a Wholesale Customer (whether permanent or temporary, firm or interruptible) unless:

1. It completes any necessary environmental review under CEQA of the proposed new wholesale water service obligations as provided in Section 4.07;

2. It concurrently completes any necessary environmental review under CEQA as provided in Section 4.07 and commits to make both San Jose and Santa Clara permanent customers with Individual Supply Guarantees equal to at least 9 MGD;

3. Doing so increases the reliability of the Regional Water System; and

4. This Agreement is concurrently amended (a) to reflect that increased reliability by means of an increased commitment by San Francisco to deliver water during Droughts and (b) to address the effects, if any, of the new customer(s) on water supply, water quality and cost to existing customers of the Regional Water System.

C. <u>New Retail Customers</u>. San Francisco may enter into new retail water service obligations outside of the City and County of San Francisco:

1. Only in Alameda, San Mateo, Santa Clara, San Joaquin and Tuolumne Counties;

2. That are within or immediately adjacent to areas in which it currently serves other Retail Customers; and

3. Until the aggregate additional demand represented by the new retail customers reaches 0.5 MGD.

The limitations on serving new Retail Customers described in this subsection do not apply to historical obligations to supply water that may be contained in prior agreements between the SFPUC or its predecessor the Spring Valley Water Company, and individual users or property owners located adjacent to Regional Water System transmission pipelines.

D. <u>Water Exchanges and Cost Sharing Agreements with Other Water Suppliers</u>. Subject to completion of necessary environmental review under CEQA, San Francisco may at any time enter into water exchanges or cost sharing agreements with other water suppliers to enhance dry year or normal year water deliveries, provided that San Francisco cannot incur new water service obligations to such other water suppliers unless the requirements for taking on new wholesale customers in subsections A and B above are met.

3.14 <u>Measurement of Water</u>

A. The parties recognize that continuous and accurate measurement of water deliveries to and from the Regional Water System and maintenance of complete and accurate records of those measurements is necessary (1) for the costs of the Regional Water System to be allocated in accordance with this Agreement, (2) for implementation of other provisions of this Agreement, and (3) for effective operation and maintenance of a water system serving a large urbanized region.

B. It is the responsibility of the SFPUC to obtain and record these measurements. To do so, the SFPUC shall install, maintain and operate measuring and recording equipment at the following locations: (1) inputs to the Regional Water System from all water sources ("System Input Meters"), (2) internal flow meters to support operation of the Regional Water System ("In-Line Meters"), (3) deliveries to the City at the San Francisco-San Mateo County line ("County-Line Meters") and to three reservoirs in San Francisco ("In-City Terminal Reservoir Meters"), (4) deliveries to SFPUC Retail Customers located outside the boundaries of the City, and (5) deliveries to the Wholesale Customers, as described and illustrated in Attachment J.

C. The SFPUC shall inspect, test, service, and calibrate the measuring and recording equipment installed at the locations described in subsection B and will repair or replace them when necessary, in order to ensure that their accuracy is consistent with specifications provided in Attachment J.

D. The SFPUC shall continue to contract with a qualified independent metering consultant to perform periodic inspection, testing, servicing and calibration of the County-Line Meters, the In-City Terminal Reservoir Meters, and the System Input and In-Line Meters described in Attachment J, as well as the portion of the SFPUC's Supervisory Control and Data Acquisition (SCADA) system that utilizes the flow signals produced by that measuring and recording equipment. The method, schedule and frequency for calibration and maintenance of the County-Line Meters and the In-City Terminal Reservoir Meters are specified in Attachment J. The SFPUC shall provide copies of the metering consultant's reports to BAWSCA.

E. System Input Meters measure water deliveries into the Regional Water System from sources such as Hetch Hetchy and the SFPUC's water treatment plants. System Input Meters also measure deliveries from the Regional Water System to outside sources or from such sources to the Regional Water System through interties with the Santa Clara Valley Water District and the East Bay Municipal Utility District. In-Line Meters measure internal system flows and are located on the Bay Division Pipelines and other main transmission pipelines. These meters are collectively referred to as the "System Input and In-line Meters." Similar to the County-Line Meters, the System Input and In-Line Meters have secondary metering equipment, such as differential pressure transmitters and flow recorders. The System Input and In-Line Meters, and all associated secondary metering equipment, shall be calibrated and maintained according to the method, schedule, and frequency specified in the Procedures Manual described in subsection G, below.

F. The locations of the smaller and more numerous meters described in subsection B (4) and (5) are not illustrated in Attachment J; however, they are also critical in the determination of cost allocations, and accordingly require continued maintenance and calibration. It is the responsibility of the SFPUC to maintain the accuracy of these meters and their secondary metering equipment.

G. The SFPUC will prepare a Procedures Manual which will describe in detail the procedures for periodic inspection, testing, servicing and calibration of the measuring and recording equipment described in subsection B. Once the Procedures Manual is completed, the SFPUC and BAWSCA may agree that it should supersede some or all of the requirements in Attachment J regarding the County-Line and the In-City Terminal Reservoir Meters. Unless and until such an agreement is reached and documented, however, the requirements in Attachment J, Section D will continue in force as minimum standards for meter maintenance and calibration of the County-Line and In-City Terminal Reservoir Meters (subject to modification under the circumstances described in Attachment J, Section A.4).

H. If BAWSCA and the SFPUC are unable to agree on the water use calculations required by Attachment J for a particular year, the Wholesale Customers may file a demand for arbitration challenging the SFPUC's determination of the Wholesale Revenue Requirement for that year on the basis of its reliance on disputed water use calculations. Such a challenge must be brought in the manner and within the time specified in Section 8.01.

3.15 New Sources of Water Supply to Maintain Supply Assurance

A. Urgent Reductions of Existing Surface Water Supplies. Sudden and unanticipated events may require San Francisco to act promptly to protect the health, safety and economic well-being of its Retail and Wholesale Customers. Such sudden events include, but are not limited to drought, earthquakes, terrorist acts, catastrophic failures of facilities owned and operated by San Francisco, and other natural or man-made events. If such events diminish San Francisco's ability to maintain the Supply Assurance, San Francisco may increase the Wholesale Revenue Requirement to pay for planning, evaluation and implementation of replacement sources of supply when such needs arise and without the prior approval of the Wholesale Customers. San Francisco will keep the Wholesale Customers informed of actions being taken under this subsection, progress made, and contingency actions the Wholesale Customers may need to consider taking. To the extent appropriate and applicable, San Francisco will act in accordance with Section 3.11 and the ERRP. Nothing in this subsection limits San Francisco's obligations under Section 3.11 to pursue additional sources of supply to augment supplies available during drought.

B. Non-Urgent Reductions of Existing Surface Water Supplies. Climate change, regulatory actions and other events may impact San Francisco's ability to maintain the Supply Assurance from its existing surface water supplies, but on timescales long enough to permit San Francisco to collaborate with its Wholesale Customers on how best to address possible impacts to water supply. If such events diminish San Francisco's ability to maintain the Supply Assurance, San Francisco may increase the Wholesale Revenue Requirement to pay for planning, evaluation and implementation of replacement sources of supply when such needs arise and without the prior approval of the Wholesale Customers. San Francisco will keep the Wholesale Customers informed of actions being taken under this subsection, progress made, and contingency actions the Wholesale Customers may need to consider taking. San Francisco will solicit input and recommendations from BAWSCA and the Wholesale Customers, and take those recommendations into consideration. Prior to Commission approval of plans or taking other actions that would impact the Wholesale Revenue Requirement, San Francisco will hold a public hearing to receive written and oral comments. Nothing in this subsection modifies San Francisco's obligation to maintain the ability to provide the Supply Assurance under this Agreement.

3.16 New Sources of Water Supply to Increase Supply Assurance

A. Surface Water Supplies From Existing Watersheds After 2018. The Commission action in SFPUC Resolution Number 08-0200, adopted October 30, 2008 requires certain decisions by San Francisco regarding whether to supply more than 265 MGD from its watersheds following 2018. Such decisions are to be made by December 31, 2018, subject to the exercise of San Francisco's retained CEQA discretion in Section 4.07. San Francisco's future decisions may include an offer to increase the Supply Assurance at the request of some or all of its Wholesale Customers. Costs associated with providing additional water from its existing water supplies in San Mateo, Santa Clara, Alameda, Tuolumne, and Stanislaus Counties shall be allocated to Wholesale and Retail Customers as described in Article 5.

B. **New Water Supplies.** If San Francisco seeks to develop additional water supplies from new sources to increase the Supply Assurance available to Wholesale Customers, studies and resulting water supply projects will be conducted jointly with BAWSCA under separate agreement(s) specifying the purpose of the projects, the anticipated regional benefits and how costs of studies and implementation will be allocated and charged. Nothing in this Agreement shall serve as precedent for the allocation of such new supply capital costs between Retail and Wholesale Customers or associated operational expenses, which shall only occur following approval of both parties and amendment of this Agreement, if necessary, under Section 2.03.

3.17 Westside Basin Conjunctive Use Program

Subject to completion of necessary CEQA review as provided in Section 4.07, the SFPUC may enter into an agreement with the cities of Daly City and San Bruno and the California Water Service Company, South San Francisco Service Area ("Participating Pumpers") governing the operation of the South Westside Basin Conjunctive Use Program (“Program”), a WSIP Project. The Program would produce Regional benefits for all customers of the Regional Water System by making use of available groundwater storage capacity in the Southern portion of the Westside Basin through the supply of additional surface water (“In Lieu Water”) to the Participating Pumpers from the Regional Water System, in exchange for a corresponding reduction in groundwater pumping at existing wells owned by the Participating Pumpers. The new groundwater supply that would accrue to storage as a result of delivery of In Lieu Water would then be recovered from the SFPUC basin storage account during water shortages using new SFPUC Regional Program wells operated by the Participating Pumpers and the SFPUC. Program annual operations and maintenance expenses and water supplies are expected to be allocated as follows:

A. All In Lieu Water delivered to the Participating Pumpers shall be (1) temporary and interruptible in nature and (2) at the sole discretion of the SFPUC based on the total volume of water available to the Regional Water System.

B. All In Lieu Water delivered to the Participating Pumpers shall be considered a delivery of water to storage and shall not be construed to affect or increase the Individual Supply Guarantees of these wholesale customers or to otherwise entitle them to any claim of water in excess of their Individual Supply Guarantees or their Interim Supply Allocations. Furthermore, Environmental Enhancement Surcharges authorized under Section 4.04 will not be applied by the SFPUC to any quantity of In Lieu Water that is delivered to the Participating Pumpers, but will instead be based solely on Participating Pumper water deliveries in excess of their respective Interim Supply Allocations.

C. Any operation and maintenance expenses incurred by the Participating Pumpers and the SFPUC that are related to the operation of Regional Program wells and related assets shall be included as Regional pumping expenses under Section 5.05.B and included as part of the Wholesale Revenue Requirement. For rate setting purposes, estimated Regional Program operation and maintenance expenses shall be used as set forth in Section 6.01. Operation and maintenance expenses associated with the Participating Pumpers' existing wells that do not provide Regional benefits shall not be included in the Wholesale Revenue Requirement. On a case-by-case basis, the SFPUC may include Participating Pumper existing well operation and maintenance expenses in the Wholesale Revenue Requirement provided that such expenses (1) are solely attributable to Regional Program operations and (2) are not caused by the Participating Pumper's failure to operate and maintain its existing wells in a reasonable and prudent manner consistent with water utility industry standards.

D. The SFPUC will audit operation and maintenance expenses submitted by the Participating Pumpers for reimbursement to confirm that such costs were incurred as a result of operating Regional Program wells and related assets. Costs associated with the use of Program facilities for Direct Retail or Direct Wholesale purposes, or that do not otherwise provide Regional benefits, shall not be included in the Wholesale Revenue Requirement. The SFPUC is responsible for resolving disputes with the Participating Pumpers concerning expense allocations. Program expense documentation, including documentation of negotiation and settlement of disputed costs, will be available for review during the Compliance Audit described in Section 7.04. The Wholesale Customers may dispute the SFPUC's resolution of expense allocations through the arbitration provisions in Section 8.01 of this Agreement.

E. The SFPUC may direct the Participating Pumpers to recover water from the SFPUC basin storage account for any type of shortage referenced in Section 3.11. Water recovered from the SFPUC basin storage account using Regional Program wells may be used for (1) the benefit of all Regional Water System customers; (2) Retail Customers; or (3) one or more of the Participating Pumpers. The Wholesale Revenue Requirement shall only include operation and maintenance expenses incurred due to the operation of Program wells for Regional benefits.

F. All water recovered from the SFPUC basin storage account by the Participating Pumpers and by the SFPUC for delivery to Retail Customers during Shortages caused by Drought shall be used to free up a comparable volume of surface water from the Regional Water System for allocation in accordance with the Tier 1 Shortage Plan.

G. If the Program is terminated for any reason, including breach of the Program agreement by the Participating Pumpers or SFPUC, or due to regulatory action or legal action, then

1. Any water remaining SFPUC Regional storage account shall be used for the benefit of all customers of the Regional Water System;

2. Outstanding eligible operation and maintenance expenses, including costs incurred during recovery of remaining stored water, will be allocated as provided in this section; and

3. The Wholesale Customers will be credited with their share of proceeds from disposition of Program facilities or reimbursed their share of such capital costs for any Program facilities which are retained by the SFPUC for Direct Retail benefit and not used for the benefit of the Wholesale Customers, on the basis of (a) original cost less depreciation and outstanding related Indebtedness or (b) original cost less accumulated depreciation for revenue funded Regional Program facilities.

Article 4. Implementation of Interim Supply Limitation.

4.01 **Interim Supply Limitation Imposed by SFPUC**

In adopting the WSIP in Res. No. 08-0200, the Commission included full implementation of all proposed WSIP capital improvement projects to achieve level of service goals relating to public health, seismic safety, and delivery reliability, but decided to adopt a water supply element that includes the Interim Supply Limitation. This article describes how the parties will implement the Interim Supply Limitation imposed by the SFPUC between the Effective Date and December 31, 2018.

4.02 **Retail and Wholesale Customer Allocations Under Interim Supply Limitation**

The Interim Supply Limitation is allocated as follows between Retail and Wholesale Customers:

Retail Customers' allocation:	81 MGD
Wholesale Customers' allocation:	184 MGD

The Wholesale Customers' collective allocation of 184 MGD under the Interim Supply Limitation includes the demand of the cities of San Jose and Santa Clara, whose demand is not included in the Supply Assurance, as provided in Section 3.02.B. By December 31st, 2010, the Commission will establish each Wholesale Customer's Interim Supply Allocation at a public meeting.

4.03 **Transfers of Interim Supply Allocations**

A. Any Wholesale Customer, including Hayward, may transfer a portion of its Interim Supply Allocation to one or more other Wholesale Customers, as provided in this section. All Wholesale Customers are also eligible transferees, including California Water Service Company up to its Individual Supply Guarantee.

B. Transfers of a portion of an Interim Supply Allocation must be prospective. The duration of a transfer cannot be less than the balance of the fiscal year. The minimum quantity that may be transferred is 1/10th of a MGD.

C. Transfers of portions of Interim Supply Allocations are subject to approval by the SFPUC. SFPUC review is limited to determining (1) whether a proposed transfer complies with the Act, and (2) whether the affected facilities in the Regional Water System have sufficient capacity to accommodate delivery of the increased amount of water to the proposed transferee.

D. The participants in a proposed transfer shall provide notice to the SFPUC specifying the amount of the Interim Supply Allocation proposed to be transferred and the proposed effective date of the transfer, which shall not be less than 60 days after the notice is submitted to the SFPUC. The SFPUC may require additional information reasonably necessary to evaluate the operational impacts of the transfer. The SFPUC will not unreasonably withhold or delay its approval; if the SFPUC does not act on the notice within 60 days, the transfer will be deemed to have been approved.

E. Within 30 days after the transfer has become effective, both the transferor and the transferee will provide written notice to the SFPUC and BAWSCA.

F. Transfers of Interim Supply Allocations shall continue in effect until the earlier of (1) delivery of written notice to the SFPUC by the transfer participants that the transfer has been rescinded or (2) December 31, 2018.

4.04 Environmental Enhancement Surcharge

A. Establishment of Environmental Enhancement Surcharge. Beginning with wholesale water rates for fiscal year 2011-2012, and continuing for the duration of the Interim Supply Limitation, the Commission will establish the Environmental Enhancement Surcharge concurrently with the budget-coordinated rate process set forth in Article 6 of this Agreement. The monetary amount of the Environmental Enhancement Surcharge per volume of water, such as dollars per acre-foot, will be equivalent for Retail Customer use in excess of 81 MGD and Wholesale Customer use in excess of 184 MGD. The Environmental Enhancement Surcharge will be simple to calculate so that Wholesale Customers can estimate potential surcharges for budgeting purposes and establish retail rates within their service areas.

B. Application of Environmental Enhancement Surcharge. Beginning in fiscal year 2011-12, the Environmental Enhancement Surcharge will be levied only if and when combined Retail Customer and Wholesale Customer purchases exceed the Interim Supply Limitation of 265 MGD and if the fund described in subsection D below has been established by the San Francisco Board of Supervisors. In that event, the Environmental Enhancement Surcharge will apply to Retail Customers for use in excess of 81 MGD and to individual

Wholesale Customers for use in excess of their Interim Supply Allocations established by the Commission pursuant to Section 4.02.

1. Environmental Enhancement Surcharges related to the Retail Customers' use in excess of their 81 MGD Retail Customer Allocation will be paid by the SFPUC, and no portion of such surcharges may be allocated to Wholesale Customers. The method of recovering the Environmental Enhancement Surcharges imposed upon Retail Customers shall be within the sole discretion of the SFPUC.

2. Environmental Enhancement Surcharges related to the individual Wholesale Customers' use in excess of their respective Interim Supply Allocations will be paid to the SFPUC by individual Wholesale Customers.

C. Collection of Environmental Enhancement Surcharge. Notwithstanding the budget-coordinated rate setting process contemplated in Article 6 of this Agreement, the Environmental Enhancement Surcharge for any given year will be determined retrospectively based on actual annual usage during the fiscal year in excess of the Interim Supply Allocation and paid in equal monthly installments over the remainder of the immediately following fiscal year.

D. Establishment of Fund for Environmental Enhancement Surcharge Proceeds. Environmental Enhancement Surcharges paid by the SFPUC and by Wholesale Customers will be placed into a restricted reserve fund. The SFPUC will request the San Francisco Board of Supervisors to establish this fund by ordinance and, if adopted, the fund will be subject to the following restrictions:

1. Interest earnings will stay in the reserve fund.

2. The reserve fund shall (a) be subject to automatic appropriation; (b) require unexpended and unencumbered fund balances to be carried forward from year to year; and (c) not be transferred to the San Francisco General Fund.

3. The reserve fund may be used only for specific environmental restoration and enhancement measures for the Sierra and local watersheds, such as those included in the Watershed Environmental Improvement Program.

4. Environmental Enhancement Surcharge proceeds shall be expended in an expeditious manner. Any Environmental Enhancement Surcharge proceeds that remain in

the reserve fund as of December 31, 2018 shall be used to complete projects previously approved under subsection E. Upon completion of the identified projects, the balance of any unexpended sums in the reserve fund shall be distributed to BAWSCA and the SFPUC in proportion to the total amount of surcharges assessed to the Wholesale and Retail Customers, respectively.

E. <u>Use of Environmental Enhancement Surcharge Proceeds</u>. Specific uses of Environmental Enhancement Surcharges will be decided by the SFPUC and BAWSCA General Managers following input from environmental stakeholders and other interested members of the public. If parties are unable to agree, then they will jointly select a third person to participate in making the decision.

4.05 <u>San Jose/ Santa Clara Interim Supply Allocation and Process for Reduction/ Termination</u>.

San Francisco will supply a combined annual average of 9 MGD to the cities of San Jose and Santa Clara through 2018. Water supplied by San Francisco may only be used in the existing defined service areas in the northern portions of San Jose and Santa Clara shown on Attachment Q. San Francisco may reduce the quantity of water specified in this section when it establishes the Interim Supply Allocations for Wholesale Customers in Section 4.02. The establishment of Interim Supply Allocations for San Jose and Santa Clara shall not be considered a reduction of supply within the meaning of this section, provided that the Interim Supply Allocations assigned to San Jose and Santa Clara do not effect a reduction greater than the aggregate average reduction in Individual Supply Guarantees for Wholesale Customers that have such guarantees. The application of Interim Supply Allocations to San Jose and Santa Clara is subject to the following provisions:

A. In December 2010 and in each December thereafter through 2017, the SFPUC shall prepare and the Commission shall consider, at a regularly scheduled public meeting, a Water Supply Development Report detailing progress made toward meeting the Interim Supply Limitation by June 30, 2018.

B. The annual Water Supply Development Report shall be based on water purchase projections and work plans for achieving the Interim Supply Limitation in the Retail and Wholesale Service Areas. The projections and work plans will be prepared by the SFPUC for the Retail Customers and by BAWSCA for the Wholesale Customers, respectively, and submitted to the Commission in June of each year beginning in 2010.

C. If the Commission finds that the projections in the Water Supply Development Report show that the Interim Supply Limitation will not be met by June 30, 2018, as a result of Wholesale Customers' projected use exceeding 184 MGD, the Commission may issue a conditional five-year notice of interruption or reduction in supply of water to San Jose and Santa Clara.

D. Upon issuance of the conditional notice of interruption or reduction, the SFPUC will prepare a new analysis of water supply that will be utilized by the San Francisco Planning Department in its preparation of any necessary documentation under CEQA pursuant to Section 4.07 on the impacts of interrupting or reducing service to San Jose and Santa Clara.

E. Such notice of interruption or reduction will be rescinded if the Commission finds, based upon a subsequent annual Water Supply Development Report, that sufficient progress has been made toward meeting the Interim Supply Limitation or projections show that the Interim Supply Limitation will be met by June 30, 2018.

F. In no case shall any interruption or reduction of service to San Jose or Santa Clara pursuant to this section become effective less than two years from the completion of the CEQA process (not including resolution of any appeals or litigation) or five years from the notice, whichever is longer. If the five-year notice is issued after 2013, such interruption or reduction would occur after 2018.

G. If deliveries to San Jose and Santa Clara are interrupted, existing turnout facilities to San Jose and Santa Clara will remain in place for possible use during emergencies.

H. San Francisco and the cities of San Jose and Santa Clara will cooperate with BAWSCA and the Santa Clara Valley Water District in the identification and implementation of additional water sources and conservation measures for the cities' service areas that are relevant to the water supply and the possible offer of permanent status for the two cities by the SFPUC.

4.06 <u>San Francisco Decisions in 2018 Regarding Future Water Supply</u>

A. By December 31, 2018, San Francisco will have completed any necessary CEQA review pursuant to Section 4.07 that is relevant to making San Jose and Santa Clara permanent customers of the Regional Water System and will decide whether or not to make San Jose and Santa Clara permanent customers of the Regional Water System. San Francisco will make San Jose and Santa Clara permanent customers only if, and to the extent that, San Francisco determines that Regional Water System long term water supplies are available. In the event that San Francisco decides to afford permanent status to San Jose and Santa Clara, this Agreement will be amended pursuant to Section 2.03.

B. By December 31, 2018, San Francisco will have completed any necessary CEQA review pursuant to Section 4.07 and will decide how much water if any, in excess of the Supply Assurance it will supply to Wholesale Customers from the Regional Water System to meet their projected future water demands until the year 2030, and whether to offer a corresponding increase in the Supply Assurance as a result of its determination.

4.07 <u>Retained Discretion of SFPUC and Wholesale Customers</u>

A. This Agreement contemplates discretionary actions that the SFPUC and the Wholesale Customers may choose to take in the future that could result in physical changes to the environment ("Discretionary Actions"). The Discretionary Actions include decisions to:

1. Develop additional or alternate water resources by the SFPUC or one or more Wholesale Customers;

2. Implement the physical facilities comprising the WSIP by December 31, 2015;

3. Approve wheeling proposals by Wholesale Customers;

4. Approve new wholesale customers and water exchange or cost sharing agreements with other water suppliers;

5. Provide additional water to San Jose and/or Santa Clara;

6. Offer permanent status to San Jose and/or Santa Clara;

7. Reduce or terminate supply to San Jose and/or Santa Clara;

8. Provide additional water to Wholesale Customers in excess of the Supply Assurance to meet their projected future water demands; and

9. Offer a corresponding volumetric increase in the Supply Assurance.

The Discretionary Actions may require the SFPUC or Wholesale Customers to prepare environmental documents in accordance with CEQA prior to the SFPUC or the Wholesale Customers determining whether to proceed with any of the Discretionary Actions. Accordingly, and notwithstanding any provision of this Agreement to the contrary, nothing in this Agreement commits the SFPUC or the Wholesale Customers to approve or carry out any Discretionary Actions that are subject to CEQA. Furthermore, the SFPUC's or Wholesale Customers' decisions to approve any of these Discretionary Actions are subject to the requirement that San Francisco and each Wholesale Customer, as either a "Lead Agency" (as defined in Section 21067 of CEQA and Section 15367 of the CEQA Guidelines) or a "Responsible Agency" (as defined in Section 21069 of CEQA and Section 15381 of the CEQA Guidelines) shall have completed any CEQA-required environmental review prior to approving a proposed Discretionary Action.

B. In considering any proposed Discretionary Actions, the SFPUC and Wholesale Customers retain absolute discretion to: (1) make such modifications to any of the proposed Discretionary Actions as may be necessary to mitigate significant environmental impacts; (2) select feasible alternatives to the proposed Discretionary Actions that avoid significant adverse impacts; (3) require the implementation of specific measures to mitigate the significant adverse environmental impacts as part of the decision to approve the Discretionary Actions; (4) balance the benefits of the proposed Discretionary Actions against any significant environmental impacts before taking final actions to approve the proposed Discretionary Actions if such significant impacts cannot otherwise be avoided; or (5) determine not to proceed with the proposed Discretionary Actions.

Article 5. Wholesale Revenue Requirement

5.01 Scope of Agreement

This Article shall be applicable only to the water rates charged by San Francisco to the Wholesale Customers. Nothing contained in this Agreement shall limit, constrain, or in any way affect the rates which San Francisco may charge for water sold to Retail Customers or the methodology by which such rates are determined.

5.02 General Principles

This Article sets forth the method by which the Wholesale Customers' collective share of expenses incurred by the SFPUC in delivering water to them will be determined. This collective share is defined as the "Wholesale Revenue Requirement."

A. The SFPUC currently operates several enterprises, including the Water Enterprise, the Wastewater Enterprise, and the Hetch Hetchy Enterprise.

B. The Wastewater Enterprise is responsible for treating sewage within San Francisco and provides no benefit to the Wholesale Customers.

C. The Hetch Hetchy Enterprise is responsible for storing and transmitting water to the Water Enterprise, generating hydroelectric power and transmitting it to San Francisco, generating electric power within San Francisco, and distributing electricity and steam heat within San Francisco. Its water supply operations provide benefits to the Wholesale Customers.

D. The Water Enterprise delivers water to both Retail Customers, which are located both within and outside San Francisco, and to the Wholesale Customers, all of which are located outside San Francisco.

E. This Article implements two general principles as follows: (1) the Wholesale Customers should not pay for expenses of SFPUC operations from which they receive no benefit and (2) the Wholesale Customers should pay their share of expenses incurred by the SFPUC in delivering water to them on the basis of Proportional Annual Use unless otherwise explicitly provided in this Agreement.

F. To implement these general principles, the Wholesale Revenue Requirement will consist of, and be limited to, the Wholesale Customers' shares of the following categories of expense:

1. Capital cost recovery of Water Enterprise Existing Assets, and Hetch Hetchy Enterprise Existing Assets classified as Water-Only and the Water-Related portion of Joint assets (Section 5.03)

2. Contribution to the capital cost of Water Enterprise New Regional Assets (Section 5.04)

3. Water Enterprise operation and maintenance expenses, including power purchased from the Hetch Hetchy Enterprise that is used in the operation of the Water Enterprise (Section 5.05)

4. Water Enterprise administrative and general expenses (Section 5.06)

5. Water Enterprise property taxes (Section 5.07)

6. The Water Enterprise's share of the Hetch Hetchy Enterprise's operation and maintenance, administrative and general, and property tax expenses (Section 5.08)

7. The Water Enterprise's share of the Hetch Hetchy Enterprise's capital cost of New Assets classified as Water-Only and the Water-Related portion of Joint assets (Section 5.09)

In each of these cost categories, Direct Retail Expenses will be allocated entirely to Retail Customers. Direct Wholesale Expenses will be allocated entirely to the Wholesale Customers. Regional Expenses will be allocated between Retail Customers and Wholesale Customers as provided in this Article.

G. For purposes of establishing the rates to be charged Wholesale Customers, expenses will be based on the budget for, and estimates of water purchases in, the following fiscal year, as provided in Article 6. For purposes of accounting, the Wholesale Revenue Requirement will be determined on the basis of actual expenses incurred and actual water use, as provided in Article 7.

H. In addition, rates charged to Wholesale Customers may include the Wholesale Customers' contribution to a Wholesale Revenue Coverage Reserve, as provided in Section 6.06, which is not included in the Wholesale Revenue Requirement itself.

5.03 Capital Cost Recovery - Existing Regional Assets

A. SFPUC has previously advanced funds to acquire or construct Existing Assets used and useful in the delivery of water to both Wholesale Customers and Retail Customers. The parties estimate that the Wholesale Customers' share of the net book value of these assets, as of the expiration of the 1984 Agreement on June 30, 2009, will be approximately $366,734,424, as shown on Attachment K-1.

B. In addition, SFPUC has also previously advanced funds received from Retail Customer revenues to acquire or construct assets included in Construction-Work-In-Progress (CWIP) as of June 30, 2009. The parties estimate that the Wholesale Customers' share of the book value of these revenue funded capital expenditures, as of the expiration of the 1984 Agreement on June 30, 2009, will be approximately $15,594,990, as shown on Attachment K-2. The Wholesale Customers shall pay their share of the cost of Existing Assets and revenue-funded CWIP by amortizing the amounts shown on Attachment K-1 and Attachment K-2 over 25 years at an interest rate of 5.13 percent. The amounts to be included in the Wholesale Revenue Requirement pursuant to this section shall be the sum of the annual principal and interest amounts shown on Attachments K-3 (for Water Enterprise Regional Assets and the one Direct Wholesale Asset) and K-4 (for Hetch Hetchy Enterprise Water-Only Assets and the Water-Related portion [45 percent] of Joint assets) calculated on the basis of monthly amortization of principal as set forth on Attachments K-3 and K-4.

C. In addition, the Commission has previously appropriated funds, advanced through rates charged to Retail Customers, for construction of capital projects. Some of these projects are active, and have unexpended balances of appropriated funds that are not included in CWIP as of June 30, 2009. These projects, and the associated balances, are shown on Attachment K-5. Expenditures of funds from these balances during FY 2009-10, FY 2010-11 and FY 2011-12 will be reviewed in FY 2012-13. The SFPUC will prepare a report showing the amount expended in each year on each project and the total expended during all years on all projects that are categorized as Regional or, in the case of Hetch Hetchy Enterprise, are categorized as either Water-Only or Joint. The wholesale share of that total will be determined using the allocation principles in this Agreement based on Proportional Water Use during those three years. The result, plus accrued interest at the rate specified in Section 6.05.B, will be calculated by the SFPUC and its calculation reviewed by the Compliance Auditor as part of the Compliance Audit for FY 2012-13. The audited total will be paid based on a schedule of level annual principal and interest amounts over ten years at an interest rate of 4.00%, calculated on a monthly amortization basis. All or any portion of the balance may be prepaid. The first year's payment will be included in the Wholesale Revenue Requirement for FY 2014-15.

D. The parties agree that the Wholesale Customers' share of the net book values of Existing Regional Assets as of June 30, 2008 as shown on Attachment K-1 are accurate. The compliance audit conducted on the calculation of the FY 2008-09 Suburban Revenue Requirement required by the 1984 Agreement will determine the actual amounts of depreciation on, and capital additions to, plant in service during that fiscal year. Those amounts will be compared to the corresponding estimates shown on Attachments K-1 and K-2. The differences will be added to or subtracted from the estimated asset values shown on Attachments K-1 and K-2 and the amortization schedules in Attachments K-3 and K-4 will be recalculated. The wholesale allocation factors shall be fixed at 70.1% for the Water Enterprise Existing Assets and 64.2% for Hetch Hetchy Enterprise Existing Assets for both the preliminary and final payment schedules. The SFPUC will prepare and provide to the Wholesale Customers revised Attachments K-1 through K-4 based on the Wholesale Customers' share of the net book value of the assets placed in service as of June 30, 2009 used to provide water service to the Wholesale Customers and the net book value of revenue-funded CWIP expended as of June 30, 2009. The revised Attachments K-1 through K-4 shall be approved by the General Manager of the SFPUC and the General Manager/CEO of BAWSCA and will be substituted for the original Attachments K-1 through K-4.

E. The original Attachments K-1 through K-4, based on estimates, shall be used for estimating the Wholesale Revenue Requirement for the fiscal year beginning July 1, 2009. The revised Attachments, based on audited actuals, shall be used to determine the actual Wholesale Revenue Requirement for FY 2009-10 and to determine the Wholesale Revenue Requirement(s) in all subsequent years, except as may be provided elsewhere in this Agreement.

F. The Wholesale Customers, acting through BAWSCA, may prepay the remaining unpaid Existing Assets principal balance, in whole or in part, at any time without penalty or early payment premium. Any prepayments will be applied in the month immediately following the month in which the prepayment is made and the revised monthly amount(s) will be used to calculate the Wholesale Revenue Requirement. Any partial prepayments must be in an amount at least equal to $10 million. In the event of a partial prepayment, an updated schedule for the remaining payments shall be prepared reflecting the unpaid balance after prepayment, amortized through the end of FY 2034, calculated as provided in this section. The updated schedule, approved by the General Manager of the SFPUC and the General Manager/CEO of BAWSCA, will be substituted for Attachment K-3 and/or Attachment K-4.

5.04 Capital Cost Contribution - New Regional Assets

A. Debt-Funded Capital Additions. The Wholesale Customers shall pay the wholesale share of Net Annual Debt Service for New Regional Assets. The Regional projects in the WSIP are identified in Attachment L-1.

1. The amount of Net Annual Debt Service for New Regional Assets will be determined for each series of Indebtedness issued. Until the proceeds of a particular series are Substantially Expended, the amount attributable to specific projects will be based on the expected use of proceeds shown in the "Certificate Regarding Use of Proceeds" executed by the SFPUC General Manager on behalf of the Commission in connection with the sale of the Indebtedness, provided such certificate identifies the use of proceeds at a level of detail equivalent to that shown on Attachment L-2, which is a copy of the certificate prepared for the 2006 Revenue Bonds, Series A. If a certificate does not identify the use of proceeds at that level of detail, the SFPUC General Manager shall prepare and execute a separate certificate which does identify the use of proceeds at the level of detail shown on Attachment L-2 and deliver it to BAWSCA within 15 days from the closing of the sale of the Indebtedness.

2. After the proceeds of a series are Substantially Expended, the SFPUC General Manager will prepare and execute a certificate showing the actual expenditure of proceeds at a level of detail equivalent to the initial General Manager certificate. The resulting allocation of Net Debt Service to New Regional Assets for a series of bonds will be used in the fiscal year in which the proceeds have been Substantially Expended and thereafter. Differences between the amount of Net Debt Service paid by Wholesale Customers prior to that year and the amount of Net Debt Service that they should have paid during that time based on the actual expenditure of proceeds will be taken into account in calculation of the balancing account for the fiscal year in which the proceeds were Substantially Expended. The application of the remaining proceeds shall be proportionate to the allocation of the Net Debt Service to New Regional Assets.

3. The Wholesale Customers' share of Net Annual Debt Service for the New Regional Assets that are categorized as Direct Wholesale will be 100 percent. (None of the

projects in the WSIP are categorized as Direct Wholesale.) The Wholesale Customers' share of Net Annual Debt Service for all other New Regional Assets will be determined each year and will be equal to the Wholesale Customers' Proportional Annual Use.

4. If Indebtedness is issued by the SFPUC to refund the 2006 Revenue Bonds, Series A or to refund any other long-term Indebtedness issued after July 1, 2009, the Net Annual Debt Service attributable to proceeds used for refunding will be allocated on the same basis as the Indebtedness being refunded.

5. The SFPUC will prepare an annual report showing for each issue of Indebtedness and through the most recently completed fiscal year: (1) net financing proceeds available to pay project costs, (2) actual earnings on proceeds, (3) actual expenditures by project. The report shall be substantially in the form of Attachment L-3 and shall be delivered to BAWSCA on or before November 30 of each year, commencing November 2009.

6. In addition to Net Debt Service, Wholesale Customers will pay a proportionate share of annual administrative costs associated with Indebtedness, such as bond trustee fees, credit rating agency fees, letter of credit issuer fees, San Francisco Revenue Bond Oversight Committee fees, etc., but only to the extent such fees are neither paid from proceeds of Indebtedness nor included in SFPUC operation and maintenance or administrative and general expenses.

B. **Revenue-Funded Capital Additions**. The Wholesale Customers shall pay the wholesale share of the appropriation contained in the SFPUC annual budget for each year to be used to acquire or construct New Regional Assets. If such appropriations are reimbursed from proceeds of Indebtedness, the Wholesale Customers will be credited for prior payments made under this Section 5.04.B.

The Wholesale Customers' share of the annual appropriation for revenue-funded New Regional Assets that are categorized as Direct Wholesale will be 100 percent. (None of the Repair and Replacement projects in the SFPUC's most recent capital improvement program updated on February 10, 2009, is categorized as Direct Wholesale.) The Wholesale Customers' share of the annual appropriation for all other revenue-funded New Regional Assets will be determined each year and will be equal to the Wholesale Customers' Proportional Annual Use in each fiscal year. The amount appropriated in each fiscal year for the wholesale share of New

Regional Assets shall be contributed to the Wholesale Capital Fund described in Section 6.08 and reported on and administered as shown in that section and Attachments M-1 through M-3.

5.05 Water Enterprise Operation and Maintenance Expenses

There are five categories of Water Enterprise Operation and Maintenance Expenses, described below:

A. Source of Supply

1. Description: This category consists of the costs of labor, supervision and engineering; materials and supplies; and other expenses incurred in the operation and maintenance of collecting and impounding reservoirs, dams, wells and other water supply facilities located outside San Francisco; watershed protection; water supply planning; and the purchase of water.

2. Allocation: Direct Retail expenses, including water supply planning for Retail operations (such as City Retail water conservation programs), will be assigned to the Retail Customers. Regional expenses will be allocated between Retail Customers and Wholesale Customers on the basis of Proportional Annual Use. Direct Wholesale expenses will be assigned to the Wholesale Customers. (As of the Effective Date there are no Direct Wholesale expenses in the Source of Supply category.)

B. Pumping

1. Description: This category consists of the costs of labor, supervision and engineering; materials and supplies; and other expenses incurred in the operation and maintenance of water pumping plants, ancillary structures and equipment and surrounding grounds; and fuel and power purchased for pumping water.

2. Allocation: Direct Retail expenses will be assigned to the Retail Customers. Regional expenses will be allocated between Retail Customers and Wholesale Customers on the basis of Proportional Annual Use. Direct Wholesale expenses will be assigned to the Wholesale Customers. (As of the Effective Date there are no Direct Wholesale expenses in the Pumping category.)

C. Treatment

1. Description: This category consists of the costs of labor, supervision and engineering; materials and supplies and other expenses incurred in the operation and

maintenance of water treatment plants and drinking water quality sampling and testing. The cost of water quality testing will not include expenses incurred on behalf of the Wastewater Enterprise. Any remaining costs, after adjusting for the Wastewater Enterprise, will be reduced by the amount of revenue received for laboratory analyses of any type performed for agencies, businesses and/or individuals other than the Water and Hetch Hetchy Enterprises.

2. Allocation: Direct Retail expenses will be assigned to the Retail Customers. Regional expenses will be allocated between Retail Customers and Wholesale Customers on the basis of Proportional Annual Use. Direct Wholesale expenses will be assigned to the Wholesale Customers. (As of the Effective Date there are no Direct Wholesale expenses in the Treatment category.)

D. Transmission and Distribution

1. Description: This category consists of the cost of labor, supervision and engineering; materials and supplies; and other expenses incurred in the operation and maintenance of transmission and distribution pipelines, appurtenances, meters (other than those expenses payable by individual Wholesale Customers pursuant to Section 5.10.C.3), distribution reservoirs storing treated water, craft shops and auto shops servicing vehicles used for operation and maintenance of the Regional Water System rather than for Direct Retail facilities, and miscellaneous facilities related to the transmission and distribution of water.

2. Allocation: Direct Retail Transmission and Distribution expenses will be assigned to the Retail Customers. Regional Transmission and Distribution expenses will be allocated between Retail and Wholesale Customers on the basis of Proportional Annual Use. Expenses incurred for the operation and maintenance of three terminal reservoirs, i.e., Sunset Reservoir (North and South Basins), University Mound Reservoir (North and South Basins), and Merced Manor Reservoir, as well as transmission pipelines delivering water to them, are classified as Regional expenses notwithstanding the location of the reservoirs within San Francisco. Direct Wholesale expenses will be assigned to the Wholesale Customers. (As of the Effective Date the only Direct Wholesale expenses in the Transmission and Distribution category are associated with the Palo Alto pipeline.)

E. Customer Services

1. Description: This category consists of labor; materials and supplies; and other expenses incurred for meter reading, customer record keeping, and billing and collection for the Water Enterprise.

2. Allocation: Customer Services expenses will be allocated among the Water Enterprise, the Wastewater Enterprise, and Hetch Hetchy Enterprise in proportion to the time spent by employees in Customer Services for each operating department/enterprise. The Water Enterprise's share of Customer Services expense will be allocated 98 percent to the Retail Customers and two percent to the Wholesale Customers, as illustrated on Attachment N-2, Schedule 1.

5.06 Water Enterprise Administrative and General Expenses

Administrative and General expenses consist of the Water Enterprise's share of the cost of general government distributed through the full-cost Countywide Cost Allocation Plan, the services of SFPUC support bureaus, Water Enterprise administrative and general expenses that cannot be directly assigned to a specific operating and maintenance category, and the cost of the Compliance Audit. These four subcategories, and the method by which costs in each are to be calculated and allocated, are as follows:

A. Countywide Cost Allocation Plan

1. Description: This subcategory consists of the Water Enterprise's share of the costs of San Francisco general government and other City central service departments which are not directly billed to the Water Enterprise or other operating departments. All San Francisco operating departments are assigned a prorated share of these costs through the full-cost Countywide Cost Allocation Plan (COWCAP) prepared annually by the San Francisco Controller.

2. Allocation: The Water Enterprise's assigned share of central government costs as shown in the annual full-cost COWCAP prepared by the San Francisco Controller, will be allocated between Retail Customers and Wholesale Customers on the basis of the composite percentage of the allocated expenses in the five categories of operation and maintenance expense described in Section 5.05. The composite wholesale percentage shown on Attachment N-2, Schedule 1 is 42.07 percent, derived by dividing the wholesale share of

Operation and Maintenance expenses ($46,573,883) by total Operation and Maintenance expenses ($110,700,133).

B. Services of SFPUC Bureaus

1. Description: This subcategory consists of the support services provided to the Water Enterprise by the SFPUC Bureaus, which presently consist of the General Manager's Office, Business Services, External Affairs, and Infrastructure Bureau. Business Services presently includes Financial Services, Information Technology Services, Human Resource Services, Fleet Management, and Customer Services.

2. Allocation: There are three steps involved in determining the Wholesale Customers' share of SFPUC Bureau costs.

a. Step One: Bureau expenses which have either been recovered separately or which provide no benefit to Wholesale Customers will be excluded. Examples of Bureau expenses recovered separately include (1) Customer Services expenses, which are recovered as provided in Section 5.05.E, and (2) Infrastructure expenses, which are assigned to individual projects and capitalized. An example of a Bureau expense that provides no benefit to Wholesale Customers is Information Technology Services expenses for support of the San Francisco Municipal Railway. In addition, the SFPUC will continue its practice of assigning City Attorney Office expenses charged to the General Manager's Office for projects or lawsuits that relate to only one enterprise directly to that enterprise. For example, costs related to a lawsuit involving the Wastewater Enterprise will not be assigned to the Water Enterprise.

b. Step Two: Bureau expenses adjusted as provided in Step One will be allocated among the Water Enterprise, the Wastewater Enterprise and the Hetch Hetchy Enterprise on the basis of the actual salaries of employees in each enterprise or department, as illustrated on Attachment N-2, Schedule 7.

c. Step Three: The amount allocated to the Water Enterprise through Step Two will be allocated between Retail Customers and Wholesale Customers on the basis of Proportional Annual Use.

C. Water Enterprise Administrative and General

1. Description: This category includes expenses incurred by the Water Enterprise that are not readily assignable to specific operating divisions. This category includes the following expenses:

a. Water Administration: This includes the costs of labor and other expenses of the administrative section of the Water Enterprise, supervision and engineering expenses, professional services, travel and training, equipment purchases, and materials and supplies not directly assignable to a specific operating unit.

b. Services Provided by Other City Departments: This includes charges of other San Francisco departments directly billed to the Water Enterprise administration by other San Francisco departments for services ordered by the Water Enterprise, such as legal services, risk management, telecommunications, employee relations, purchasing, mail services, and workers compensation claims paid.

c. Litigation and Claims Paid: This includes charges incurred for attorney services and claims and judgments paid in litigation arising from the operation of the Water Enterprise.

2. Allocation: In each of these three subcategories, expenses that benefit only Retail Customers will be excluded. For example, the cost of claims and judgments resulting from a break in or leak from pipelines or reservoirs in the Retail Service Area (with the exception of the three terminal reservoirs and pipelines delivering water to them) will be assigned to the Retail Customers. Remaining Water Enterprise Administrative and General expenses will be allocated between Retail Customers and Wholesale Customers on the basis of the composite percentage of allocated operation and maintenance expense categories described in Section 5.05.

D. Compliance Audit. The cost of the Compliance Audit described in Section 7.04 will be assigned 50 percent to the Retail Customers and 50 percent to the Wholesale Customers.

5.07 Water Enterprise Property Taxes

A. Description: This category consists of property taxes levied against property owned by San Francisco located in Alameda, San Mateo and Santa Clara counties and used and managed by the SFPUC.

B. Allocation: All property taxes paid, net of (1) reimbursements received from lessees and permit holders, and (2) refunds from the taxing authority, are Regional expenses. Net property taxes will be allocated between Retail Customers and Wholesale Customers on the basis of Proportional Annual Use.

5.08 Hetch Hetchy Enterprise Expenses

A. Introduction. There are two steps involved in determining the amount of the Wholesale Customers' share of Hetch Hetchy Enterprise expenses.

1. The first step is to determine the Water Enterprise's share of Hetch Hetchy Enterprise operation expenses, maintenance expenses, administrative and general expenses, and property taxes.

2. The second step is to determine the Wholesale Customers' share of expenses allocable to the Water Enterprise.

B. Determination of the Water-Related Portion of Hetch Hetchy Enterprise Expenses

1. Operation and Maintenance Expenses: This category consists of the cost of labor, materials and supplies, and other expenses incurred in operating and maintaining Hetch Hetchy Enterprise physical facilities.

a. Description: Expenses associated exclusively with the production and distribution of hydroelectric power (e.g., generating plants and power transmission lines and towers, transformers and associated electric equipment, purchased power, wheeling charges, rental of power lines, etc.) are categorized as Power-Only and are allocated to power. Expenses associated exclusively with the operation and maintenance of facilities that serve only the water function (e.g., water transmission pipelines and aqueducts, activities related to compliance with federal and state drinking water quality laws, etc.) are categorized as Water-Only and are allocated entirely to water. Expenses associated with the operation and maintenance of facilities that serve both the water and power functions (e.g., dams, security programs, etc.) are categorized as Joint and are reallocated as 55 percent Power-Related and 45 percent Water-Related.

2. Administrative and General Expenses: There are three subcategories of Hetch Hetchy Enterprise Administrative and General expenses.

a. Full-Cost Countywide Cost Allocation Plan: This subcategory consists of the cost of San Francisco general government and other City central service departments which are not directly billed to operating departments but allocated through the full-cost Countywide Cost Allocation Plan described in Section 5.06.A. Costs in this subcategory are classified as Joint, and are reallocated as 55 percent Power-Related and 45 percent Water-Related.

b. SFPUC Bureau Costs: This subcategory consists of the expenses described in Section 5.06.B. One hundred percent of Customer Services expenses allocated to the Hetch Hetchy Enterprise are categorized as Power-Only. The remaining amount of Bureau expenses allocated to the Hetch Hetchy Enterprise pursuant to Section 5.06.B will be reallocated between power and water in proportion to the salaries of Hetch Hetchy Enterprise employees assigned to each function as shown on Attachment N-2, Schedule 7.1.

c. Other Administrative and General: This subcategory includes payments to the United States required by the Act, labor, supervision and engineering and other costs not readily assignable to a specific operation or maintenance function or program. Costs related to power administration (such as long range planning and policy analysis for energy development, administration of power contracts, and administration of work orders to City departments for energy services) are Power-Only costs. Costs related to water administration (such as legal and professional services for the protection of the City's water rights) are Water-Only costs and will be assigned to the Water Enterprise. Costs related to both power administration and water administration (such as general administration, office rents, office materials and supplies, and services of other City departments benefitting to both power and water are Joint administrative and general costs and are reallocated as 55 percent Power-Related and 45 percent Water-Related.

3. Property Taxes. This category consists of property taxes levied against property owned by San Francisco in Tuolumne, Stanislaus, San Joaquin, and Alameda counties and operated and managed by the Hetch Hetchy Enterprise.

Allocation: Property taxes are classified as Joint costs. They will be reallocated as 55 percent Power-Related and 45 percent Water-Related.

C. <u>Calculation of Wholesale Customers' Share of Hetch Hetchy Enterprise Expenses</u>. The Water Enterprise's share of Hetch Hetchy Enterprise expenses consist of 100 percent of Water-Only expenses and the Water-Related portion (45%) of Joint expenses.

The Wholesale Customers' share of the sum of the Water Enterprise's share of Hetch Hetchy Enterprise expenses determined under subsection B shall be calculated by multiplying that dollar amount by Adjusted Proportional Annual Use.

5.09 <u>Hetch Hetchy Enterprise Capital Costs</u>

A. <u>Introduction</u>. Wholesale Customers are also allocated a share of Hetch Hetchy Enterprise capital costs.

B. <u>Components of Capital Costs</u>. The components of Hetch Hetchy Enterprise capital costs are as follows:

1. <u>Existing Assets Cost Recovery</u>. The Wholesale Customers' repayment of their share of Hetch Hetchy Existing Assets (Water-Only and the Water-Related portion [45 percent] of Joint assets) is shown on Attachment K-4 accompanying Section 5.03.

2. <u>Debt Service on New Assets</u>. The Water Enterprise will be assigned 100 percent of Net Annual Debt Service attributable to acquisition and construction of New Hetch Hetchy Enterprise assets that are Water-Only and the Water-Related portion (45 percent) of Net Annual Debt Service on New Hetch Hetchy Enterprise Joint assets. The provisions of Section 5.04.A apply to debt service on New Hetch Hetchy Enterprise assets.

3. <u>Revenue-Funded Capital Additions</u>. The Water Enterprise will be assigned 100 percent of capital expenditures from revenues for New Hetch Hetchy Enterprise assets that are Water-Only and the Water-Related portion (45 percent) of such expenditures for new Hetch Hetchy Enterprise Joint assets. The provisions of Section 5.04.B apply to the payment of New revenue-funded Hetch Hetchy Enterprise assets.

C. <u>Calculation of Wholesale Customers' Share of Hetch Hetchy Enterprise Capital Costs</u>. The Wholesale Customers' share of the Net Annual Debt Service and revenue funded capital expenditures determined under subsections B.2 and 3 shall be calculated by multiplying that dollar amount by Adjusted Proportional Annual Use.

5.10 Additional Agreements Related to Financial Issues

A. Wholesale Customers Not Entitled to Certain Revenues. The Wholesale Customers have no entitlement to any of the following sources of revenue to the SFPUC.

1. Revenues from leases or sales of SFPUC real property.

2. Revenues from the other utility services such as the sale of electric power, natural gas and steam.

3. Revenues from the sale of water to customers and entities other than the Wholesale Customers.

4. Revenues earned from the investment of SFPUC funds other than funds contributed by the Wholesale Customers to the Wholesale Revenue Coverage Reserve described in Section 6.06 or the Wholesale Capital Fund described in Section 6.08. Wholesale Customers are also entitled to the benefit of earnings on proceeds of Indebtedness (through expenditure on New Regional Assets and /or application to Debt Service) and to interest on the Balancing Account as provided in Section 6.05.B.

5. Revenues not related to the sale of water.

B. Wholesale Customers Not Charged with Certain Expenses. The Wholesale Customers will not be charged with any of the following expenses:

1. Capital costs for assets constructed or acquired prior to July 1, 1984 other than Existing Asset costs that are repaid pursuant to Section 5.03.

2. Expenses incurred by the SFPUC for generation and distribution of electric power, including Hetch Hetchy Enterprise Power-Only expenses and the Power-Related share of Hetch Hetchy Enterprise Joint expenses. An exception to this is Regional energy costs incurred by the Water Enterprise, for which Wholesale Customers are charged on the basis of Proportional Annual Use.

3. Expenses incurred by SFPUC in providing water to Retail Customers.

4. Expenses associated with the SFPUC's accruals or allocations for uncollectible Retail Water accounts.

5. Attorneys' fees and costs incurred by the Wholesale Customers that a court of competent jurisdiction orders San Francisco to pay as part of a final, binding judgment against San Francisco as provided in Section 8.03.B.2.

6. Any expenses associated with funding any reserves (other than the required Wholesale Revenue Coverage Reserve described in Section 6.06) accrued and not anticipated to be paid within one year unless such reserve is established by mutual agreement of the SFPUC and BAWSCA.

7. Any expenses accrued in respect to pending or threatened litigation, damage or personal injury claims or other loss contingencies unless projected to be paid within one year. Otherwise, such expenses will be charged to the Wholesale Customers when actually paid.

8. Any expense associated with installing, relocating, enlarging, removing or modifying meters and service connections at the request of an individual Wholesale Customer.

9. The Retail Customers' portion of any Environmental Enhancement Surcharges imposed to enforce the Interim Supply Limitation set forth in Section 4.04.

C. Revenues Not Credited to Payment of Wholesale Revenue Requirement. The following payments by Wholesale Customers, individually or collectively, are not credited as Wholesale revenues for purposes of Section 6.05.B:

1. Payments by individual Wholesale Customers of the Environmental Enhancement Surcharge imposed to enforce the Interim Supply Limitation set forth in Section 4.04.

2. Payments of attorneys' fees and costs incurred by San Francisco that a court of competent jurisdiction orders the Wholesale Customers to pay as part of a final, binding judgment against the Wholesale Customers, as provided in Section 8.03.B.3.

3. Payments by individual Wholesale Customers for installation, relocation, enlargement, removal or modification of meters and service connections requested by, and charged to, a Wholesale Customer.

4. Payments applied to the amortization of the ending balance in the balancing account under the 1984 Agreement, pursuant to Section 6.05.A.

5. Payments of the Water Management Charge which are delivered to BAWSCA pursuant to Section 3.06.

6. Payments directed to the Wholesale Revenue Coverage Reserve pursuant to Section 6.06.

7. Prepayments authorized by Sections 5.03.C and 5.03.F.

D. <u>Other</u>

1. The Wholesale Customers will receive a proportional benefit from funds received by the SFPUC from (a) governmental grants, rebates, reimbursements or other subventions, (b) private-sector grants for Regional capital or operating purposes of the Water Enterprise and the Water-Only and Water-related portion of Joint Hetch Hetchy Water Enterprise expenses, or (c) a SFPUC use of taxable bonds.

2. The Wholesale Customers will receive a proportionate benefit from recovery of damages, including liquidated damages, by SFPUC from judgments against or settlements with contractors, suppliers, sureties, etc., related to Regional Water System projects and the Water-Only and Water-Related portion of Joint Hetch Hetchy Enterprise projects.

3. The SFPUC will continue to charge Wholesale Customers for assets acquired or constructed with proceeds of Indebtedness on which Wholesale Customers paid Debt Service during the Term of this Agreement on the "cash" basis (as opposed to the "utility" basis) after the expiration or earlier termination of this Agreement. The undertaking in this Section 5.10.D.3 will survive the expiration or earlier termination of this Agreement.

Article 6. Integration of Wholesale Revenue Requirement with SFPUC Budget Development and Rate Adjustments

6.01 General

A. The purpose of the allocation bases set forth in Article 5 is to determine the Wholesale Revenue Requirement for each fiscal year. The Wholesale Revenue Requirement can only be estimated in advance, based on projected costs and water deliveries. These projections are used to establish water rates applicable to the Wholesale Customers.

B. After the close of each fiscal year, the procedures described in Article 7 will be used to determine the actual Wholesale Revenue Requirement for that year, based on actual costs incurred, allocated according to the provisions of Article 5, and using actual water delivery data. The amount properly allocated to the Wholesale Customers shall be compared to the amount billed to the Wholesale Customers for the fiscal year, other than those identified in Section 5.10.C. The difference will be entered into a balancing account to be charged to, or credited to, the Wholesale Customers, as appropriate.

C. The balancing account shall be managed as described in Section 6.05.

6.02 Budget Development

The SFPUC General Manager will send a copy of the proposed SFPUC budget to BAWSCA at the same time as it is sent to the Commission. In addition, a copy of materials submitted to the Commission for consideration at meetings prior to the meeting at which the overall SFPUC budget is considered (including (a) operating budgets for the Water Enterprise and the Hetch Hetchy Enterprise, (b) budgets for SFPUC Bureaus, and (c) capital budgets for the Water Enterprise and the Hetch Hetchy Enterprise) will also be sent to BAWSCA concurrently with their submission to the Commission.

6.03 Rate Adjustments

A. Budget Coordinated Rate Adjustments. Adjustments to the rates applicable to the Wholesale Customers shall be coordinated with the budget development process described in this section except to the extent that Sections 6.03.B and 6.03.C authorize emergency rate increases and drought rate increases, respectively.

If the SFPUC intends to increase wholesale water rates during the ensuing fiscal year, it will comply with the following procedures:

1. Adjustments to the wholesale rates will be adopted by the Commission at a regularly scheduled meeting or at special meeting, properly noticed, called for the purpose of adjusting rates or for taking any other action under the jurisdiction of the Commission.

2. The SFPUC will send a written notice by mail or electronic means to each Wholesale Customer and to BAWSCA of the recommended adjustment at least thirty (30) days prior to the date of the meeting at which the Commission will consider the proposed adjustment. The notice will include the date, time and place of the Commission meeting.

3. The SFPUC shall prepare and provide to each Wholesale Customer and to BAWSCA the following materials: (a) a table illustrating how the increase or decrease in the Wholesale Revenue Requirement and wholesale rates were calculated, substantially in the form of Attachment N-1, (b) a schedule showing the projected expenses included in the Wholesale Revenue Requirement for the fiscal year for which the rates are being proposed, and supporting materials, substantially in the form of Attachment N-2, and (c) a schedule showing projected water sales, Wholesale Revenue Requirements and wholesale rates for the fiscal year for which rates are being set and the following four years, substantially in the form of Attachment N-3. These materials will be included with the notification required by Section 6.03.A.2.

4. Rate adjustments will be effective no sooner than thirty (30) days after adoption of the wholesale rate by the Commission.

5. San Francisco will use its best efforts to provide the Wholesale Customers with the information described above. San Francisco's failure to comply with the requirements set forth in this section shall not invalidate any action taken by the Commission (including, but not limited to, any rate increase or decrease adopted). In the event of such failure, the Wholesale Customers may either invoke arbitration, as set forth in Section 8.01, or seek injunctive relief, to compel San Francisco to remedy the failure as soon as is reasonably practical, and San Francisco shall be free to oppose the issuance of the requested judicial or arbitral relief on any applicable legal or equitable basis. The existence of this right to resort to arbitration shall not be deemed to preclude the right to seek injunctive relief.

6. Because delays in the budget process or other events may cause San Francisco to defer the effective date of Wholesale Customer rate adjustments until after the beginning of San Francisco's fiscal year, nothing contained in this Agreement shall require San Francisco to make any changes in the water rates charged to Wholesale Customers effective at

the start of San Francisco's fiscal year or at any other specific date. Nothing in the preceding sentence shall excuse non-compliance with the provisions of Section 6.02 and this section.

B. **Emergency Rate Increases**. The Commission may adjust the Wholesale Customers' rates without complying with the requirements of Section 6.03.A in response to an Emergency that damages the Regional Water System and disrupts San Francisco's ability to maintain normal deliveries of water to Retail and Wholesale Customers. In such an Emergency, the Commission may adopt an emergency rate surcharge applicable to Wholesale Customers without following the procedures set forth in this section, provided that any such rate surcharge imposed by the Commission shall be applicable to both Retail and Wholesale Customers and incorporate the same percentage increase for all customers. Any emergency rate surcharge adopted by the Commission shall remain in effect only until the next-budget coordinated rate-setting cycle.

C. **Drought Rates**. If the Commission declares a water shortage emergency under Water Code Section 350, implements the Tier 1 Shortage Plan (Attachment H) described in Section 3.11.C, and imposes drought rates on Retail Customers, it may concurrently adjust wholesale rates independently of coordination with the annual budget process. Those adjustments may be designed to encourage water conservation and may constitute changes to the structure of the rates within the meaning of Section 6.04. The parties agree, however, that, in adopting changes in rates in response to a declaration of water shortage emergency, the Commission shall comply with Section 6.03.A.1 and 2 but need not comply with Section 6.04.B. Drought Rate payments and payments of excess use charges levied in accordance with the Tier 1 Shortage Plan described in Section 3.11.C constitute Wholesale Customer Revenue and count towards the Wholesale Revenue Requirement. The SFPUC may use these revenues to purchase additional water for the Wholesale Customers from the State Drought Water Bank or other willing seller.

6.04 **Rate Structure**

A. This Agreement is not intended and shall not be construed to limit the Commission's right (a) to adjust the structure of the rate schedule applicable to the Wholesale Customers (i.e., the relationship among the several charges set out therein) or (b) to add, delete, or change the various charges which make up the rate schedule, provided that neither such charges nor the structure of the rate schedule(s) applicable to the Wholesale Customers shall be arbitrary, unreasonable, or unjustly discriminatory as among said customers. The

SFPUC will give careful consideration to proposals for changes in the rate schedule made jointly by the Wholesale Customers but, subject to the limitations set out above, shall retain the sole and exclusive right to determine the structure of the rate schedule.

B. If the SFPUC intends to recommend that the Commission adopt one or more changes to the structure of wholesale rates (currently set forth in SFPUC Rate Schedule W-25), it shall prepare and distribute to the Wholesale Customers and BAWSCA a report describing the proposed change(s), the purpose(s) for which it/they are being considered, and the estimated financial effect on individual Wholesale Customers or classes of customers. Wholesale Customers may submit comments on the report to the SFPUC for sixty (60) days after receiving the report. The SFPUC will consider these comments and, if it determines to recommend that the Commission adopt the change(s), as described in the report or as modified in response to comments, the SFPUC General Manager shall submit a report to the Commission recommending specific change(s) in the rate structure. Copies of the General Manager's report shall be sent to all Wholesale Customers and BAWSCA at least thirty (30) days prior to the Commission meeting at which the changes will be considered.

C. The SFPUC may recommend, and the Commission may adopt, changes in the structure of wholesale rates at any time. However, the new rate schedule implementing these changes will become effective at the beginning of the following fiscal year.

6.05 Balancing Account

A. Balancing Account Established Under 1984 Agreement. The amount of credit in favor of San Francisco as of the expiration of the term of 1984 Agreement (June 30, 2009) is not known with certainty as of preparation and execution of this Agreement. It will not be known with certainty until the Compliance Audit for FY 2008-09 is completed and disputes, if any, that the Wholesale Customers or the SFPUC may have with the calculation of the Suburban Revenue Requirement for that fiscal year and for previous fiscal years have been settled or decided by arbitration.

The parties anticipate that the amount of the credit in favor of San Francisco as of June 30, 2009 may be within the range of $15 million to $20 million.

In order to reduce the credit balance due San Francisco under the 1984 Agreement in an orderly manner, while avoiding unnecessary fluctuations in wholesale rates, the parties agree to implement the following procedure.

1. In setting wholesale rates for FY 2009-10, SFPUC will include a balancing account repayment of approximately $2 million.

2. In setting wholesale rates for FY 2010-11 and following years, SFPUC will include a balancing account repayment of not less than $2 million and not more than $5 million annually until the full amount of the balance due, plus interest at the rate specified in Section 6.05.B, is repaid.

3. The actual ending balance as of June 30, 2009 will be determined, by the parties' agreement or arbitral ruling, after the Compliance Audit report for FY 2008-09 is delivered to BAWSCA. That amount, once determined, will establish the principal to be amortized through subsequent years' repayments pursuant to this Section 6.05.A.

B. Balancing Account Under This Agreement

1. Operation. After the close of each fiscal year, the SFPUC will compute the costs allocable to the Wholesale Customers for that fiscal year pursuant to Article 5, based on actual costs incurred by the SFPUC and actual amounts of water used by the Wholesale Customers and the Retail Customers. That amount will be compared to the amounts billed to the Wholesale Customers for that fiscal year (including any Excess Use Charges, but excluding revenues described in Section 5.10.C). The difference will be posted to a "balancing account" as a credit to, or charge against, the Wholesale Customers. Interest shall also be posted to the balancing account calculated by multiplying the amount of the opening balance by the average net interest rate, certified by the Controller as earned in the San Francisco Treasury for the previous fiscal year on the San Francisco County Pooled Investment Account. Interest, when posted, will carry the same mathematical sign (whether positive or negative) as carried by the opening balance. The amount posted to the balancing account in each year shall be added to, or subtracted from, the balance in the account from previous years. The calculation of the amount to be posted to the balancing account shall be included in the report prepared by the SFPUC pursuant to Section 7.02.

The opening balance for fiscal year 2009-10 shall be zero.

2. Integration of Balancing Account with Wholesale Rate Setting Process. If the amount in the balancing account is owed to the Wholesale Customers (a positive balance), the SFPUC shall take it into consideration in establishing wholesale rates. However, the SFPUC need not apply the entire amount to reduce wholesale rates for the immediately ensuing

year. Instead, the SFPUC may prorate a positive ending balance over a period of up to three successive years in order to avoid fluctuating decreases and increases in wholesale rates.

a. If a positive balance is maintained for three successive years and represents 10 percent or more of the Wholesale Revenue Requirement for the most recent fiscal year, the SFPUC shall consult with BAWSCA as to the Wholesale Customers' preferred application of the balance. The Wholesale Customers shall, through BAWSCA, direct that the positive balance be applied to one or more of the following purposes: (a) transfer to the Wholesale Revenue Coverage Reserve, (b) amortization of any remaining negative balance from the ending balancing account under the 1984 Agreement, (c) prepayment of the existing asset balance under Section 5.03, (d) water conservation or water supply projects administered by or through BAWSCA, (e) immediate reduction of wholesale rates, or (f) continued retention for future rate stabilization purposes. In the absence of a direction from BAWSCA, the SFPUC shall continue to retain the balance for rate stabilization in subsequent years.

b. If the amount in the balancing account is owed to the SFPUC (a negative balance), the SFPUC shall not be obligated to apply all or any part of the negative balance in establishing wholesale rates for the immediately ensuring year. Instead, the SFPUC may prorate the negative balance in whole or in part over multiple years in order to avoid fluctuating increases and decreases in wholesale rates.

6.06 <u>Wholesale Revenue Coverage Reserve</u>

A. The SFPUC may include in wholesale rates for any fiscal year an additional dollar amount ("Wholesale Revenue Coverage"), which for any fiscal year shall equal the following:

1. The lesser of (i) 25% of the Wholesale Customers' share of Net Annual Debt Service for that fiscal year determined as described in Section 5.04.A, or (ii) the amount necessary to meet the Wholesale Customers' proportionate share of Debt Service coverage required by then-current Indebtedness for that fiscal year, minus

2. A credit for (i) the actual amounts previously deposited in the "Wholesale Revenue Coverage Reserve" (as defined in subsection B below), (ii) accrued interest on the amounts on deposit in the Wholesale Revenue Coverage Reserve, and (iii) an amount equal to any additional interest that would have accrued on the actual amounts previously deposited in

the Wholesale Revenue Coverage Reserve assuming no withdrawals had been made therefrom.

B. During each fiscal year, the SFPUC will set aside and deposit that portion of revenue equal to Wholesale Revenue Coverage into a separate account that the SFPUC will establish and maintain, to be known as the "Wholesale Revenue Coverage Reserve." Deposits into the Wholesale Revenue Coverage Reserve shall be made no less frequently than monthly. The Wholesale Revenue Coverage Reserve shall be credited with interest at the rate specified in Section 6.05.B. The SFPUC may use amounts in the Wholesale Revenue Coverage Reserve for any lawful purpose. Any balance in the Wholesale Revenue Coverage Reserve in excess of the Wholesale Revenue Coverage amount as of the end of any fiscal year (as calculated in subsection 6.06(A) above) shall be applied as a credit against wholesale rates in the immediately following fiscal year unless otherwise directed by BAWSCA.

C. Within 180 days following the later of expiration of the Term or final payment of Debt Service due on Indebtedness issued during the Term to which Wholesale Customers were contributing, SFPUC shall rebate to the Wholesale Customers an amount equal to the Wholesale Revenue Coverage amount in effect for the fiscal year during which the Term expires or the final payment of Debt Service on Indebtedness is made based on each Wholesale Customer's Proportional Annual Use in the fiscal year during which the Term expires or the final payment of debt service on Indebtedness is made.

D. SFPUC shall provide a schedule of debt issuance (with assumptions), and the Wholesale Customers' share of Net Annual Debt Service (actual and projected) expected to be included in wholesale rates starting in 2009-10 through the expected completion of the WSIP. The schedule is to be updated annually prior to rate setting. If estimated Debt Service is used in rate setting, the SFPUC must be able to demonstrate that the Water Enterprise revenues will be sufficient to meet the additional bonds test for the proposed bonds and rate covenants for the upcoming year.

E. Conditions in the municipal bond market may change from those prevailing in 2009. If, prior to expiration of the Term, the SFPUC determines that it would be in the best financial interest of both Retail Customers and Wholesale Customers of the Regional Water System for the Debt Service coverage requirement to be increased in one or more series of proposed new Indebtedness above 1.25%, or for the coverage covenant to be strengthened in other ways, it will provide a written report to BAWSCA. The report will contain (1) a description of proposed covenant(s) in the bond indenture; (2) an explanation of how savings are expected to be achieved (e.g., increase in the SFPUC's credit rating over the then-current level; ability to obtain credit enhancement, etc.); (3) the estimated all-in true interest cost savings; (4) a comparison of the Wholesale Revenue Requirements using the Debt Service coverage limitation in subsection A and under the proposed methodology; and (5) a comparison of the respective monetary benefits expected to be received by both Retail and Wholesale Customers. The SFPUC and BAWSCA agree to meet and confer in good faith about the proposed changes.

F. Any increase in Debt Service coverage proposed by the SFPUC shall be commensurate with Proportional Water Use by Retail and Wholesale Customers. If the SFPUC demonstrates that an increase in Debt Service coverage will result in equivalent percentage reductions in total Wholesale and Retail Debt Service payments over the life of the proposed new Indebtedness, based on Proportional Water Use, BAWSCA may agree to a modification of the Wholesale Revenue Coverage requirement in subsection A. If BAWSCA does not agree to a proposed modification in coverage requirements in the covenants for new Indebtedness, SFPUC may nevertheless proceed with the modification and the issuance of new Indebtedness. Any Wholesale Customer, or BAWSCA, may challenge an increase in the Wholesale Revenue Requirement resulting from the modification in Debt Service coverage through arbitration as provided in Section 8.01.A. If the arbitrator finds that the increase in Debt Service coverage (1) did not and will not result in equivalent percentage reductions in total Wholesale and Retail Debt Service payments over the life of the proposed new Indebtedness, based on Proportional Water Use, or (2) was not commensurate with Proportional Water Use, the arbitrator may order the Wholesale Revenue Requirement to be recalculated both retrospectively and prospectively to eliminate the differential impact to Wholesale or Retail Customers, subject to the limitation in Section 8.01.C.

6.07 <u>Working Capital Requirement</u>

A. The SFPUC maintains working capital in the form of unappropriated reserves for the purpose of bridging the gap between when the SFPUC incurs operating expenses required to provide service and when it receives revenues from its Retail and Wholesale Customers. The Wholesale Customers shall fund their share of working capital as part of the annual Wholesale Revenue Requirement calculation. The amount of wholesale working capital for which the Wholesale Customers will be responsible will be determined using the 60-day standard formula approach.

B. Applying this approach, annual wholesale working capital equals one-sixth of the wholesale allocation of operation and maintenance, administrative and general, and property tax expenses for the Water and Hetch Hetchy Enterprises. Wholesale working capital shall be calculated separately for the Water and Hetch Hetchy Enterprises.

C. Each month, the sum of the Water Enterprise and Hetch Hetchy Enterprise working capital components will be compared with the ending balance in the Wholesale Revenue Coverage Reserve to determine if the Wholesale Customers provided the minimum required working capital. If the Wholesale Revenue Coverage Reserve is greater than the total Water Enterprise and Hetch Hetchy Enterprise working capital requirement, the Wholesale Customers will have provided their share of working capital. If the Wholesale Revenue Coverage Reserve is less than the total Water Enterprise and Hetch Hetchy Enterprise working capital requirement, the Wholesale Customers will be charged interest on the difference, which will be included in the adjustment to the Balancing Account under Section 6.05.B for the subsequent fiscal year.

6.08 <u>Wholesale Capital Fund</u>

A. The SFPUC currently funds revenue-funded capital projects through annual budget appropriations that are included in rates established for that fiscal year and transferred to a capital project fund from which expenditures are made. Consistent with the San Francisco Charter and Administrative Code, the SFPUC appropriates funds in advance of construction in order to maintain a positive balance in the capital project fund. The capital project fund also accrues interest and any unspent appropriations in excess of total project costs. It is the SFPUC's practice to regularly monitor the capital project fund balance to determine whether a surplus has accumulated, which can be credited against the next fiscal year's capital project appropriation.

B. The SFPUC shall establish a comparable Wholesale Revenue-Funded Capital Fund (Wholesale Capital Fund) to enable the Wholesale Customers to fund the wholesale share of revenue-funded New Regional Assets. The Wholesale Capital Fund balance is zero as of July 1, 2009. The SFPUC may include in wholesale rates for any fiscal year an amount equal to the wholesale share of the SFPUC's appropriation for revenue funded New Regional Assets for that year, which sum will be credited to the Wholesale Capital Fund. The wholesale share of other sources of funding, where legally permitted and appropriately accounted for under GAAP, will also be credited to the Wholesale Capital Fund, together with interest earnings on the Wholesale Capital Fund balance.

C. The SFPUC will expend revenues appropriated and transferred to the Wholesale Capital Fund only on New Regional Assets. The annual capital appropriation included in each fiscal year's budget will be provided to BAWSCA in accordance with Section 6.02 and will take into account the current and projected balance in the Wholesale Capital Fund, as well as current and projected unexpended and unencumbered surplus, as shown on attachment M-1, which will be prepared by the SFPUC each year.

D. Commencing on November 30, 2010 and thereafter in each fiscal year during the Term, the SFPUC will also provide an annual report to BAWSCA on the status of individual revenue-funded New Regional Assets, substantially in the form of Attachment M-2.

E. In order to prevent the accumulation of an excessive unexpended and unencumbered surplus in the Wholesale Capital Fund, the status of the fund balance will be reviewed through the Compliance Audit at five-year intervals, commencing in FY 2014-15. Any excess fund balance (i.e., an accumulated unexpended, unencumbered amount in excess of ten percent (10%) of the wholesale share of total capital appropriations for New Regional Assets during the five preceding years) will be transferred to the credit of the Wholesale Customers to the Balancing Account described in Section 6.05. Attachment M-3 illustrates the operation of this review process, covering FY 2009-10 through FY 2013-14 and FY 2014-15 through 2018-19.

F. Three years prior to the end of the Term, the SFPUC and BAWSCA will discuss the disposition of the Wholesale Capital Fund balance at the end of the Term. Absent agreement, any balance remaining in the Wholesale Capital Fund at the end of the Term shall be transferred to the Balancing Account, to the credit of the Wholesale Customers.

Article 7. Accounting Procedures; Compliance Audit

7.01 SFPUC Accounting Principles, Practices

A. Accounting Principles. San Francisco will maintain the accounts of the SFPUC and the Water and Hetch Hetchy Enterprises in conformity with Generally Accepted Accounting Principles. San Francisco will apply all applicable pronouncements of the Governmental Accounting Standards Board (GASB) as well as statements and interpretations of the Financial Accounting Standards Board and Accounting Principles Board opinions issued on or before March 30, 1989, unless those pronouncements or opinions conflict with GASB pronouncements.

B. General Rule. San Francisco will maintain the accounting records of the SFPUC and the Water and Hetch Hetchy Enterprises in a format and level of detail sufficient to allow it to determine the annual Wholesale Revenue Requirement in compliance with this Agreement and to allow its determination of the Wholesale Revenue Requirement to be audited as provided in Section 7.04.

C. Water Enterprise. San Francisco will maintain an account structure which allows utility plant and operating and maintenance expenses to be segregated by location (inside San Francisco and outside San Francisco) and by function (Direct Retail, Regional and Direct Wholesale).

D. Hetch Hetchy Enterprise. San Francisco will maintain an account structure which allows utility plant and operating and maintenance expenses to be segregated into Water Only, Power Only and Joint categories.

E. SFPUC. San Francisco will maintain an account structure which allows any expenses of SFPUC bureaus that benefit only the Wastewater Enterprise, the Power-Only operations of the Hetch Hetchy Enterprise or Retail Customers to be excluded from the Wholesale Revenue Requirement.

F. Utility Plant Ledgers. San Francisco will maintain subsidiary plant ledgers for the Water and Hetch Hetchy Enterprises that contain unique identifying numbers for all assets included in the rate base and identify the original cost, annual depreciation, accumulated depreciation, date placed in service, useful life, salvage value if any, source of funding (e.g., bond series, revenues, grants), and classification for purposes of this Agreement.

G. **<u>Debt</u>.** San Francisco will maintain documentation identifying:

1. The portion of total bonded debt outstanding related to each series of each bond issue.

2. The portion of total interest expense related to each series of each bond issue.

3. The use of proceeds of each bond issue (including proceeds of commercial paper and/or other interim financial instruments redeemed or expected to be redeemed from bonds and earnings on the proceeds of financings) in sufficient detail to determine, for each bond issue, the proceeds and earnings of each (including proceeds and earnings of interim financing vehicles redeemed by a bond issue) and the total amounts expended on Direct Retail improvements and the total amounts expended on Regional improvements.

H. **<u>Changes in Accounting</u>.** Subject to subsections A thru G, San Francisco may change the chart of accounts and accounting practices of the SFPUC and the Water and Hetch Hetchy Enterprises. However, the allocation of any expense to the Wholesale Customers that is specified in the Agreement may not be changed merely because of a change in (1) the accounting system or chart of accounts used by SFPUC, (2) the account to which an expense is posted or (3) a change in the organizational structure of the SFPUC or the Water or Hetch Hetchy Enterprises.

I. **<u>Audit</u>.** San Francisco will arrange for an audit of the financial statements of Water and Hetch Hetchy Enterprises to be conducted each year by an independent certified public accountant, appointed by the Controller, in accordance with Generally Accepted Auditing Standards.

7.02 <u>Calculation of and Report on Wholesale Revenue Requirement</u>

A. Within five months after the close of each fiscal year, San Francisco will prepare a report showing its calculation of the Wholesale Revenue Requirement for the preceding fiscal year and the change in the balancing account as of the end of that fiscal year. The first such report will be prepared by November 30, 2010 and will cover fiscal year 2009-10 and the balancing account as of June 30, 2010.

B. The report will consist of the following items:

1. Statement of changes in the balancing account for the fiscal year being reported on, and for the immediately preceding fiscal year, substantially in the form of Attachment O.

2. Detailed supporting schedules 8.1 through 8.2 substantially in the form of Attachment N-2.

3. Description and explanation of any changes in San Francisco's accounting practices from those previously in effect.

4. Explanation of any line item of expense (shown on Attachment N-2, schedules 1 and 4) for which the amount allocated to the Wholesale Customers increased by (a) ten percent or more from the preceding fiscal year, or (b) more than $1,000,000.

5. Representation letter signed by the SFPUC General Manager and by other SFPUC financial staff shown on Attachment P, as the General Manager may direct, subject to change in position titles at the discretion of the SFPUC.

C. The report will be delivered to the BAWSCA General Manager by the date identified in Subsection A.

Once the report has been delivered to BAWSCA, San Francisco will, upon request:

1. Provide BAWSCA with access to, and copies of, all worksheets and supporting documents used or prepared by San Francisco during its calculation of the Wholesale Revenue Requirement;

2. Make available to BAWSCA all supporting documentation and calculations used by San Francisco in preparing the report; and

3. Promptly provide answers to questions from BAWSCA staff about the report.

7.03 Appointment of Compliance Auditor

A. Purpose. The purpose of this section is to provide for an annual Compliance Audit by an independent certified public accountant of the procedures followed and the underlying data used by San Francisco in calculating the Wholesale Revenue Requirement for the preceding fiscal year. The annual Compliance Audit shall also determine whether the Wholesale Revenue Requirement has been calculated in accordance with the terms of the Agreement and whether amounts paid by the Wholesale Customers in excess of or less than the Wholesale Revenue Requirement have been posted to the balancing account, together with interest as provided in Section 6.05.

B. Method of Appointment. The Controller shall select an independent certified public accountant ("Compliance Auditor") to conduct the Compliance Audit described below. The Compliance Auditor may be the same certified public accountant engaged by the Controller to audit the financial statements of the Water and Hetch Hetchy Enterprises. Subject to approval by the Controller and the General Manager of the SFPUC, the Compliance Auditor shall have the authority to engage such consultants as it deems necessary or appropriate to assist in the audit. The terms of this Article shall be incorporated into the contract between San Francisco and the Compliance Auditor, and the Wholesale Customers shall be deemed to be third-party beneficiaries of said contract.

7.04 Conduct of Compliance Audit

A. Standards. The Compliance Auditor shall perform the Compliance Audit in accordance with Generally Accepted Auditing Standards. In particular, its review shall be governed by the standards contained in Section AU 623 (Reports on Specified Elements, Accounts or Items of a Financial Statement) of the AICPA, *Professional Standards*, as amended from time to time.

B. Preliminary Meeting; Periodic Status Reports; Access to Data. Prior to commencing the audit, the Compliance Auditor shall meet with San Francisco and BAWSCA to discuss the audit plan, the procedures to be employed and the schedule to be followed. During the course of the audit, the Compliance Auditor shall keep San Francisco and BAWSCA informed of any unforeseen problems or circumstances which could cause a delay in the audit or any material expansion of the audit's scope. The Compliance Auditor shall be given full access to all records of the SFPUC and the Water and Hetch Hetchy Enterprises that the Auditor deems necessary for the audit.

C. Audit Procedures. The Compliance Auditor shall review San Francisco's calculation of the Wholesale Revenue Requirement and the underlying data in order to carry out the purpose of the audit described in Section 7.03.A and to issue the report described in Section 7.05. At a minimum, the Compliance Auditor shall address the following:

1. Water Enterprise Operating and Maintenance Expenses. The Compliance Auditor shall review Water Enterprise cost ledgers to determine whether the recorded operating and maintenance expenses fairly reflect the costs incurred, were recorded on a basis consistent with applicable Generally Accepted Accounting Principles, and were allocated to the Wholesale Customers as provided in this Agreement.

2. Water Enterprise Administrative and General Expenses. The Compliance Auditor shall review Water Enterprise cost ledgers and other appropriate financial records, including those of the SFPUC, to determine whether the recorded administrative and general expenses fairly reflect the costs incurred by or allocated to the Water Enterprise, whether they were recorded on a basis consistent with applicable Generally Accepted Accounting Principles, whether SFPUC charges were allocated to the Water Enterprise in accordance with this Agreement, and whether the amount of administrative and general expenses allocated to the Wholesale Customers was determined as provided by this Agreement.

3. Property Taxes. The Compliance Auditor shall review Water Enterprise cost ledgers to determine whether the amount of property taxes shown on the report fairly reflects the property tax expense incurred by San Francisco for Water Enterprise property outside of San Francisco and whether there has been deducted from the amount to be allocated (1) all taxes actually reimbursed to San Francisco by tenants of Water Enterprise property under leases that require such reimbursement and (2) any refunds received from the taxing authority. The Compliance Auditor also shall determine whether the amount of property taxes allocated to the Wholesale Customers was determined as provided in this Agreement.

4. Debt Service. The Compliance Auditor shall review SFPUC records to determine whether debt service, and associated coverage requirements, were allocated to the Wholesale Customers as provided in this Agreement.

5. Amortization of Existing Assets in Service as of June 30, 2009. The Compliance Auditor shall review both Water and Hetch Hetchy Enterprise records to determine whether the payoff amount for Existing Assets allocated to the Wholesale Customers as shown on Attachment K-1 through K-4 was calculated as provided in Section 5.03 of this Agreement.

6. Revenue-Funded Capital Appropriations/Expenditures. The Compliance Auditor shall review San Francisco's calculation of actual expenditures on the wholesale share of revenue-funded New Regional Assets and remaining unexpended and unencumbered project balances in the "Wholesale Capital Fund" described in Section 6.08, to determine whether the procedures contained in that section were followed.

7. Hetch Hetchy Expenses. The Compliance Auditor shall determine whether Hetch Hetchy Enterprise expenses were allocated to the Wholesale Customers as provided in this Agreement.

D. Use of and Reliance on Audited Financial Statements and Water Use Data

1. In performing the audit, the Compliance Auditor shall incorporate any adjustments to the cost ledgers recommended by the independent certified public accountant, referred to in Section 7.01.I, which audited the financial statements of the Water and Hetch Hetchy Enterprises. The Compliance Auditor may rely upon the work performed by that independent certified public accountant if the Compliance Auditor reviews the work and is willing to take responsibility for it as part of the compliance audit.

2. In performing the Compliance Audit and issuing its report, the Compliance Auditor may rely on water use data furnished by the Water Enterprise, regardless of whether the Wholesale Customers contest the accuracy of such data. The Compliance Auditor shall have no obligation to independently verify the accuracy of the water use data provided by San Francisco; however, the Compliance Auditor shall disclose in its report any information which came to its attention suggesting that the water use data provided by San Francisco are inaccurate in any significant respect.

E. Exit Conference. Upon completion of the audit, the Compliance Auditor shall meet with San Francisco and BAWSCA to discuss audit findings, including (1) any material weakness in internal controls and (2) adjustments proposed by the Compliance Auditor and San Francisco's response (i.e., booked or waived).

7.05 Issuance of Compliance Auditor's Report

A. San Francisco will require the Compliance Auditor to issue its report no later than nine months after the fiscal year under audit (i.e., March 31 of the following calendar year). The Compliance Auditor's report shall be addressed and delivered to San Francisco and BAWSCA. The report shall contain:

1. A statement that the Auditor has audited the report on the calculation of the Wholesale Revenue Requirement and changes in the balancing account, and supporting documents, prepared by San Francisco as required by Section 7.02.

2. A statement that the audit was conducted in accordance with auditing standards generally accepted in the United States of America, and that the audit provides a reasonable basis for its opinion.

3. A statement that in the Compliance Auditor's opinion the Wholesale Revenue Requirement was calculated by San Francisco in accordance with this Agreement and that the change in the balancing account shown in San Francisco's report was calculated as required by this Agreement and presents fairly, in all material respects, changes in and the balance due to (or from) the Wholesale Customers as of the end of the fiscal year under audit.

7.06 Wholesale Customer Review

A. One or more Wholesale Customers, or BAWSCA, may engage an independent certified public accountant (CPA) to conduct a review (at its or their expense) of San Francisco's calculation of the annual Wholesale Revenue Requirement and a review of changes in the balancing account.

B. If a Wholesale Customer or BAWSCA wishes such a review to be conducted it will provide written notice to SFPUC within 30 days of the date the Compliance Auditor's report is issued. The notice will identify the CPA or accounting/auditing firm that will conduct the review and the specific aspects of the Compliance Auditor's report that are the subject of the review. If more than one notice of review is received by the SFPUC, the requesting Wholesale Customers shall combine and coordinate their reviews and select a lead auditor to act on their behalf for the purposes of requesting documents and conducting on-site investigations.

C. San Francisco will cooperate with the CPA appointed by a Wholesale Customer or BAWSCA. This cooperation includes making requested records promptly available, making knowledgeable SFPUC personnel available to timely and truthfully answer the CPA's questions and directing the Compliance Auditor to cooperate with the CPA.

D. The Wholesale Customer's review shall be completed within 60 days after the date the Compliance Auditor's report is issued. At the conclusion of the review, representatives of San Francisco and BAWSCA shall meet to discuss any differences between them concerning San Francisco's compliance with Articles 5 or 6 of this Agreement during the preceding fiscal year or San Francisco's calculation of the Wholesale Revenue Requirement for the preceding fiscal year. If such differences cannot be resolved, the dispute shall be submitted to arbitration in accordance with Section 8.01.

Article 8. Other Agreements of the Parties

8.01 <u>Arbitration and Judicial Review</u>

A. **General Principles re Scope of Arbitration.** All questions or disputes arising under the following subject areas shall be subject to mandatory, binding arbitration and shall not be subject to judicial determination:

1. the determination of the Wholesale Revenue Requirement, which shall include both the calculations used in the determination and the variables used in those calculations;

2. the SFPUC's adherence to accounting practices and conduct of the Compliance Audit; and

3. the SFPUC's classification of new assets for purposes of determining the Wholesale Revenue Requirement.

All other questions or disputes arising under this Agreement shall be subject to judicial determination. Disputes about the scope of arbitrability shall be resolved by the courts.

B. **Demand for Arbitration**. If any arbitrable question or dispute should arise, any Wholesale Customer or the SFPUC may commence arbitration proceedings hereunder by service of a written Demand for Arbitration. Demands for arbitration shall set forth all of the issues to be arbitrated, the general contentions relating to those issues, and the relief sought by the party serving the Demand. Within 45 days after service of a Demand upon it, any Wholesale Customer or the SFPUC may serve a Notice of Election to become a party to the arbitration and a Response to the issues set forth in the Demand. The Response shall include the party's general contentions and defenses with respect to the claims made in the Demand, and may include any otherwise arbitrable claims, contentions and demands that concern the fiscal year covered by the Demand. If a timely Notice of Election and Response is not filed by any such entity, it shall not be a party to the arbitration but shall nonetheless be bound by the award of the arbitrator. If no party to this Agreement serves a timely Notice of Election and Response, the party seeking arbitration shall be entitled to the relief sought in its Demand for Arbitration without the necessity of further proceedings. Any claims not made in a Demand or Response shall be deemed waived.

If a Demand or Notice of Election is made by the SFPUC, it shall be served by personal delivery or certified mail to each Wholesale Customer at the address of such customer as set forth in the billing records of the SFPUC. If a Demand or Notice of Election is made by a Wholesale Customer, service shall be by certified mail or personal delivery to the General Manager, SFPUC, 1155 Market Street, 11th Floor, San Francisco, California 94103, and to each of the other Wholesale Customers. If arbitration is commenced, the Wholesale Customers shall use their best efforts to formulate a single, joint position with respect thereto. In any event, with respect to the appointment of arbitrators, as hereinafter provided, all Wholesale Customers that take the same position as to the issues to be arbitrated shall jointly and collectively be deemed to be a single party.

C. Limitations Period. All Demands For Arbitration shall be served within twelve months of receipt by BAWSCA of the Wholesale Revenue Requirement Compliance Auditor's Report for that year. If a party fails to file a Demand within the time period specified in this subsection, that party waives all present and future claims with respect to the fiscal year in question. If no such Demand is served within the twelve month period specified above, the SFPUC's determination of the Wholesale Revenue Requirement for that year shall be final and conclusive. Whether any particular claim is barred by the twelve month limitations period provided for herein shall be for the arbitrator to determine. Prior to the expiration of the twelve month limitations period, the parties to the dispute may agree by written stipulation to extend the period by up to six additional months.

The Arbitrator may order the alteration or recalculation of underlying Water Enterprise and/or Hetch Hetchy Enterprise accounts or asset classifications. Such changes shall be used to calculate the Wholesale Revenue Requirement for the fiscal year in dispute and shall also be used to determine future Wholesale Revenue Requirements, if otherwise applicable, even though the existing entries in such accounts or the asset classifications, in whole or in part, predate the twelve month period described above, so long as a timely arbitration Demand has been filed in accordance with this subsection.

D. Number and Appointment of Arbitrators. All arbitration proceedings under this section shall be conducted by a single arbitrator, selected by the SFPUC and a designated representative of the Wholesale Customers or each group of Wholesale Customers that take the same position with respect to the arbitration, within 75 days after service of the Demand. If the parties to the arbitration cannot agree on an arbitrator within 75 days, any party may petition the Marin County Superior Court for the appointment of an arbitrator pursuant to Code of Civil Procedure Section 1281.6 (or any successor provision).

E. <u>Guidelines for Qualifications of Arbitrators</u>. The Wholesale Customers and the SFPUC acknowledge that the qualifications of the arbitrator will vary with the nature of the matter arbitrated, but, in general, agree that such qualifications may include service as a judge or expertise in one or more of the following fields: public utility law, water utility rate setting, water system and hydraulic engineering, utility accounting methods and practices, and water system operation and management. The parties to the arbitration shall use their best efforts to agree in advance upon the qualifications of any arbitrator to be appointed by the Superior Court.

F. <u>Powers of Arbitrator; Conduct of Proceedings</u>

1. Except as provided in this section, arbitrations under this section shall be conducted under and be governed by the provisions of California Code of Civil Procedure Sections 1282.2 through 1284.2 (hereinafter, collectively, "Code sections"), and arbitrators appointed hereunder shall have the powers and duties specified by the Code sections.

2. Within the meaning of the Code sections, the term "neutral arbitrator" shall mean the single arbitrator selected by the parties to the arbitration.

3. Unless waived in writing by the parties to the arbitration, the notice of hearing served by the arbitrator shall not be less than 90 days.

4. The lists of witnesses (including expert witnesses), and the lists of documents (including the reports of expert witnesses) referred to in Code of Civil Procedure Section 1282.2 shall be mutually exchanged, without necessity of demand therefore, no later than 60 days prior to the date of the hearing, unless otherwise agreed in writing by the parties to the arbitration. Upon application of any party, or on his or her own motion, the arbitrator may schedule one or more prehearing conferences for the purposes of narrowing and/or expediting resolution of the issues in dispute. Strict conformity to the rules of evidence is not required, except that the arbitrator shall apply applicable law relating to privileges and work product. The arbitrator shall consider evidence that he or she finds relevant and material to the dispute, giving the evidence such weight as is appropriate. The arbitrator may limit testimony to exclude evidence that would be immaterial or unduly repetitive, provided that all parties are afforded the opportunity to present material and relevant evidence.

5. Within thirty days after the close of the arbitration hearing, or such other time as the arbitrator shall determine, the parties will submit proposed findings and a proposed remedy to the arbitrator. The parties may file objections to their adversary's proposed findings and remedy within a time limit to be specified by the arbitrator. The arbitrator shall not base his or her award on information not obtained at the hearing.

6. The arbitrator shall render a written award no later than twelve months after the arbitrator is appointed, either by the parties or by the court, provided that such time may be waived or extended as provided in Code of Civil Procedure Section 1283.8.

7. The provisions for discovery set forth in Code of Civil Procedure Section 1283.05 are incorporated into and made part of this Agreement, except that: (a) leave of the arbitrator need not be obtained for the taking of depositions, including the depositions of expert witnesses; (b) the provisions of Code of Civil Procedure Section 2034.010 et seq., relating to discovery of expert witnesses, shall automatically be applicable to arbitration proceedings arising under this Agreement without the necessity for a formal demand pursuant to Section 2034.210 and the date for the exchange of expert discovery provided by Sections 2034.260 and 2034.270 shall be not later than 60 days prior to the date for the hearing; and (c) all reports, documents, and other materials prepared or reviewed by any expert designated to testify at the arbitration shall be discoverable. In appropriate circumstances, the arbitrator may order any party to this Agreement that is not a party to the arbitration to comply with any discovery request.

8. For the purposes of allocation of expenses and fees, as provided in Code of Civil Procedure Section 1284.2, if any two or more Wholesale Customers join together in a single, joint position in the arbitration, those Wholesale Customers shall be deemed to be a single party. If any Wholesale Customer or customers join together with the SFPUC in a single joint position in the arbitration, those Wholesale Customers and the SFPUC together shall be deemed to be a single party.

9. Subject to any other limitations imposed by the Agreement, the arbitrator shall have power to issue orders mandating compliance with the terms of the Agreement or enjoining violations of the Agreement. With respect to any arbitration brought to redress a claimed wholesale overpayment to the SFPUC, the arbitrator's power to award monetary relief

shall be limited to entering an order requiring that an adjustment be made in the amount posted to the balancing account for the fiscal year covered by the Demand.

10. All awards of the arbitrator shall be binding on the SFPUC and the Wholesale Customers regardless of the participation or lack thereof by any Wholesale Customer or the SFPUC as a party to the arbitration proceeding. The parties to an arbitration shall have the power to modify or amend any arbitration award by mutual consent. The arbitrator shall apply California law.

8.02 Attorneys' Fees

A. Arbitration or Litigation Between San Francisco and Wholesale Customers Arising under the Agreement or Individual Water Sales Contracts. Each party will bear its own costs, including attorneys' fees, incurred in any arbitration or litigation arising under this Agreement or the Individual Water Sales Contracts between San Francisco and the Wholesale Customers. Notwithstanding the foregoing, and subject to the limitations contained herein, the SFPUC may allocate to the Wholesale Customers as an allowable expense, utilizing the composite rate used for allocating other Water Enterprise administrative and general expenses, any attorneys' fees and costs incurred by the SFPUC in connection with arbitration and/or litigation arising under this Agreement and/or the Individual Water Sales Contracts. Attorneys' fees incurred by the SFPUC for attorneys employed in the San Francisco City Attorney's office shall be billed at the hourly rates charged for the attorneys in question by the San Francisco City Attorney's Office to the SFPUC. Attorneys' fees incurred by the SFPUC for attorneys other than those employed in the San Francisco City Attorney's Office shall be limited to the hourly rates charged to the SFPUC for attorneys and paralegals with comparable experience employed in the San Francisco City Attorney's office and in no event shall exceed the highest hourly rate charged by any attorney or paralegal employed in the City Attorney's Office to the SFPUC.

B. Arbitration or Litigation Outside of Agreement Concerning the SFPUC Water System or Reserved Issues

1. The attorneys' fees and costs incurred by the SFPUC in litigation between San Francisco and one or more of the Wholesale Customers arising from matters outside of the Agreement, including, without limitation, litigation and/or arbitration concerning the issues specifically reserved in the Agreement, shall be allocated between the Retail Customers and the

Wholesale Customers utilizing the composite rate used for allocating other Water Enterprise administrative and general expenses.

2. If, in any litigation described in subsection B.1 above, attorneys' fees and costs are awarded to one or more of the Wholesale Customers as prevailing parties, the SFPUC's payment of the Wholesale Customers' attorneys' fees and costs shall not be an allowable expense pursuant to subsection A.

3. If, in any litigation described in subsection B.1, the SFPUC obtains an award of attorneys' fees and costs as a prevailing party against one or more of the Wholesale Customers, any such award shall be reduced to offset the amount of the SFPUC's fees and costs, if any, that have already been paid by the Wholesale Customers in the current or any prior fiscal years pursuant to subsection B.1 and the provisions of Articles 5 and 6 of the Agreement.

4. Nothing contained in this Agreement, including this subsection, shall authorize a court to award attorneys' fees and costs to a prevailing party as a matter of contract and/or the provisions of Civil Code Section 1717, in litigation between San Francisco and one or more of the Wholesale Customers arising from matters outside of the Agreement, including, without limitation, litigation and/or arbitration concerning the issues specifically reserved in the Agreement.

C. Attorneys Fees and Costs Incurred by the SFPUC in Connection with the Operation and Maintenance of the SFPUC Water Supply System. All attorneys' fees and costs incurred by the SFPUC in connection with the operation and maintenance of the SFPUC's water supply system shall be allocated between Retail Customers and the Wholesale Customers utilizing the composite rate used for allocating other Water Enterprise administrative and general expenses.

8.03 Annual Meeting and Report

A. The parties wish to ensure that the Wholesale Customers may, in an orderly way, be informed of matters affecting the Regional Water System, including matters affecting the continuity and adequacy of their water supply from San Francisco.

For this purpose, the General Manager of the SFPUC shall meet annually with the Wholesale Customers and BAWSCA during the month of February, commencing

February 2010. At these annual meetings, the SFPUC shall provide the Wholesale Customers a report on the following topics:

1. Capital additions under construction or being planned for the Regional Water System, including the status of planning studies, financing plans, environmental reviews, permit applications, etc.;

2. Water use trends and projections for Retail Customers and Wholesale Customers;

3. Water supply conditions and projections;

4. The status of any administrative proceedings or litigation affecting San Francisco's water rights or the SFPUC's ability to deliver water from the watersheds which currently supply the Regional Water System;

5. Existing or anticipated problems with the maintenance and repair of the Regional Water System or with water quality;

6. Projections of Wholesale Revenue Requirements for the next five years;

7. Any other topic which the SFPUC General Manager places on the agenda for the meeting;

8. Any topic which the Wholesale Customers, through BAWSCA, request be placed on the agenda, provided that the SFPUC is notified of the request at least 10 days before the meeting.

B. The General Manager of the SFPUC, the Assistant General Manager of the Water Enterprise, and the Assistant General Manager of Business Services-CFO will use their best efforts to attend the annual meetings. If one or more of these officers are unable to attend, they will designate an appropriately informed assistant to attend in their place.

8.04 Administrative Matters Delegated to BAWSCA

A. The Wholesale Customers hereby delegate the authority and responsibility for performing the following administrative functions contemplated in this Agreement to BAWSCA:

1. Approval of calculations of Proportional Annual Water Use required by Section 3.14 and Attachment J, "Water Use Measurement and Tabulation";

2. Approval of amendments to Attachments J and K-3 and K-4, "25-Year Payoff Schedules for Existing Rate Base";

3. Agreement that the Water Meter and Calibration Procedures Manual to be prepared by the SFPUC may supersede some or all of the requirements in Attachment J, as described in Section 3.14;

4. Conduct of Wholesale Customer review of SFPUC's calculation of annual Wholesale Revenue Requirement/Change in Balancing Account described in Section 7.06;

5. Approval of an adjustment to Wholesale Revenue Coverage as described in Section 6.06.

B. A majority of the Wholesale Customers may, without amending this Agreement, delegate additional administrative functions to BAWSCA. To be effective, such expanded delegation must be evidenced by resolutions adopted by the governing bodies of a majority of the Wholesale Customers.

C. Unless otherwise explicitly stated, the administrative authority delegated to BAWSCA may be exercised by the General Manager/CEO of BAWSCA, rather than requiring action by the BAWSCA Board of Directors. In addition, the Wholesale Customers may, with the consent of BAWSCA, delegate to BAWSCA the initiation, defense, and settlement of arbitration proceedings provided for in Section 8.01.

8.05 <u>Preservation of Water Rights; Notice of Water Rights Proceedings</u>

A. It is the intention of San Francisco to preserve all of its water rights, irrespective of whether the water held under such water rights is allocated under this Agreement. Nothing in this Agreement shall be construed as an abandonment, or evidence of an intent to abandon, any of the water rights that San Francisco presently possesses.

B. San Francisco shall use its best efforts to give prompt notice to BAWSCA of any litigation or administrative proceedings to which San Francisco is a party involving water rights to the Regional Water System. The failure of San Francisco to provide notice as required by this section, for whatever reason, shall not give rise to any monetary liability.

8.06 SFPUC Rules and Regulations

The sale and delivery of all water under this Agreement shall be subject to such of the "Rules and Regulations Governing Water Service to Customers" of the Water Enterprise adopted by the Commission, as those rules and regulations may be amended from time to time, as are (1) applicable to the sale and delivery of water to the Wholesale Customers, (2) reasonable, and (3) not inconsistent with either this Agreement or with an Individual Water Sales Contract. The SFPUC will give the Wholesale Customers notice of any proposal to amend the Rules and Regulations in a manner that would affect the Wholesale Customers. The notice will be delivered at least thirty days in advance of the date on which the proposal is to be considered by the Commission and will be accompanied by the text of the proposed amendment.

8.07 Reservations of, and Limitations on, Claims

A. General Reservation of Raker Act Contentions. The 1984 Agreement resolved a civil action brought against San Francisco by certain of the Wholesale Customers. Plaintiffs in that action contended that they, and other Wholesale Customers that are municipalities or special districts, were "co-grantees" within the meaning of Section 8 of the Act and were entitled to certain rights, benefits and privileges by virtue of that status. San Francisco disputed those claims.

Nothing in this Agreement, or in the Individual Water Sales Contracts, shall be construed or interpreted in any way to affect the ultimate resolution of the controversy between the parties concerning whether any of the Wholesale Customers are "co-grantees" under the Act and, if so, what rights, benefits and privileges accrue to them by reason of that claimed status.

B. Claims Reserved but not Assertable During Term or Portions Thereof. The following claims, which San Francisco disputes, are reserved but may not be asserted during the Term (or portions thereof, as indicated):

1. The Wholesale Customers' claim that the Act entitles them to water at cost.

2. The Wholesale Customers' claim that San Francisco is obligated under the Act or state law to supply them with additional water in excess of the Supply Assurance. This claim may not be asserted unless and until San Francisco decides not to meet projected

water demands of Wholesale Customers in excess of the Supply Assurance pursuant to Section 4.06.

3. The claim by San Jose and Santa Clara that they are entitled under the Act, or any other federal or state law, to permanent, non-interruptible status and to be charged rates identical to those charged other Wholesale Customers. This claim may not be asserted unless and until San Francisco notifies San Jose or Santa Clara that it intends to interrupt or terminate water deliveries pursuant to Section 4.05.

4. The Wholesale Customers' claim that the SFPUC is not entitled to impose a surcharge for lost power generation revenues attributable to furnishing water in excess of the Supply Assurance. This claim may not be asserted unless and until SFPUC furnishes water in excess of the Supply Assurance during the Term and also includes such a surcharge in the price of such water.

5. Claims by Wholesale Customers (other than San Jose and Santa Clara, whose service areas are fixed) that SFPUC is obligated under the Act or state law to furnish water, within their Individual Supply Guarantee, for delivery to customers outside their existing service area and that Wholesale Customers are entitled to enlarge their service areas to supply those customers. Such claims may be asserted only after compliance with the procedure set forth in Section 3.03, followed by SFPUC's denial of, or failure for six months to act on, a written request by a Wholesale Customer to expand its service area.

C. <u>Waived Activities</u>. The Wholesale Customers (and the SFPUC, where specified) will refrain from the following activities during the Term (or portions thereof, as specified):

1. The Wholesale Customers and the SFPUC will not contend before any court, administrative agency or legislative body or committee that the methodology for determining the Wholesale Revenue Requirement (or the requirements for (a) amortization of the ending balance under the 1984 Agreement, or (b) contribution to the Wholesale Revenue Coverage) determined in accordance with this Agreement violates the Act or any other provision of federal law, state law, or San Francisco's City Charter, or is unfair, unreasonable or unlawful.

2. The Wholesale Customers will not challenge the transfer of funds by the SFPUC to any other San Francisco City department or fund, provided such transfer complies with the San Francisco City Charter. The transfer of its funds, whether or not permitted by the

City Charter, will not excuse the SFPUC from its failure to perform any obligation imposed by this Agreement.

3. The Wholesale Customers and the SFPUC will not assert monetary claims against one another based on the 1984 Agreement other than otherwise arbitrable claims arising from the three fiscal years immediately preceding the start of the Term (i.e., FYs 2006-07, 2007-08 and 2008-09). Such claims, if any, shall be governed by the dispute resolution provisions of this Agreement, except that the time within which arbitration must be commenced shall be 18 months from delivery of the Compliance Auditor's report.

D. Other

1. This Agreement shall determine the respective monetary rights and obligations of the parties with respect to water sold by the SFPUC to the Wholesale Customers during the Term. Such rights and obligations shall not be affected by any judgments or orders issued by any court in litigation, whether or not between parties hereto, and whether or not related to the controversy over co-grantee status, except for arbitration and/or litigation expressly permitted in this Agreement. No judicial or other resolution of issues reserved by this section will affect the Wholesale Revenue Requirement which, during the Term, will be determined exclusively as provided in Articles 5, 6 and 7 of this Agreement.

2. Because delays in the budget process or other events may cause the SFPUC to defer the effective date of changes in wholesale rates until after the beginning of the fiscal year, this Agreement does not require the SFPUC to make changes in wholesale rates effective at the start of the fiscal year or at any other specific date.

3. The Wholesale Customers do not, by executing this Agreement, concede the legality of the SFPUC's establishing Interim Supply Allocations, as provided in Article 4 or imposing Environmental Enhancement Surcharges on water use in excess of such allocations. Any Wholesale Customer may challenge such allocation when imposed and/or such surcharges if and when levied, in any court of competent jurisdiction.

4. The furnishing of water in excess of the Supply Assurance by San Francisco to the Wholesale Customers shall not be deemed or construed to be a waiver by San Francisco of its claim that it has no obligation under any provision of law to supply such water to the Wholesale Customers, nor shall it constitute a dedication by San Francisco to the Wholesale Customers of such water.

8.08 <u>Prohibition of Assignment</u>

A. This Agreement shall be binding on, and shall inure to the benefit of, the parties and their respective successors and permitted assigns. Each Wholesale Customer agrees that it will not transfer or assign any rights or privileges under this Agreement, either in whole or in part, or make any transfer of all or any part of its water system or allow the use thereof in any manner whereby any provision of this Agreement will not continue to be binding on it, its assignee or transferee, or such user of the system. Any assignment or transfer in violation of this covenant, and any assignment or transfer that would result in the supply of water in violation of the Act, shall be void.

B. Nothing in this section shall prevent any Wholesale Customer (except the California Water Service Company and Stanford) from entering into a joint powers agreement or a municipal or multi-party water district with any other Wholesale Customer (except the two listed above) to exercise the rights and obligations granted to and imposed upon the Wholesale Customers hereunder, nor shall this section prevent any Wholesale Customer (except the two listed above) from succeeding to the rights and obligations of another Wholesale Customer hereunder as long as the Wholesale Service Area served by the Wholesale Customers involved in the succession is not thereby enlarged.

8.09 <u>Notices</u>

A. All notices and other documents that San Francisco is required or permitted to send to the Wholesale Customers under this Agreement shall be sent to each and all of the Wholesale Customers by United States mail, first class postage prepaid, addressed to each Wholesale Customer at the address to which monthly water bills are mailed by the Water Enterprise.

B. All notices or other documents which the Wholesale Customers are required or permitted to send to San Francisco under this Agreement shall be sent by United States mail, first class postage prepaid, addressed as follows:

General Manager
San Francisco Public Utilities Commission
1155 Market Street, 11th Floor
San Francisco, CA 94103

C. Each Wholesale Customer is a member of BAWSCA. San Francisco shall send a copy of each notice or other document which it is required to send to all Wholesale Customers to BAWSCA addressed as follows:

General Manager/CEO
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302
San Mateo, CA 94402

The failure of San Francisco to send a copy of such notices or documents to BAWSCA shall not invalidate any rate set or other action taken by San Francisco.

D. Any party (or BAWSCA) may change the address to which notice is to be sent to it under this Agreement by notice to San Francisco (in the case of a change desired by a Wholesale Customer or BAWSCA) and to the Wholesale Customer and BAWSCA (in the case of a change desired by San Francisco).

The requirements for notice set forth in Section 8.01 concerning arbitration shall prevail over this section, when they are applicable.

8.10 Incorporation of Attachments

Attachments A through Q, referred to herein, are incorporated in and made a part of this Agreement.

8.11 Interpretation

In interpreting this Agreement, or any provision thereof, it shall be deemed to have been drafted by all signatories, and no presumption pursuant to Civil Code Section 1654 may be invoked to determine the Agreement's meaning. The marginal headings and titles to the sections and paragraphs of this Agreement are not a part of this Agreement and shall have no effect upon the construction or interpretation of any part hereof.

8.12 Actions and Approvals by San Francisco

Whenever action or approval by San Francisco is required or contemplated by this Agreement, authority to act or approve shall be exercised by the Commission, except if such action is required by law to be taken, or approval required to be given, by the San Francisco Board of Supervisors. The Commission may delegate authority to the General Manager in accordance with the San Francisco City Charter and Administrative Code, except for actions that this Agreement requires to be taken by the Commission.

8.13 Counterparts

Execution of this Agreement may be accomplished by execution of separate counterparts by each signatory. San Francisco shall deliver its executed counterpart to BAWSCA and the counterpart which each Wholesale Customer executes shall be delivered to San Francisco. The separate executed counterparts, taken together, shall constitute a single agreement.

8.14 Limitations on Damages

A. Unless otherwise prohibited by this Agreement, general or direct damages may be recovered for a breach of a party's obligations under this Agreement. No party is liable for, or may recover from any other party, special, indirect or consequential damages or incidental damages, including, but not limited to, lost profits or revenue. No damages may be awarded for a breach of Section 8.17.

B. The limitations in subsection A apply only to claims for damages for an alleged breach of this Agreement. These limitations do not apply to claims for damages for an alleged breach of a legal duty that arises independently of this Agreement, established by constitution or statute.

C. If damages would be an inadequate remedy for a breach of this Agreement, equitable relief may be awarded by a court in a case in which it is otherwise proper.

D. This section does not apply to any claim of breach for which arbitration is the exclusive remedy pursuant to Section 8.01.A.

8.15 Force Majeure

A. Excuse from Performance. No party shall be liable in damages to any other party for delay in performance of, or failure to perform, its obligations under this Agreement, including the obligations set forth in Sections 3.09 and 4.06, if such delay or failure is caused by a "Force Majeure Event."

B. Notice. The party claiming excuse shall deliver to the other parties a written notice of intent to claim excuse from performance under this Agreement by reason of a Force

Majeure Event. Notice required by this section shall be given promptly in light of the circumstances, and, in the case of events described in (c), (d) or (e) of the definition of Force Majeure Event only, not later than ten (10) days after the occurrence of the Force Majeure Event. Such notice shall describe the Force Majeure Event, the services impacted by the claimed event, the length of time that the party expects to be prevented from performing, and the steps which the party intends to take to restore its ability to perform.

C. **Obligation to Restore Ability to Perform**. Any suspension of performance by a party pursuant to this section shall be only to the extent, and for a period of no longer duration than, required by the nature of the Force Majeure Event, and the party claiming excuse shall use its best efforts to remedy its inability to perform as quickly as possible.

8.16 No Third-Party Beneficiaries

This Agreement is exclusively for the benefit of the parties and not for the benefit of any other Person. There are no third-party beneficiaries of this Agreement and no person not a party shall have any rights under or interests in this Agreement.

No party may assert a claim for damages on behalf of a person other than itself, including a person that is not a party.

8.17 Good Faith and Fair Dealing

San Francisco and the Wholesale Customers each acknowledge their obligation under California law to act in good faith toward, and deal fairly with, each other with respect to this Agreement.

Article 9. Implementation and Special Provisions Affecting Certain Wholesale Customers

9.01 General; Individual Water Sales Contracts

A. As described in Section 1.03, San Francisco previously entered into Individual Water Sales Contracts with each of the Wholesale Customers. The term of the majority of Individual Water Sales Contracts will expire on June 30, 2009, concurrently with the expiration of the 1984 Agreement. Except as provided below in this Article, each of the Wholesale Customers will execute a new Individual Water Sales Contract with San Francisco concurrently with its approval of the Agreement.

B. The Individual Water Sales Contracts will describe the service area of each Wholesale Customer, identify the location and size of connections between the Regional Water System and the Wholesale Customer's distribution system, provide for periodic rendering and payment of bills for water usage, and in some instances contain additional specialized provisions unique to the particular Wholesale Customer and not of general concern or applicability. A sample Individual Water Sales Contract is provided at Attachment F. The Individual Water Sales Contracts between San Francisco and the Wholesale Customers will not contain any provision inconsistent with Articles 1 through 8 of this Agreement except (1) as provided below in this Article or (2) to the extent that such provisions are not in derogation of the Fundamental Rights of other Wholesale Customers under this Agreement. Any provisions in an Individual Water Sales Contract which are in violation of this section shall be void.

9.02 California Water Service Company

A. The parties recognize that the California Water Service Company is an investor-owned utility company and, as such, has no claim to co-grantee status under the Act, which specifically bars private parties from receiving for resale any water produced by the Hetch Hetchy portion of the Regional Water System. Accordingly, the following provisions shall apply to the California Water Service Company, notwithstanding anything to the contrary elsewhere in this Agreement.

B. The total quantity of water delivered by San Francisco to the California Water Service Company shall not in any calendar year exceed 47,400 acre feet, which is the estimated average annual production of Local System Water. If San Francisco develops additional Local System Water after the Effective Date, it may (1) increase the maximum delivery amount stated herein; and (2) increase the Supply Assurance, but not necessarily both. San Francisco has no obligation to deliver water to California Water Service Company in excess of the maximum stated herein, except as such maximum may be increased by San Francisco pursuant to this subsection. The maximum annual quantity of Local System Water set forth in this subsection is intended to be a limitation on the total quantity of water that may be allocated to California Water Service Company, and is not an Individual Supply Guarantee for purposes of Section 3.02. The maximum quantity of Local System Water set forth in this subsection is subject to reduction in response to (1) changes in long-term hydrology or (2) environmental water requirements that may be imposed by or negotiated with state and federal resource agencies in order to comply with state or federal law or to secure applicable permits for construction of Regional Water System facilities. San Francisco shall notify California Water Service Company of any anticipated reduction of the quantity of Local System Water set forth in this subsection, along with an explanation of the basis for the reduction.

C. Notwithstanding anything in Section 8.08 to the contrary, California Water Service Company shall have the right to assign to a public agency having the power of eminent domain all or a portion of the rights of California Water Service Company under any contract between it and San Francisco applicable to any individual district of California Water Service Company in connection with the acquisition by such public agency of all or a portion of the water system of California Water Service Company in such district. In the event of any such assignment of all the rights, privileges and obligations of California Water Service Company under such contract, California Water Service Company shall be relieved of all further obligations under such contract provided that the assignee public agency expressly assumes the obligations of California Water Service Company thereunder. In the event of such an assignment of a portion of the rights, privileges and obligations of California Water Service Company under such contract, California Water Service Company shall be relieved of such portion of such obligations so assigned thereunder provided that the assignee public agency shall expressly assume such obligations so assigned to it.

D. Should California Water Service Company seek to take over or otherwise acquire, in whole or in part, the service obligations of another Wholesale Customer under Section 3.03.E, it will so inform San Francisco at least six months prior to the effective date of the sale and provide information concerning the total additional demand proposed to be served, in order that San Francisco may compare the proposed additional demand to the then-current estimate of Local System Water. In this regard, California Water Service Company has notified the SFPUC that it has reached an agreement to acquire the assets of Skyline County Water District ("Skyline") and assume the responsibility for providing water service to customers in the Skyline service area. California Water Service Company has advised the SFPUC that, on September 18, 2008, the California Public Utilities Commission approved California Water Service Company's acquisition of Skyline. The SFPUC anticipates approving the transfer of Skyline's Supply Guarantee as shown on Attachment C to California Water Service Company and the expansion of California Water Service Company's service area to include the current Skyline service area before the Effective Date of this Agreement. All parties to this Agreement authorize corresponding modifications of Attachment C, as well as any of the Agreement's other provisions, to reflect the foregoing transaction without the necessity of amending this Agreement.

E. Nothing in this Agreement shall preclude San Francisco from selling water to any county, city, town, district, political subdivision, or other public agency for resale to customers within the service area of the California Water Service Company. Nothing in this Agreement shall require or contemplate any delivery of water to California Water Service Company in violation of the Act.

F. Nothing in this Agreement shall alter, amend or modify the Findings of Fact and Conclusions of Law and the Judgment dated May 25, 1961, in that certain action entitled *City and County of San Francisco v. California Water Service Company* in the Superior Court of the State of California in and for the County of Marin, No. 23286, as modified by the Quitclaim Deed from California Water Service Company to San Francisco dated August 22, 1961. The rights and obligations of San Francisco and California Water Service Company under these documents shall continue as therein set forth.

9.03 <u>City of Hayward</u>

A. San Francisco and the City of Hayward ("Hayward") entered into a water supply contract on February 9, 1962 ("the 1962 contract") which provides, *inter alia*, that San Francisco will supply Hayward with all water supplemental to sources and supplies of water owned or controlled by Hayward as of that date, in sufficient quantity to supply the total water needs of the service area described on an exhibit to the 1962 contract "on a permanent basis." The service area map attached as Exhibit C to the 1962 contract was amended in 1974 to remove an area of land in the Hayward hills and in 2008 to make minor boundary adjustments identified in SFPUC Resolution No. 08-0035.

B. The intention of the parties is to continue the 1962 contract, as amended, in effect as the Individual Water Sales Contract between San Francisco and Hayward. Accordingly, it shall not be necessary for San Francisco and Hayward to enter into a new Individual Water Sales Contract pursuant to this Article and approval of this Agreement by Hayward shall constitute approval of both this Agreement and an Individual Water Sales Contract for purposes of Section 1.03. The 1962 contract, as amended, will continue to describe the service area of Hayward, while rates for water delivered to Hayward during the Term shall be governed by Article 5 hereof. The 1962 contract, as amended, will continue in force after the expiration of the Term.

9.04 Estero Municipal Improvement District

A. San Francisco and the Estero Municipal Improvement District ("Estero") entered into a water supply contract on August 24, 1961, the term of which continues until August 24, 2011 ("the 1961 Contract"). The 1961 Contract provides, *inter alia*, that San Francisco will supply Estero with all water supplemental to sources and supplies of water owned or controlled by Estero as of that date, in sufficient quantity to supply the total water needs of the service area described on an exhibit to the 1961 Contract.

B. The intention of the parties is to terminate the 1961 Contract and replace it with a new Individual Water Sales Contract which will become effective on July 1, 2009. The new Individual Water Sales Contract will describe the current service area of Estero. The Individual Supply Guarantee applicable to Estero shall be 5.9 MGD, rather than being determined as provided in the 1961 Contract.

9.05 Stanford University

A. The parties recognize that The Board of Trustees of The Leland Stanford Junior University ("Stanford") operates a non-profit university, and purchases water from San Francisco for redistribution to the academic and related facilities and activities of the university and to residents of Stanford, the majority of whom are either employed by or students of Stanford. Stanford agrees that all water furnished by San Francisco shall be used by Stanford only for domestic purposes and those directly connected with the academic and related facilities and activities of Stanford, and no water furnished by San Francisco shall be used in any area now or hereafter leased or otherwise used for industrial purposes or for commercial purposes other than those campus support facilities that provide direct services to Stanford faculty, students or staff such as the U.S. Post Office, the bookstore and Student Union.

Nothing in this Agreement shall preclude San Francisco from selling water to any county, city, town, political subdivision or other public agency for resale to Stanford or to customers within the service area of Stanford.

B. Notwithstanding anything in Section 8.08 to the contrary, Stanford shall have the right to assign to a public agency having the power of eminent domain all or a portion of the rights of Stanford under this Agreement or the Individual Water Sales Contract between it and San Francisco in connection with the acquisition by such public agency of all or a portion of Stanford's water system. In the event of any such assignment of all the rights, privileges, and obligations of Stanford under such contract, Stanford shall be relieved of all further obligations under such contract, provided that the assignee public agency expressly assumes Stanford's obligations thereunder. In the event of such an assignment of a portion of the rights, privileges, and obligations of Stanford under such contract, Stanford shall be relieved of such obligations so assigned thereunder, provided that the assignee public agency shall expressly assume such obligations so assigned to it.

Nothing in this Agreement shall require or contemplate any delivery of water to Stanford in violation of the Act.

9.06 <u>City of San Jose and City of Santa Clara</u>

A. <u>Continued Supply on Temporary, Interruptible Basis</u>. During the term of the 1984 Agreement, San Francisco provided water to the City of San Jose ("San Jose") and the City of Santa Clara ("Santa Clara") on a temporary, interruptible basis pursuant to SFPUC Resolution No. 85-0256. Subject to termination or reduction of supply as provided in Section 4.05 of this Agreement, San Francisco will continue to supply water to San Jose and Santa Clara on a temporary, interruptible basis pending a decision by the Commission, pursuant to Section 4.05.H, as to whether to make San Jose and Santa Clara permanent customers of the Regional Water System. San Francisco will furnish water to San Jose and Santa Clara at the same rates as those applicable to other Wholesale Customers pursuant to this Agreement. Water delivered to San Jose and Santa Clara after July 1, 2009 may be limited by the SFPUC's ability to meet the full needs of all its other Retail and Wholesale Customers. The service areas of San Jose and Santa Clara set forth in their Individual Water Sales Contracts may not be expanded using the procedure set forth in Section 3.03. The combined annual average water usage of San Jose and Santa Clara shall not exceed 9 MGD. The allocation of that total amount between San Jose and Santa Clara shall be as set forth in their Individual Water Sales Contracts.

B. **Reservation of Rights.** In signing this Agreement, neither San Jose nor Santa Clara waives any of its rights to contend, in the event that San Francisco (1) elects to terminate or interrupt water deliveries to either or both of the two cities prior to 2018 using the process set forth in Section 4.05, or (2) does not elect to take either city on as a permanent customer in 2018, that it is entitled to permanent customer status, pursuant to the Act or any other federal or state law. In signing this Agreement, San Francisco does not waive its right to deny any or all such contentions.

9.07 City of Brisbane, Guadalupe Valley Municipal Improvement District, Town of Hillsborough

A. The parties acknowledge that San Francisco has heretofore provided certain quantities of water to the City of Brisbane ("Brisbane"), Guadalupe Valley Municipal Improvement District ("Guadalupe") and the Town of Hillsborough ("Hillsborough") at specified rates or without charge pursuant to obligations arising out of agreements between the predecessors of San Francisco and these parties, which agreements are referred to in judicial orders, resolutions of the SFPUC and/or the 1960 contracts between San Francisco and Brisbane, Guadalupe and Hillsborough. The parties intend to continue those arrangements and accordingly agree as follows:

1. Nothing in this Agreement is intended to alter, amend or modify the terms of SFPUC Resolution No. 74-0653 or the indenture of July 18, 1908 between the Guadalupe Development Company and the Spring Valley Water Company.

2. Nothing in this Agreement is intended to alter, amend or modify the Findings of Fact and Conclusions of Law and Judgment dated May 25, 1961 in that certain action entitled *City and County of San Francisco v. Town of Hillsborough* in the Superior Court of the State of California in and for the County of Marin, No. 23282, as modified by the Satisfaction of Judgment filed October 23, 1961 and the Compromise and Release between Hillsborough and San Francisco dated August 22, 1961. The rights and obligations of Hillsborough under these documents shall continue as therein set forth.

3. Nothing in this Agreement is intended to affect or prejudice any claims, rights or remedies of Guadalupe or of Crocker Estate Company, a corporation, or of Crocker

Land Company, a corporation, or of San Francisco, or of their successors and assigns, respectively, with respect to or arising out of that certain deed dated May 22, 1884, from Charles Crocker to Spring Valley Water Works, a corporation, recorded on May 24, 1884, in Book 37 of Deeds at page 356, Records of San Mateo County, California, as amended by that certain Deed of Exchange of Easements in Real Property and Agreement for Trade in Connection Therewith, dated July 29, 1954, recorded on August 4, 1954, in Book 2628, at page 298, Official Records of said San Mateo County, or with respect to or arising out of that certain action involving the validity or enforceability of certain provisions of said deed entitled *City and County of San Francisco v. Crocker Estate Company*, in the Superior Court of the State of California in and for the County of Marin, No. 23281.

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IN WITNESS WHEREOF the parties have executed this Agreement by their duly authorized officers.

CITY AND COUNTY OF SAN FRANCISCO
Acting by and through its Public Utilities Commission

By:______________________________
Edward Harrington
General Manager

Date: ________________________, 2009

Approved by Commission Resolution No. 09-0069,
adopted April 28, 2009

____
Michael Housh
Secretary to Commission

Approved as to form:

DENNIS J. HERRERA
City Attorney

By:______________________________
Joshua D. Milstein
Deputy City Attorney

Attachment A - Definitions

"1984 Agreement" refers to the 1984 Settlement Agreement and Master Water Sales Contract between the City and County of San Francisco and certain Suburban Purchasers in San Mateo County, Santa Clara County and Alameda County, which expires on June 30, 2009.

"Act" refers to the Raker Act, 38 Stat. 242, the Act of Congress, enacted in 1913, that authorized the construction of the Hetch Hetchy system on federal lands.

"Adjusted Proportional Annual Use" means the respective percentages of annual water use, as adjusted to reflect deliveries of water by the Hetch Hetchy Enterprise to outside City Retail Customers. The adjustment is calculated each year as described in Section B of Attachment J and is shown on lines 18 and 19 of Table 1 of that Attachment.

"Agreement" refers to this Water Supply Agreement, by and among San Francisco and the Wholesale Customers who approve this Agreement in accordance with Section 1.03.

"BAWSCA" refers to the Bay Area Water Supply and Conservation Agency established pursuant to Division 31 of the California Water Code (Water Code §§81300-81461) or its successor and permitted assigns.

"CEQA" refers to the California Environmental Quality Act found at §§21000 et seq. of the Public Resources Code and the Guidelines for the California Environmental Quality Act found at §§15000 et seq. of Title 14 of the California Code of Regulations, as amended from time to time.

"Commission" means the governing board of the SFPUC, whose members, as of the date of this Agreement, are appointed by the Mayor of San Francisco and confirmed by the San Francisco Board of Supervisors.

"Compliance Audit" refers to the annual audit of the Wholesale Revenue Requirement by the Compliance Auditor required by Sections 7.03 through 7.05.

"Compliance Auditor" refers to the independent certified public accountant chosen by the San Francisco Controller to conduct each fiscal year's audit of the SFPUC's calculation of the Wholesale Revenue Requirement as provided in Section 7.03.B.

“Countywide Cost Allocation Plan” refers to the full costs of the Water and Hetch Hetchy Enterprises’ prorated share of San Francisco city government expenses that are not directly billed to city departments, as determined by the Controller of the City and County of San Francisco.

“Debt Service” means principal and interest paid during a fiscal year on Indebtedness incurred by the SFPUC for the 2006 Revenue Bonds, Series A, and subsequently issued Indebtedness (exclusive of 2006 Revenue Bonds Series B and C), the proceeds of which are used or are scheduled to be used for the acquisition or construction of New Regional Assets or to refund such Indebtedness.

“Direct Retail” refers to Regional Water System capital or operating expenditures that are incurred to provide water service solely to Retail Customers.

“Direct Wholesale” refers to Regional Water System capital or operating expenditures that are incurred to provide water service solely to one or more Wholesale Customers.

“Drought” means a water shortage caused by lack of precipitation, as reflected in resolutions of the Commission calling for voluntary or mandatory water rationing based on evaluation of water stored or otherwise available to the Regional Water System, whether or not the Commission declares a water shortage emergency pursuant to Water Code §§ 350 et seq., as amended from time to time.

“Effective Date” refers to the date this Agreement will become effective in accordance with the terms of Section 1.03.

“Emergency” means a sudden, non-drought event, such as an earthquake, failure of Regional Water System infrastructure or other catastrophic event or natural disaster that results in an insufficient supply of water available to the Retail or Wholesale Service Areas for basic human consumption, firefighting, sanitation, and fire protection.

“Encumbrance” or **“Encumber”** refers to the process by which the City Controller certifies the availability of amounts previously appropriated by the Commission for specifically identified SFPUC capital projects performed either by third parties or through work orders to other City departments.

“Environmental Enhancement Surcharge” means the surcharge to be imposed by the SFPUC on individual parties to this Agreement whose use exceeds their Interim Supply Allocation when the collective use of water by all parties to this Agreement is in excess of the Interim Supply Limitation.

“ERRP” refers to a SFPUC document entitled *Emergency Response and Recovery Plan: Regional Water System* (“ERRP”) dated August 23, 2003, and updated November 2006.

“Excess Use Charges” are monthly charges set by the SFPUC, in the form of multipliers, that are applied to the Wholesale Customer water rates during times of mandatory rationing if a Wholesale Customer's water usage is greater than its shortage allocation. Excess Use Charges are further described in Section 4 of the Tier 1 Shortage Plan (Attachment H).

“Existing Assets” refers to Regional and Hetch Hetchy Water-Only and Water-Related capital assets plant in service as of June 30, 2009.

“Force Majeure Event” means an event not the fault of, and beyond the reasonable control of, the party claiming excuse which makes it impossible or extremely impracticable for such party to perform obligations imposed on it by this Agreement, by virtue of its effect on physical facilities and their operation or employees essential to such performance. Force Majeure Events include (a) an “act of God” such as an earthquake, flood, earth movement, or similar catastrophic event, (b) an act of the public enemy, terrorism, sabotage, civil disturbance or similar event, (c) a strike, work stoppage, picketing or similar concerted labor action, (d) delays in construction caused by unanticipated negligence or breach of contract by a third party or inability to obtain essential materials after diligent and timely efforts; or (e) an order or regulation issued by a federal or state regulatory agency after the Effective Date or a judgment or order entered by a federal or state court after the Effective Date.

“Fundamental Rights” of Wholesale Customers are their status as parties to this Agreement, their allocation of water recognized in Section 3.02, their protection against arbitrary, unreasonable, or unjustly discriminatory rates provided in Section 6.04, and any specific rights described in Article 9.

“Hetch Hetchy Enterprise” refers to Hetch Hetchy Water and Power Enterprise, a SFPUC operating department.

“Include” and its variants mean “including but not limited to” whenever used in this Agreement, regardless of whether or not it is capitalized.

“Indebtedness” includes revenue bonds, bond anticipation notes, certificates of participation (excluding certificates of participation towards which SFPUC contributes debt service as an operating expense), and commercial paper.

“Individual Water Sales Contract” refers to the contracts between each Wholesale Customer and San Francisco contemplated in Section 9.01 that details customer-specific matters such as location of service connections, service area maps and other matters specific to that customer.

“Individual Supply Guarantee” refers to each Wholesale Customer’s share of the Supply Assurance, as shown in Attachment C.

“Interim Supply Allocation” refers to each Wholesale Customer’s share, to be established by the SFPUC pursuant to Section 4.02, of the Interim Supply Limitation.

“Interim Supply Limitation” refers to the 265 MGD annual average limitation on water deliveries until December 31, 2018 from Regional Water System watersheds imposed by the SFPUC in its approval of the WSIP in Resolution Number 08-0200 dated October 30, 2008.

“Joint,” when used in connection with Hetch Hetchy Enterprise assets or expenses, refers to assets used or expenses incurred in providing both water supply (“Water-Related”) and in the generation and transmission of electrical energy (“Power-Related”).

“Local System Water” refers to Regional Water System water supplies developed in San Mateo, Alameda and Santa Clara Counties or otherwise not produced by the Hetch Hetchy Enterprise under rights of way granted by the Raker Act.

“MGD” refers to an average flow rate of one million gallons per day over a specific time period, often a year. For example, one MGD is equal to 365 million gallons per year or 1,120 acre feet per year.

“Net Annual Debt Service” refers to debt service less payments made from proceeds of Indebtedness (e.g., capitalized interest), earnings on bond proceeds (e.g., reserve fund earnings) used to pay Debt Service, and interest paid from renewed commercial paper, or from reserve fund liquidation.

“New Assets” refers to Regional and Hetch Hetchy Water-Only and Water-Related capital assets added to Regional Water System plant in service after June 30, 2009.

“New Regional Assets” refers to New Assets placed in service on or after July 1, 2009 that are used and useful in delivering water to Wholesale Customers. The following four categories comprise New Regional Assets:

1. Water Enterprise Regional Assets
2. Water Enterprise Direct Wholesale Assets
3. Hetch Hetchy Water Only Assets
4. Water-Related portion (45 percent) of Hetch Hetchy Joint Assets

“Power-Only,” when used with reference to Hetch Hetchy Enterprise capital costs and operating and maintenance expenses, means capital costs and expenses that are incurred solely for the construction and operation of assets used to generate and transmit electrical energy.

“Power-Related” refers to the power related portion (55%) of Joint Hetch Hetchy Enterprise assets or expenses.

“Prepayment” refers to payments of principal and interest amounts not due in the year the prepayment is made, as described in Section 5.03.

“Proportional Annual Use” means the shares of deliveries from the Regional Water System used by City Retail Customers and by the Wholesale Customers in a fiscal year, expressed as a percentage. The percentages of annual use are calculated each year as described in Section B of Attachment J and are shown on lines 10 and 11 of Table 1 of that Attachment.

“Proportional Water Use” refers the general principle of allocating Regional Water System costs based on the relative purchases of water by Retail and Wholesale Customers.

“Regional,” when used with reference to Water Enterprise capital assets and operating expenses, refers to assets and expenses that benefit Wholesale and Regional Customers.

“Regional Water System” means the water storage, transmission and treatment system operated by the SFPUC in Tuolumne, Stanislaus, San Joaquin, Alameda, Santa Clara, San Mateo and San Francisco counties, including projects constructed under the WSIP, but excluding Direct Retail and Direct Wholesale assets.

"Retail Customers" means any customer that purchases water from San Francisco that is not a Wholesale Customer, whether located inside or outside of San Francisco.

"Retail Service Area" means the areas where SFPUC sells water to Retail Customers.

"Retail Water" means water sold by the SFPUC to its Retail Customers within and outside San Francisco.

"San Francisco" refers to the City and County of San Francisco.

"SFPUC" refers to the San Francisco Public Utilities Commission as an operating department of San Francisco, the General Manager of which reports to the Commission.

"SFPUC Bureaus" refers to the portions of the SFPUC that provide support services to the SFPUC Operating Departments. These presently consist of the General Manager's Office, Business Services, and External Affairs.

"SFPUC Operating Departments" refers to the Water, Hetch Hetchy and Wastewater Program Enterprises under the control and management of the SFPUC pursuant to the San Francisco Charter.

"Substantially Expended": A bond issue series is substantially expended when 98% of the proceeds and investment earnings contributed to the project fund have been expended.

"Supply Assurance" means the 184 MGD maximum annual average metered supply of water dedicated by San Francisco to public use in the Wholesale Service Area (not including San Jose and Santa Clara) in the 1984 Agreement and Section 3.01 of this Agreement.

"Term" means the 25-year term commencing July 1, 2009, including one or both 5-year extensions authorized by Section 2.02.A and B.

"Tier 1 Shortage Plan" refers to the Water Shortage Allocation Plan (Attachment H) adopted by the SFPUC and the Wholesale Customers in conjunction with this Agreement describing the method for allocating water between the SFPUC and the Wholesale Customers collectively for shortages of up to 20% of deliveries from the Regional Water System, as amended from time-to-time.

“Water Enterprise” refers to the San Francisco Water Department (SFWD), an SFPUC Operating Department.

“Water Management Charge” refers to the charge collected by San Francisco on behalf of BAWSCA for local water resource development in the Wholesale Service Area pursuant to Section 3.06 of this Agreement.

“Water-Only,” when used with reference to Hetch Hetchy Enterprise capital costs and operating and maintenance expenses, means capital costs and expenses that are incurred solely for the construction and operation of assets used to protect water quality or to provide for the delivery of water for consumptive purposes.

“Water-Related” refers to the water related portion (45%) of Joint Hetch Hetchy Enterprise assets or expenses.

“Water Supply Development Report” refers to the annual report prepared pursuant to Section 4.05, and submitted to the Commission for purposes of estimating whether Regional Water System demand will be within the Interim Supply Limitation by June 30, 2018.

“Wheeling Statute” refers to Article 4 of Chapter 11 of the California Water Code, as amended from time to time.

“Wholesale Capital Fund” is the account established by the SFPUC for deposit of Wholesale Customer revenue that is used to fund the wholesale share of revenue-funded New Regional Assets, as described in Section 6.08.

“Wholesale Customer” or “Customers” means one or more of the 27 water customers identified in Section 1.01 that are contracting for purchase of water from San Francisco pursuant to this Agreement.

“Wholesale Revenue Coverage” refers to the additional dollar amount included in wholesale rates each fiscal year that is charged to Wholesale Customers by the SFPUC for their proportionate share of Debt Service coverage under Section 6.06.A.

“Wholesale Revenue Coverage Reserve” refers to the account established by the SFPUC for deposit of Wholesale Revenue Coverage under Section 6.06.B.

“Wholesale Revenue Requirement” means the calculated Wholesale Customer portion of SFPUC Regional Water System capital and operating costs as determined in accordance with the provisions of Article 5 of this Agreement, formerly called the “Suburban Revenue Requirement” in the 1984 Agreement.

“Wholesale Service Area” means the combined service areas of the Wholesale Customers, as delineated on the service area maps attached to each Individual Water Sales Contract.

“WSIP” refers to the Water System Improvement Program approved by the Commission in Resolution No. 08-0200 on October 30, 2008, as amended from time to time.

ATTACHMENT B

WHOLESALE CUSTOMER REGIONAL WATER SYSTEM PURCHASES FY 2007-2008*

(To determine 75% approval process for Section 1.02)

WHOLESALE CUSTOMER	MGD
Alameda County Water District	12.90
California Water Service Company	37.72
City of Brisbane	0.23
City of Burlingame	4.50
City of Daly City	4.49
City of East Palo Alto	2.16
City of Hayward	19.33
City of Menlo Park	3.69
City of Millbrae	2.46
City of Milpitas	6.95
City of Mountain View	10.51
City of Palo Alto	12.72
City of Redwood City	11.01
City of San Bruno	1.86
City of San Jose	4.80
City of Santa Clara	3.49
City of Sunnyvale	10.52
Coastside County Water District	2.08
Estero Municipal Improvement District	5.51
Guadalupe Valley Municipal Improvement District	0.40
Mid-Peninsula Water District	3.25
North Coast County Water District	3.25
Purissima Hills Water District	2.31
Skyline County Water District	0.16
Stanford University	2.31
Town of Hillsborough	3.83
Westborough Water District	0.95
Total	173.39

*Source: SFPUC Commercial Division Records
Note: FY 2007-2008 was a Leap Year with 366 days.

ATTACHMENT C
INDIVIDUAL SUPPLY GUARANTEES

WHOLESALE CUSTOMER	(1) 100 Cubic Feet *	(2) MGD
Alameda County Water District	6,714,439	13.760
California Water Service Company**	17,320,807	35.499
City of Brisbane	224,435	0.460
City of Burlingame	2,553,753	5.234
City of Daly City	2,094,386	4.292
City of East Palo Alto	957,813	1.963
City of Menlo Park	2,174,231	4.456
City of Millbrae	1,538,120	3.152
City of Milpitas	4,504,533	9.232
City of Mountain View	6,567,648	13.460
City of Palo Alto	8,331,697	17.075
City of Redwood City	5,333,115	10.930
City of San Bruno	1,583,899	3.246
City of Sunnyvale	6,138,122	12.580
Coastside County Water District	1,061,453	2.175
Estero Municipal Improvement District	2,878,807	5.900
Guadalupe Valley Municipal Improvement District	254,436	0.521
Mid-Peninsula Water District	1,898,707	3.891
North Coast County Water District	1,872,928	3.838
Purissima Hills Water District	792,832	1.625
Skyline County Water District	88,537	0.181
Stanford University	1,479,764	3.033
Town of Hillsborough	1,995,644	4.090
Westborough Water District	644,172	1.320
Total:***	79,004,278	161.913

* 100 Cubic feet equals MGD divided by 0.00000204946. Figures in this column are calculated using unrounded MGD values and are more precise than the figures listed in column (2).

** Includes quantities from Los Trancos County Water District and Palomar Park Water District.

*** Total does not equal sum of MGD figures due to rounding. Total is not 184 MGD because table does not include the City of Hayward.

**** Cordilleras Mutual Water Association is not a party to this Agreement, but it has its own Supply Assurance of 3,007 hundred cubic feet (CCF).

ATTACHMENT D

PROCEDURE FOR PRO-RATA REDUCTION OF WHOLESALE CUSTOMERS' INDIVIDUAL SUPPLY GUARANTEES (SECTION 3.02).

The 23 wholesale customers listed on Attachment C have individual Supply Guarantees that total approximately 161.9 MGD.

If the amount of water purchased from SFPUC by Hayward exceeds 22.1 MGD for three consecutive fiscal years, the individual Supply Guarantees of each of those 23 wholesale customers will be reduced as described below.

STEP ONE:

Obtain the average annual excess purchases during the three fiscal year period. For example, assume Hayward uses 25.0 MGD, 24.2 MGD and 26.0 MGD in three consecutive years. The average annual excess use for that period is 2.9 MGD; calculated as follows:

$$\frac{[25.0\text{ MGD} + 24.2\text{ MGD} + 26.0\text{ MGD}]}{3} + 161.9\text{ MGD} = 186.9\text{ MGD}$$

$$186.9\text{ MGD} - 184.0\text{ MGD} = 2.9\text{ MGD}$$

STEP TWO:

Allocate the excess purchases among the 23 Wholesale Customers in proportion to each customer's Supply Guarantee as a percentage of the total Supply Guarantees (161.9 MGD as of FY 2009-10).

For example, assume that Wholesale Customer A's Supply Guarantee is 12.0 MGD. Wholesale Customer A's percentage share of the total individual supply guarantees is 0.074, calculated as follows:

$$\frac{12.0\text{ MGD}}{161.9\text{ MGD}} = 0.074$$

and its share of the excess use is 0.22 MGD, calculated as follows:

2.9 MGD x 0.074 = 0.22 MGD

STEP THREE:

Determine Wholesale Customer's adjusted Supply Guarantee by subtracting the result of Step Two from the Wholesale Customer's Supply Guarantee:

12 MGD - 0.22 MGD = 11.78 MGD

* * * * * * * * * *

Adjustments will be made at intervals comprised of distinct three-year periods of use by Hayward in excess of 22.1 MGD rather than overlapping periods. For example, assuming that the first adjustment were to occur in FY 2014-15 (based on use during FY 2011-12, FY 2012-13 and FY 2013-14), a second adjustment will not occur earlier than three full fiscal years thereafter (i.e., FY 2017-18, based on use by Hayward in FY 2014-15, FY 2015-16 and FY 2016-17). The figures used in the second and subsequent adjustments will reflect previous adjustments. For example, a second adjustment will use 158.9 MGD as the total of individual Supply Guarantees (161.6 MGD - 2.7 MGD = 158.9 MGD).

For purposes of simplicity, the volumetric units used in the foregoing example are MGD. For actual adjustment calculations, the unit employed will be hundreds of cubic feet ("ccf"), the unit by which the SFPUC measures water deliveries for billing purposes.

The procedure described and illustrated above is independent of and unrelated to the establishment by the SFPUC of Interim Supply Limitations described in Article 4.

ATTACHMENT E

MINIMUM ANNUAL PURCHASE QUANTITIES

(Section 3.07.C)

AGENCY	MINIMUM ANNUAL PURCHASE QUANTITY (IN MGD)
Alameda County Water District	7.648
City of Milpitas	5.341
City of Mountain View	8.930
City of Sunnyvale	8.930

<u>ATTACHMENT F</u>

WATER SALES CONTRACT

This Contract, dated as of ____________, 2009, is entered into by and between the City and County of San Francisco ("San Francisco") and

____

____ ("Customer").

RECITALS

San Francisco and the Customer have entered into a Water Supply Agreement ("WSA"), which sets forth the terms and conditions under which San Francisco will continue to furnish water for domestic and other municipal purposes to Customer and to other Wholesale Customers. The WSA contemplates that San Francisco and each individual Wholesale Customer will enter into an individual contract describing the location or locations at which water will be delivered to each customer by the San Francisco Public Utilities Commission ("SFPUC"), the customer's service area within which water so delivered is to be sold, and other provisions unique to the individual purchaser. This Water Sales Contract is the individual contract contemplated by the WSA.

AGREEMENTS OF THE PARTIES

1. Incorporation of the WSA

The terms and conditions of the WSA are incorporated into this Contract as if set forth in full herein.

2. Term

Unless explicitly provided to the contrary in Article 9 of the WSA, the term of this Contract shall be identical to that provided in Section ___ of the WSA.

3. Service Area

Water delivered by San Francisco to the Customer may be used or sold within the service area shown on the map designated Exhibit A attached hereto. Except as provided in Section ___ of the WSA, Customer shall not deliver or sell any water provided by San Francisco outside of this area without the prior written consent of the General Manager of the SFPUC.

4. Location and Description of Service Connections

Sale and delivery of water to Customer will be made through a connection or connections to the SFPUC Regional Water System at the location or locations shown on Exhibit A attached hereto and with the applicable present account number, description, connection size, and meter size shown on Exhibit B attached hereto.

5. Interties With Other Systems.

Customer maintains interties with neighboring water systems at the location or locations shown on Exhibit A attached hereto and with the connection size(s) as shown on Exhibit C attached hereto.

6. Billing and Payment

San Francisco shall compute the amounts of water delivered and bill Customer therefor on a monthly basis. The bill shall show the separate components of the charge (e.g., service, consumption, demand). Customer shall pay the amount due within thirty (30) days after receipt of the bill.

If Customer disputes the accuracy of any portion of the water bill it shall (a) notify the General Manager of the SFPUC in writing of the specific nature of the dispute and (b) pay the undisputed portion of the bill within thirty (30) days after receipt. Customer shall meet with the General Manager of the SFPUC or a delegate to discuss the disputed portion of the bill.

7., 8., 9... Other Specialized Provisions

[Certain Wholesale Customers will require additional provisions in their individual contracts addressed to issues such as minimum and/or maximum water delivery quantities, prior authorized wheeling arrangements, maximum expansion of the service area, etc. These and other provisions addressing issues unique to the particular Wholesale Customer may be added here, subject to the provisions of Section 9.01 of the WSA.]

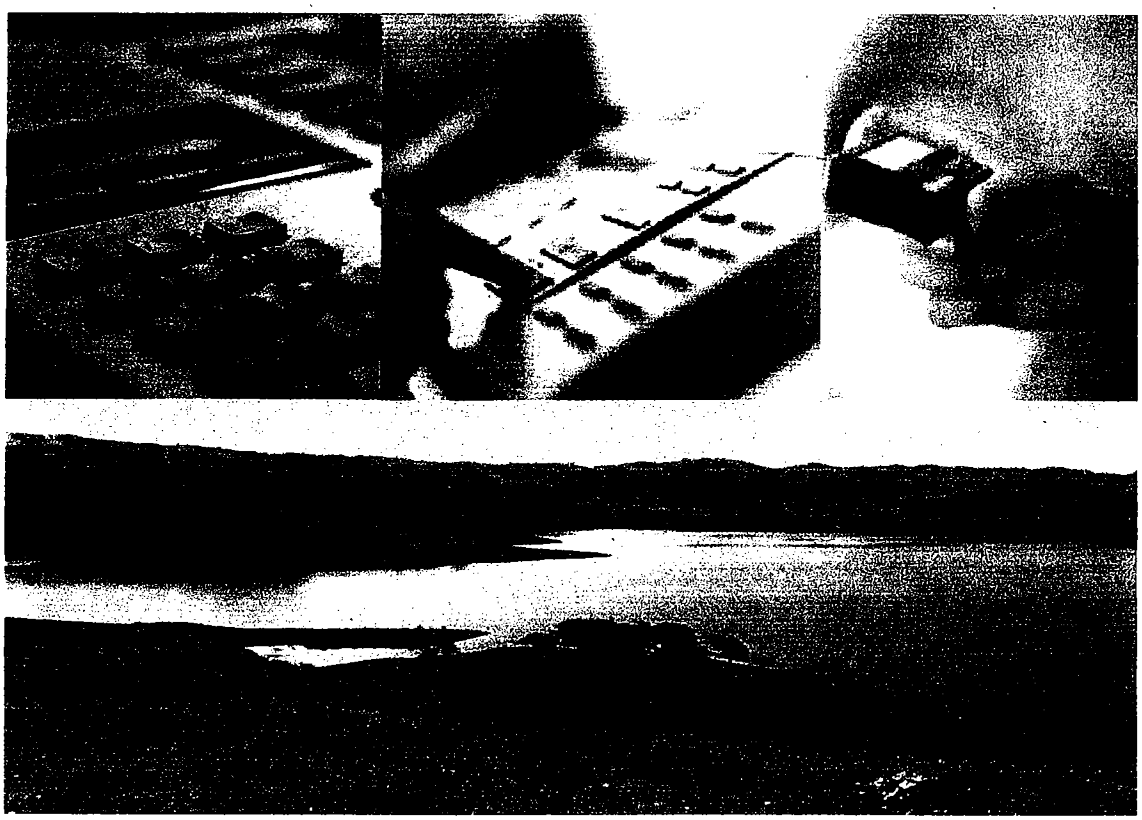
IN WITNESS WHEREOF, the parties hereto have executed this Contract, to become effective upon the effectiveness of the WSA, by their duly authorized representatives.

CITY AND COUNTY OF SAN FRANCISCO Acting by and through its Public Utilities Commission BY ______________________________ Edward Harrington General Manager	Date: _____, 2009
NAME OF WHOLESALE CUSTOMER BY ______________________________ Name: Title:	Date: _____, 2009

Note: This attachment is provided for the convenience of the prospective parties to the Water Supply Agreement and associated individual contracts. The format may be modified as desired by San Francisco and Wholesale Customer, subject to Section 9.01 of the WSA.

ATTACHMENT G

Water Quality
Notification and Communications Plan
Revision 4
January 2006



Updated by:
Water Quality Engineering
Olivia Chen Consultants, Inc.

ATTACHMENT H

WATER SHORTAGE ALLOCATION PLAN

This Interim Water Shortage Allocation Plan ("Plan") describes the method for allocating water between the San Francisco Public Utilities Commission ("SFPUC") and the Wholesale Customers collectively during shortages caused by drought. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The Plan includes provisions for transfers, banking, and excess use charges. The Plan applies only when the SFPUC determines that a system-wide water shortage due to drought exists, and all references to "shortages" and "water shortages" are to be so understood. This Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County ("Agreement").

SECTION 1. SHORTAGE CONDITIONS

1.1. Projected Available SFPUC Water Supply. The SFPUC shall make an annual determination as to whether or not a shortage condition exists. The determination of projected available water supply shall consider, among other things, stored water, projected runoff, water acquired by the SFPUC from non-SFPUC sources, inactive storage, reservoir losses, allowance for carryover storage, and water bank balances, if any, described in Section 3.

1.2 Projected SFPUC Purchases. The SFPUC will utilize purchase data, including volumes of water purchased by the Wholesale Customers and by Retail Customers (as those terms are used in the Agreement) in the year immediately prior to the drought, along with other available relevant information, as a basis for determining projected system-wide water purchases from the SFPUC for the upcoming year.

1.3. Shortage Conditions. The SFPUC will compare the available water supply (Section 1.1) with projected system-wide water purchases (Section 1.2). A shortage condition exists if the SFPUC determines that the projected available water supply is less than projected system-wide water purchases in the upcoming Supply Year (defined as the period from July 1 through June 30). When a shortage condition exists, SFPUC will determine whether voluntary or mandatory actions will be required to reduce purchases of SFPUC water to required levels.

1.3.1 Voluntary Response. If the SFPUC determines that voluntary actions will be sufficient to accomplish the necessary reduction in water use throughout its service area, the SFPUC and the Wholesale Customers will make good faith efforts to reduce their water purchases to stay within their annual shortage allocations and associated monthly water use budgets. The SFPUC will not impose excess use charges during periods of voluntary rationing, but may suspend the prospective accumulation of water bank credits, or impose a ceiling on further accumulation of bank credits, consistent with Section 3.2.1 of this Plan.

1.3.2 Mandatory Response. If the SFPUC determines that mandatory actions will be required to accomplish the necessary reduction in water use in the SFPUC service area, the SFPUC may implement excess use charges as set forth in Section 4 of this Plan.

1.4. Period of Shortage. A shortage period commences when the SFPUC determines that a water shortage exists, as set forth in a declaration of water shortage emergency issued by the SFPUC pursuant to California Water Code Sections 350 et seq. Termination of the water shortage emergency will be declared by resolution of the SFPUC.

SECTION 2. SHORTAGE ALLOCATIONS

2.1. Annual Allocations between the SFPUC and the Wholesale Customers. The annual water supply available during shortages will be allocated between the SFPUC and the collective Wholesale Customers as follows:

Level of System Wide Reduction in Water Use Required	Share of Available Water	
	SFPUC Share	Wholesale Customers Share
5% or less	35.5%	64.5%
6% through 10%	36.0%	64.0%
11% through 15%	37.0%	63.0%
16% through 20%	37.5%	62.5%

The water allocated to the SFPUC shall correspond to the total allocation for all Retail Customers.

2.2 Annual Allocations among the Wholesale Customers. The annual water supply allocated to the Wholesale Customers collectively during system wide shortages of 20 percent or less will be apportioned among them based on a methodology adopted by all of the Wholesale Customers, as described in Section 3.11(C) of the Agreement. In any year for which the methodology must be applied, the Bay Area Water Supply and Conservation Agency ("BAWSCA") will calculate each Wholesale Customer's individual percentage share of the amount of water allocated to the Wholesale Customers collectively pursuant to Section 2.1. Following the declaration or reconfirmation of a water shortage emergency by the SFPUC, BAWSCA will deliver to the SFPUC General Manager a list, signed by the President of BAWSCA's Board of Directors and its General Manager, showing each Wholesale Customer together with its percentage share and stating that the list has been prepared in accordance with the methodology adopted by the Wholesale Customers. The SFPUC shall allocate water to each Wholesale Customer, as specified in the list. The shortage allocations so established may be transferred as provided in Section 2.5 of this Plan. If BAWSCA or all Wholesale Customers do not provide the SFPUC with individual allocations, the SFPUC may make a final allocation decision after first meeting and discussing allocations with BAWSCA and the Wholesale Customers.

The methodology adopted by the Wholesale Customers utilizes the rolling average of each individual Wholesale Customer's purchases from the SFPUC during the three immediately preceding Supply Years. The SFPUC agrees to provide BAWSCA by November 1 of each year a list showing the amount of water purchased by each Wholesale Customer during the immediately preceding Supply Year. The list will be prepared using Customer Service Bureau report MGT440 (or comparable official record in use at the time), adjusted as required for any reporting errors or omissions, and will be transmitted by the SFPUC General Manager or his designee.

2.3. Limited Applicability of Plan to System Wide Shortages Greater Than Twenty Percent. The allocations of water between the SFPUC and the Wholesale Customers collectively, provided for in Section 2.1, apply only to shortages of 20 percent or less. The SFPUC and Wholesale Customers recognize the possibility of a drought occurring which could create system-wide shortages greater than 20 percent despite actions taken by the SFPUC aimed at reducing the probability and severity of water shortages in the SFPUC service area. If the SFPUC determines that a system wide water shortage greater than 20 percent exists, the SFPUC and the Wholesale Customers agree to meet within 10 days and discuss whether a change is required to the allocation set forth in Section 2.1 in order to mitigate undue hardships that might otherwise be experienced by individual Wholesale Customers or Retail Customers. Following these discussions, the Tier 1 water allocations set forth in Section 2.1 of this Plan, or a modified version thereof, may be adopted by mutual written consent of the SFPUC and the Wholesale Customers. If the SFPUC and Wholesale Customers meet and cannot agree on an appropriate Tier 1 allocation within 30 days of the SFPUC's determination of water shortage greater than 20 percent, then (1) the provisions of Section 3.11(C) of the Agreement will apply, unless (2) all of the Wholesale Customers direct in writing that a Tier 2 allocation methodology agreed to by them be used to apportion the water to be made available to the Wholesale Customers collectively, in lieu of the provisions of Section 3.11(C).

The provisions of this Plan relating to transfers (in Section 2.5), banking (in Section 3), and excess use charges (in Section 4) shall continue to apply during system-wide shortages greater than 20 percent.

2.4. Monthly Water Budgets. Within 10 days after adopting a declaration of water shortage emergency, the SFPUC will determine the amount of Tier 1 water allocated to the Wholesale Customers collectively pursuant to Section 2.1. The SFPUC General Manager, using the Tier 2 allocation percentages shown on the list delivered by BAWSCA pursuant to Section 2.2, will calculate each Wholesale Customer's individual annual allocation. The SFPUC General Manager, or his designee, will then provide each Wholesale Customer with a proposed schedule of monthly water budgets based on the pattern of monthly water purchases during the Supply Year immediately preceding the declaration of shortage (the "Default Schedule"). Each Wholesale Customer may, within two weeks of receiving its Default Schedule, provide the SFPUC with an alternative monthly water budget that reschedules its annual Tier 2 shortage allocation over the course of the succeeding Supply Year. If a Wholesale Customer does not deliver an alternative monthly water budget to the SFPUC within two weeks of its receipt of the Default Schedule, then its monthly budget for the ensuing Supply Year shall be the Default Schedule proposed by the SFPUC.

Monthly Wholesale Customer water budgets will be derived from annual Tier 2 allocations for purposes of accounting for excess use. Monthly Wholesale Customer water budgets shall be adjusted during the year to account for transfers of shortage allocation under Section 2.5 and transfers of banked water under Section 3.4.

2.5. Transfers of Shortage Allocations. Voluntary transfers of shortage allocations between the SFPUC and any Wholesale Customers, and between any Wholesale Customers, will be permitted using the same procedure as that for transfers of banked water set forth in Section 3.4. The SFPUC and BAWSCA shall be notified of each transfer. Transfers of shortage allocations shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC. Transfers of shortage allocations shall be in compliance with Section 3.05 of the Agreement. The transferring parties will meet with the SFPUC, if requested, to discuss any effect the transfer may have on its operations.

SECTION 3. SHORTAGE WATER BANKING

3.1. Water Bank Accounts. The SFPUC shall create a water bank account for itself and each Wholesale Customer during shortages in conjunction with its resale customer billing process. Bank accounts will account for amounts of water that are either saved or used in excess of the shortage allocation for each agency; the accounts are not used for tracking billings and payments. When a shortage period is in effect (as defined in Section 1.4), the following provisions for bank credits, debits, and transfers shall be in force. A statement of bank balance for each Wholesale Customer will be included with the SFPUC's monthly water bills.

3.2. Bank Account Credits. Each month, monthly purchases will be compared to the monthly budget for that month. Any unused shortage allocation by an agency will be credited to that agency's water bank account. Credits will accumulate during the entire shortage period, subject to potential restrictions imposed pursuant to Section 3.2.1. Credits remaining at the end of the shortage period will be zeroed out; no financial or other credit shall be granted for banked water.

3.2.1. Maximum Balances. The SFPUC may suspend the prospective accumulation of credits in all accounts. Alternatively, the SFPUC may impose a ceiling on further accumulation of credits in water bank balances based on a uniform ratio of the bank balance to the annual water allocation. In making a decision to suspend the prospective accumulation of water bank credits, the SFPUC shall consider the available water supply as set forth in Section 1.1 of this Plan and other reasonable, relevant factors.

3.3. Account Debits. Each month, monthly purchases will be compared to the budget for that month. Purchases in excess of monthly budgets will be debited against an agency's water bank account. Bank debits remaining at the end of the fiscal year will be subject to excess use charges (see Section 4).

3.4. Transfers of Banked Water. In addition to the transfers of shortage allocations provided for in Section 2.5, voluntary transfers of banked water will also be permitted between the SFPUC and any Wholesale Customer, and among the Wholesale Customers. The volume of transferred water will be credited to the transferee's water bank account and debited against the transferor's water bank account. The transferring parties must notify the SFPUC and BAWSCA of each transfer in writing (so that adjustments can be made to bank accounts), and will meet with the SFPUC, if requested, to discuss any affect the transfer may have on SFPUC operations. Transfers of banked water shall be deemed to be an emergency transfer and shall become effective on the third business day after notice of the transfer has been delivered to the SFPUC.

If the SFPUC incurs extraordinary costs in implementing transfers, it will give written notice to the transferring parties within ten (10) business days after receipt of notice of the transfer. Extraordinary costs means additional costs directly attributable to accommodating transfers and which are not incurred in non-drought years nor simply as a result of the shortage condition itself. Extraordinary costs shall be calculated in accordance with the procedures in the Agreement and shall be subject to the disclosure and auditing requirements in the Agreement. In the case of transfers between Wholesale Customers, such extraordinary costs shall be considered to be expenses chargeable solely to individual Wholesale Customers and shall be borne equally by the parties to the transfer. In the case of transfers between the SFPUC and a Wholesale Customer, the SFPUC's share of any extraordinary transfer costs shall not be added to the Wholesale Revenue Requirement.

3.4.1. Transfer Limitations. The agency transferring banked water will be allowed to transfer no more than the accumulated balance in its bank. Transfers of estimated prospective banked credits and the "overdrafting" of accounts shall not be permitted. The price of transfer water originally derived from the SFPUC system is to be determined by the transferring parties and is not specified herein. Transfers of banked water shall be in compliance with Section 3.05 of the Agreement.

SECTION 4. WHOLESALE EXCESS USE CHARGES

4.1. Amount of Excess Use Charges. Monthly excess use charges shall be determined by the SFPUC at the time of the declared water shortage consistent with the calendar in Section 6 and in accordance with Section 6.03 of the Agreement. The excess use charges will be in the form of multipliers applied to the rate in effect at the time the excess use occurs. The same excess use charge multipliers shall apply to the Wholesale Customers and all Retail Customers. The excess use charge multipliers apply only to the charges for water delivered at the rate in effect at the time the excess use occurred.

4.2 Monitoring Suburban Water Use. During periods of voluntary rationing, water usage greater than a customer's allocation (as determined in Section 2) will be indicated on each SFPUC monthly water bill. During periods of mandatory rationing, monthly and cumulative water usage greater than a Wholesale Customer's shortage allocation and the associated excess use charges will be indicated on each SFPUC monthly water bill.

4.3. Suburban Excess Use Charge Payments. An annual reconciliation will be made of monthly excess use charges according to the calendar in Section 6. Annual excess use charges will be calculated by comparing total annual purchases for each Wholesale Customer with its annual shortage allocation (as adjusted for transfers of shortage allocations and banked water, if any). Excess use charge payments by those Wholesale Customers with net excess use will be paid according to the calendar in Section 6. The SFPUC may dedicate excess use charges paid by Wholesale Customers toward the purchase of water from the State Drought Water Bank or other willing sellers in order to provide additional water to the Wholesale Customers. Excess use charges paid by the Wholesale Customers constitute Wholesale Customer revenue and shall be included within the SFPUC's annual Wholesale Revenue Requirement calculation.

SECTION 5. GENERAL PROVISIONS GOVERNING WATER SHORTAGE ALLOCATION PLAN

5.1. Construction of Terms. This Plan is for the sole benefit of the parties and shall not be construed as granting rights to any person other than the parties or imposing obligations on a party to any person other than another party.

5.2. Governing Law. This Plan is made under and shall be governed by the laws of the State of California.

5.3. Effect on Agreement. This Plan describes the method for allocating water between the SFPUC and the collective Wholesale Customers during system-wide water shortages of 20 percent or less. This Plan also provides for the SFPUC to allocate water among the Wholesale Customers in accordance with directions provided by the Wholesale Customers through BAWSCA under Section 2.2, and to implement a program by which such allocations may be voluntarily transferred among the Wholesale Customers. The provisions of this Plan are intended to implement Section 3.11(C) of the Agreement and do not affect, change or modify any other section, term or condition of the Agreement.

5.4. Inapplicability of Plan to Allocation of SFPUC System Water During Non-Shortage Periods. The SFPUC's agreement in this Plan to a respective share of SFPUC system water during years of shortage shall not be construed to provide a basis for the allocation of water between the SFPUC and the Wholesale Customers when no water shortage emergency exists.

5.5. Termination. This Plan shall expire at the end of the Term of the Agreement.. The SFPUC and the Wholesale Customers can mutually agree to revise or terminate this Plan prior to that date due to changes in the water delivery capability of the SFPUC system, the acquisition of new water supplies, and other factors affecting the availability of water from the SFPUC system during times of shortage.

SECTION 6. ALLOCATION CALENDAR

6.1. Annual Schedule. The annual schedule for the shortage allocation process is shown below. This schedule may be changed by the SFPUC to facilitate implementation.

6.1.1

In All Years	Target Dates
1. SFPUC delivers list of annual purchases by each Wholesale Customer during the immediately preceding Supply Year	November 1
2. SFPUC meets with the Wholesale Customers and presents water supply forecast for the following Supply Year	February
3. SFPUC issues initial estimate of available water supply	February 1
4. SFPUC announces potential first year of drought (if applicable)	February 1
5. SFPUC and Wholesale Customers meet upon request to exchange information concerning water availability and projected system-wide purchases	February 1-May 31
6. SFPUC issues revised estimate of available water supply, and confirms continued potential shortage conditions, if applicable	March 1
7. SFPUC issues final estimate of available water supply	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.
8. SFPUC determines amount of water available to Wholesale Customers collectively	April 15th or sooner if adequate snow course measurement data is available to form a robust estimate on available water supply for the coming year.

In Drought Years	Target Dates
9. SFPUC formally declares the existence of water shortage emergency (or end of water shortage emergency, if applicable) under Water Code Sections 350 et. seq.	April 15-31
10. SFPUC declares the need for a voluntary or mandatory response	April 15-31
11. BAWSCA submits calculation to SFPUC of individual Wholesale Customers' percentage shares of water allocated to Wholesale Customers collectively	April 15- 31
12. SFPUC determines individual shortage allocations, based on BAWSCA's submittal of individual agency percentage shares to SFPUC, and monthly water budgets (Default Schedule)	April 25—May 10
13. Wholesale Customers submit alternative monthly water budgets (optional)	May 8-May 24
14. Final drought shortage allocations are issued for the Supply Year beginning July 1 through June 30	June 1
15. Monthly water budgets become effective	July 1
16. Excess use charges indicated on monthly Suburban bills	August 1 (of the beginning year) through June 30 (of the succeeding year)
17. Excess use charges paid by Wholesale Customers for prior year	August of the succeeding year

ATTACHMENT I

NOT USED

ATTACHMENT J

DEFINITIONS AND FORMULAS FOR
CALCULATING PROPORTIONAL ANNUAL WATER USE

TABLE OF CONTENTS

This Attachment contains four sections, three figures, and five tables.

Table 1 presents the format for the water usage and allocation rate calculations for reference and to illustrate the definitions and formulas described in Sections A through C. Tables 2 and 3 list the meters whose locations are shown on Figures 1 and 3, respectively. Table

4 identifies the type of meter and associated metering equipment for the County-line Meters and Terminal Reservoirs. Table 5 identifies the meter calibration and maintenance frequency for the meters and equipment listed in Table 4.

SECTION A. WATER METERS

1. General

The Agreement provides that certain operating and maintenance expenses and the capital cost of certain categories of utility plant in service are to be allocated between San Francisco and the Wholesale Customers on the basis of proportionate annual usage of the Regional Water System. The purpose of this Attachment is to describe the meters and illustrate the method by which proportionate annual usage will be calculated.

2. Units of Measurement, Rounding, Conversion

The SFPUC will compile the usage data required to complete Table 1 annually. The units of measurement and conventions for converting and rounding will be as follows.

The data in the Table 1 will be presented, and the calculations contemplated by this Attachment shown, in units of millions of gallons per day (mgd), rounded to the nearest tenth of an mgd. Percentages (e.g., the City and Wholesale usage rates) shall be carried to two digits to the right of the decimal point and reduction factors shall be carried to four digits to the right of the decimal point. Data compiled by the SFPUC in units of hundreds of cubic feet per year (ccf) shall be converted to mgd by multiplying hundreds of cubic feet per year by 0.0000020493 (or 2.0493×10^{-6}) for non-leap years and 0.0000020437 (or 2.0437×10^{-6}) for leap years.

In rounding, if the rightmost digit dropped is 0 through 4, the preceding digit shall be left unchanged; if the rightmost digit dropped is 5 through 9, the preceding digit shall be increased by 1.

3. Location of Meters/Gauges

The SFPUC presently maintains meters and gauges that have been used to determine the proportionate usage of the Regional Water System, in accordance with the methods and calculations described in Exhibit J to the 1984 contract between San Francisco and the Wholesale Customers. These meters consist of "County-Line Meters," "In-City Terminal Reservoir Meters" and "System Input and In-line Meters" as described in the following subsections. As new capital improvement projects are designed and constructed by the SFPUC, it may be necessary for new meters to be installed to ensure continued accurate determinations of the proportionate usage of the Regional Water System. "Planned meters" are included in the following subsections where planned capital improvement projects are likely to require the installation of additional meters.

a. County-line Meters

The SFPUC presently maintains meters at or near the San Mateo-San Francisco County line to measure flow through all transmission pipelines entering the City ("County-line Meters"). The existing and planned County-line Meters are listed in Table 2 and shown on Figures 1 and 2. Additional details pertaining to the County-line meters located at the Lake Merced Pump Station, and specifically to water deliveries from the pump station to Sunset Reservoir, Sutro Reservoir, and Lake Merced are provided below.

(1) County-Line deliveries to Sunset and Sutro Reservoirs

Water delivered to the City through the Sunset Supply Pipeline may be pumped from the Lake Merced Pump Station to either Sunset Reservoir or Sutro Reservoir located within the City. When water is pumped from the Lake Merced Pump Station to both Sunset and Sutro reservoirs simultaneously, the recording instrumentation on the Sunset and Sutro venturi meters are designed to record flows through both meters. When water is pumped to Sutro Reservoir only (typically utilizing Pump No. 4 at the

Lake Merced Pump Station), the source water is from the Sunset Reservoir (not the County-line), and the direction of flow through the Sunset venturi meter is reversed. Under this pumping scenario, the recording instrumentation on the Sunset and Sutro venturi meters are designed to not record flow on their respective recorders such that the in-City transfer of water between Sunset and Sutro Reservoirs is not included as a County-line delivery to the City. Figure 2 provides a generalized schematic of the Lake Merced Pump Station and the typical direction of flow from the County-line, through the pump station.

(2) <u>County-line deliveries to Lake Merced</u>
In order to raise and maintain water levels in Lake Merced, the SFPUC occasionally delivers water directly from the Regional Water System to Lake Merced. Deliveries from the Regional Water System to Lake Merced are accomplished at the Lake Merced Pump Station. The procedure involves operating valves on the suction side of Sunset Pump No. 2 such that water may flow by gravity in the Sunset Supply Pipeline, from San Mateo County, across the County-line and into San Francisco, through Lake Merced Pump Station and into the Lake Merced wet well. A 16-inch pipeline connection on the suction side of Sunset Pump No. 2 allows for deliveries of water to the wet well (see Figure 2). Water deliveries from the Regional Water System to Lake Merced are considered County-line deliveries and an in-City usage in the calculation of water allocation rates.

b. <u>In-City Terminal Reservoirs</u>

Water usage by the City includes water deliveries from the SFPUC's "terminal reservoirs." The terminal reservoirs are: 1) Sunset Reservoir, 2) University Mound Reservoir, and 3) Merced Manor Reservoir. The terminal reservoirs are shown on Figure 1.

c. <u>System Input and In-Line Meters</u>

The SFPUC presently measures water flow into and through the Regional System utilizing "System Input and In-Line Meters." The existing and planned System Input and In-Line Meters are listed in Table 3 and shown on Figure 3.

d. <u>Wholesale Customer Meters and City Retail Customer Meters Located Outside the Boundaries of the City</u>

The SFPUC presently measures water deliveries from the Regional Water System to its Wholesale Customers at various locations where the water delivery systems of the individual Wholesale Customers tie into the Regional Water System. The meters at these locations are referred to as the Wholesale Customers' "master meters." The SFPUC also measures water deliveries from the Regional Water System to other customers located outside of the boundaries of the City that are not Wholesale Customers. Water deliveries to the Wholesale Customers and Retail Customers outside the City's boundaries that receive water from the Regional Water System are accounted for by the SFPUC's Customer Service Division as described in Section B.

4. <u>Replacement and Relocation of Meters, Gauges, and Recording Devices</u>.

The SFPUC presently equips all of its large venturi meters with differential pressure transmitters. The smaller meters utilize other methods and equipment to register and record flows. The SFPUC will maintain the meters, gauges, and recording devices described above in subsections (a), (b), (c), and (d) unless and until such meters, gauges, and recording devices are replaced.

The SFPUC may replace the meters, gauges, and recording devices described above in subsections (a), (b), (c), and (d) or install new meters, gauges, and recording devices at new locations, provided that such changes do not diminish the accuracy of the water flow measurements or impair the ability of the SFPUC to separate direct City water use from water use by the wholesale customers. Maintenance and calibration procedures for new or replaced equipment may change. Modified maintenance and calibration procedures for new or replaced equipment will conform to industry standards set forth in AWWA Manual M33, the applicable standards in the International Society of Automation, and will implement the manufacturer's instructions for maintenance and calibration. The SFPUC will provide BAWSCA with advance written notice of any such changes, together with a brief explanation of the reasons therefor and a description of the type and location of the replacement. Such notice shall automatically amend the list of meters, gauges, and recording devices set forth above in subsections (a), (b), (c), and (d).

5. Recording of Water Flow Data

a. Flow Data

The City shall record and maintain data measuring base water flow throughout the SFPUC Regional Water System as necessary to determine proportional annual water usage.

b. Reservoir Data

The SFPUC shall record and maintain data measuring the levels of the terminal reservoirs described above in subsection A.3.b and shown on Figure 1 on an hourly basis. Flow values derived from reservoir level readings for all reservoirs in the SFPUC wholesale system shall be calculated using the tables contained in the SFPUC publication "Reservoir Data" (aka "The Weir Book"), which set forth the relationship between reservoir levels and water volumes, as such tables may be amended from time to time to reflect changes in the volumes of the various reservoirs. The tables to be used initially shall be those from the current edition of The Weir Book.

SECTION B. CALCULATION OF PROPORTIONAL ANNUAL USAGE

"Base rates" means the percentages of annual SFPUC deliveries attributed to the Wholesale Customers and to City Retail Customers.

The percentage of annual SFPUC metered deliveries attributed to the Wholesale Customers (i.e., the wholesale base rate) shall be calculated for each fiscal year as described below and illustrated in Table 1. The item numbers listed below correspond to the item numbers listed in Table 1.

(1) "Gross San Francisco County line base deliveries" shall equal the total amount of water flowing into the City's distribution system through transmission pipelines entering the City, as measured by the County-Line Meters described in Section A.3.a. and shown on Figures 1 and 2.

(2) "Daly City base deliveries" shall equal the water flowing to Daly City through meter accounts provided downstream of the County-Line meters or through SFPUC's City Distribution Division. At present these accounts are:

 (a) CSPL1/Macdonald Avenue Service (Account number 010084-01-0)
 (b) Guttenberg Street Service (Account number 010013-01-3)
 (c) Carter Street Service (Account numbers 284070-01-8 and 284071-01-6)

These accounts represent a portion of the total deliveries to Daly City. The quantities of water delivered to these four Daly City accounts are reported monthly in Form MGT441 by the SFPUC's Customer Service Division. These connections to meters are presently located within the City, and thus record water which has already been recorded by the SFPUC's master meters at the County line. So long as this condition continues, Daly City base deliveries shall be subtracted from "Gross San Francisco County line base deliveries."

(3) "Net San Francisco base deliveries" shall equal the result of subtracting "Daly City base deliveries" from "Gross San Francisco County line base deliveries."

(4) "Other suburban raw water base deliveries" shall equal the sum of all deliveries of raw (untreated) water to customers of the SFPUC located outside the City other than deliveries to the Wholesale Customers. "Other suburban raw water base deliveries" include deliveries of raw water in Alameda and San Mateo Counties to SFPUC Retail Customers, City departments and commissions, and other users affiliated with San Francisco.

(5) "Other suburban treated water base deliveries" shall equal the sum of all deliveries of treated water to customers of the SFPUC located outside the City other than deliveries to the Wholesale Customers. Other suburban treated water base deliveries include deliveries of treated water to the SFPUC's Retail Customers in San Mateo, Santa Clara and Alameda Counties (such as NASA Ames Research Center and LLNL), to City departments and commissions and other users affiliated with San Francisco (such as the San Francisco International Airport, the San Francisco County Jail, and tenants of land owned by the City Recreation and Park Department).

(6) "Other suburban base deliveries" shall equal the sum of "Other suburban raw water deliveries" and "Other suburban treated water deliveries." The combined amount of raw and treated water delivered to suburban entities other than the Wholesale Customers is reported monthly in Form MGT440 by the SFPUC's Customer Service Division.

(7) "Total City base usage" shall equal "Net San Francisco base deliveries" plus "Other suburban base deliveries."

(8) "Total wholesale base usage" shall equal the sum of all metered deliveries to the Wholesale Customers measured at their SFPUC master meters (including all deliveries to Daly City which are comprised of deliveries through meters located outside San Francisco and meters located inside San Francisco, deliveries through the latter of which are designated above in paragraph B.1.2 as "Daly City base

deliveries"). The quantity of water delivered to the individual Wholesale Customers, and the combined amount of water delivered to all Wholesale Customers is reported monthly in Form MGT440 by the SFPUC's Customer Service Division.

(9) "Total system base usage" shall equal "City base usage" plus "Wholesale base usage."

(10) "Wholesale base rate" shall equal the percentage obtained by dividing "Wholesale base usage" by "Total system base usage."

(11) "City base rate" shall equal the percentage obtained by subtracting "Wholesale base rate" from 100 percent.

(12) "Base system input" shall equal all amounts of water supplied to the SFPUC Regional Water System, which presently comes from the following sources:

(a) Hetch Hetchy water as measured at the venturi meters on the 58–inch, 61-inch, and 78.5-inch San Joaquin Pipeline Nos. 1, 2, and 3 near Oakdale.

(b) Water supplied by HHWPD to LLNL as measured at the customer meter. Water delivered from the system to LLNL shall be deemed negative in sign for the purpose of determining "Base system input."

(c) Hetch Hetchy water pumped from the Alameda siphons to San Antonio Reservoir as measured at the venturi meter on the 60-inch San Antonio pipeline. Water delivered from the system to San Antonio Reservoir shall be deemed negative in sign for the purpose of determining "Base system input."

(d) Sunol Valley Water Treatment Plant as measured at the meter on the 78-inch effluent pipeline.

(e) Harry Tracy Water Treatment Plant as measured at the venturi meters on the 60-inch and 78-inch effluent pipelines.

(f) Raw water deliveries to all SFPUC Retail Customers outside the City boundaries as measured at the customer meter. These deliveries are considered positive for the purposes of Table 1. Currently, raw water deliveries to the system are represented by the following account numbers contained in Form MGT440 prepared by the SFPUC's Customer Service Division:

266081-01-7 (Calaveras Nursery)
266081-02-5 (Calaveras Nursery)
264355-01-7 (Caltrans)
266084-02-9 (Color Spot Nursery)
272701-02-0 (Color Spot Nursery)
266069-02-0 (Crystal Springs Golf Course)
266078-02-1 (Dell Franklin)
266078-01-3 (Dells Nursery)
266084-01-1 (Hi-C Nursery)
272701-01-2 (Hi-C Nursery)
284112-01-8 (Hansen Aggregates)
266084-03-7 (Jeff Anhorn Nursery)
272701-03-8 (Jeff Anhorn Nursery)
266079-02-9 (Mission Valley Rock)
281043-01-8 (Mission Valley Rock)
267618-02-3 (Nagata Farms)
267618-01-5 (Nagata Farms)
266090-01-8 (Naka Nursery)

266091-01-6 (Naka Nursery)
266090-02-6 (Naka Nursery)
266091-02-4 (Naka Nursery)
264315-02-9 (Pacific Nurseries)
266076-01-7 (Sunol Christmas Tree Farm)
266076-02-5 (Sunol Tree Farm)
276095-01-5 (Sunol Valley Golf & Recreation)
266077-02-3 (Ura Farm)
264352-01-4 (Ura, John)
266075-01-9 (Valley Crest)
268276-01-1 (Valley Crest Nursery)
266093-01-2 (Valley Crest Tree Company)
268426-02-0 (Valley Crest Tree Company)
266075-02-7 (Valley Crest Tree Company)
266093-02-0 (Valley Crest Tree Company)
268276-02-9 (Valley Crest Tree Company)
266082-01-5 (Western Star Nursery)
266089-01-0 (Western Star Nursery)
267254-02-7 (Western Star Nursery)
266082-02-3 (Western Star)
266089-02-8 (Western Star)
267254-03-5 (Western Star)

(g) Raw water deliveries from Pilarcitos Reservoir and Crystal Springs Reservoir to Coastside County Water District as measured at the customer meters. These deliveries are considered positive for the purposes of Table 1. Currently, raw water deliveries to Coastside County Water District from both reservoirs are represented under account number 010027-01-9 contained in Form MGT441 prepared by the SFPUC's Customer Service Division:

(h) Crystal Springs Balancing Reservoir. The flow into or out of the Crystal Springs Balancing Reservoir shall be calculated based on the changes in the amounts of water stored in the reservoir. The amounts of water stored shall be determined by the use of water level sensors, and the application of water level readings to a water level-storage capacity table. Decreases in storage, which indicate a flow from the Balancing Reservoir into the system, shall be deemed positive in sign. Increases in storage, which indicate a flow into the Balancing Reservoir from the system, shall be deemed negative in sign. Over the period of a year, the total flows into and out of Crystal Springs Balancing Reservoir are nearly equivalent. As such, total system input from Crystal Springs Reservoir shall be deemed zero for calculating current base rates.

(i) Deliveries to Crystal Springs Reservoir as measured by the overflow weir at the Pulgas Pump Station. Deliveries from the system to Crystal Springs Reservoir ("spills") shall be deemed negative in sign for the purpose of determining "Base system input."

(j) Terminal Reservoirs. The "terminal reservoirs" consist of Sunset Reservoir, University Mound Reservoir, and Merced Manor Reservoir, each located within the City of San Francisco. The flow into or out of the terminal reservoirs shall be calculated based on the changes in the amounts of water stored in them. The amounts of water stored shall be determined by the use of water level sensors, and the application of water levels to water level-storage capacity tables. Over the period of a year, the total flows into and out of terminal reservoirs are nearly equivalent. As such, total system input from the terminal reservoirs shall be deemed zero for calculating base rates.

(k) Other Sources. Other sources of flow into, or from, the Regional Water System, shall be accounted for as "other sources." Examples of other sources of system input would include intertie water deliveries between the Regional System and the Santa Clara Valley Water District, and between the Regional System and the East Bay Municipal Utilities District, and deliveries of raw water from Crystal Springs Reservoir in the event of an emergency. Flows from the system shall be deemed negative in sign for the purpose of determining "Base system input."

(13) "Total base system input" shall equal the sum of the system inputs from the sources described in paragraph B.1.12.

(14) "Joint system loss reduction factor" shall equal "Total system base usage" divided by "Total base system input." "Joint system loss reduction factor" shall not exceed 1.0.

(15) "Daly City reduction factor" shall equal "Net San Francisco base deliveries" divided by "Gross San Francisco County line base deliveries." "Daly City reduction factor" shall not exceed 1.0.

(16) "Total suburban base deliveries" shall equal "Other suburban base deliveries" plus "Total wholesale base usage."

(17) "Suburban reduction factor" shall equal "Wholesale base usage" divided by "Total suburban base deliveries." "Suburban reduction factor" shall not exceed 1.0.

(18) "HHWPD Deliveries above Oakdale" shall equal the total amount of water delivered by the HHWPD to users located above the system input meters in Oakdale. Water users located above the system input meters in Oakdale are currently represented by Groveland Community Services District and the HHWPD facility at Moccasin.

(19) "HH Reduction Factor" is calculated for the purpose of determining the Wholesale Customers' share of the Hetch Hetchy Assessment. The factor shall equal a fraction, the numerator of which is the total system input measured at the Oakdale meters (Table 1, line 12.a) and the denominator of which is the sum of the total system input measured at the Oakdale meters (Table 1, line 12.a) plus the total "HHWPD deliveries above Oakdale" (Table 1, line 18).

SECTION C. DATA REQUIREMENTS AND SCHEDULE

1. Collection and Dissemination of Data

The SFPUC presently compiles daily flow data for the County-line meters, System Input and In-Line Meters, and daily reservoir water level data, and provides copies of that data to the Wholesale Customers (through BAWSCA) on a monthly basis. The SFPUC also provides copies of wholesale "Suburban Resale" and City Retail water usage data to BAWSCA on a monthly basis. Additionally, the SFPUC provides BAWSCA access to flow data for the meters as reported and recorded by the SFPUC's SCADA system.

The SFPUC shall continue to provide the flow and water usage data described above to BAWSCA on a monthly basis, and shall continue to allow BAWSCA access to the SCADA system data, so that a coordinated effort between the SFPUC and BAWSCA will allow for updating Table 1 of this Attachment annually on a timely basis.

It shall continue to be the SFPUC's responsibility to compile the data necessary to update Table 1 of this Attachment annually and the City shall deliver to BAWSCA, for review and approval, copies of the updated Table 1 by September 15 for the fiscal year ending the preceding June 30, as shown by the schedule contained in Section C.3.

Upon reasonable notice to the General Manager of the SFPUC, BAWSCA shall be given access to all water flow and usage records compiled by the SFPUC, including raw data, at reasonable times during business hours and shall have the right to copy such records and data at its expense.

2. Lack of Data

The parties recognize that, because of human error, mechanical failure, or other unplanned events, portions of the data required for the calculation of the usage rates and ratios described in Sections B and C of this Attachment occasionally may be unavailable or incorrect. In the event that such data are unavailable or inaccurate, the SFPUC shall make a reasonable estimate of the unavailable or incorrect data or use the most accurate alternative data that are available, and substitute the estimate therefor.

If the SFPUC uses an estimate of the unavailable or inaccurate data or alternative data, it shall provide BAWSCA with the following:

(1) a description of the unavailable or inaccurate data and the estimation or substitution of data used therefor;

(2) an explanation of the cause of the missing or inaccurate data and the reasons underlying the SFPUC's estimation or substitution of alternate data; and

(3) a statement of how the error or malfunction that caused the unavailability or inaccuracy of the data will be avoided in the future.

The SFPUC shall provide this information to BAWSCA upon calculation by the SFPUC of the usage rates and ratios described in this Attachment for the fiscal year in question.

3. <u>Schedule for Completing the Annual Calculations of Water Usage Rates</u>

The parties recognize the importance of updating Table 1 of this Attachment annually in a timely manner, and that historically, doing so has required a coordinated effort between the SFPUC and BAWSCA. To assure timely completion of the annual calculations of water usage rates and ratios, the parties agree to adhere to the following schedule.

(1) By August 15: The SFPUC shall forward to BAWSCA all data for the fiscal year ending the preceding June 30, necessary to make a determination of the base water usage and base allocation rates for the Wholesale Customers and the City.

(2) By September 15. The City shall deliver to BAWSCA, for review and approval, draft copies of the updated Table 1 for the fiscal year ending the preceding June 30.

(3) Between September 15 and October 15. The SFPUC and BAWSCA shall reconcile any discrepancies or inaccuracies in the draft calculations of water usage rates and shall reach agreement on a final updated Table 1 for the fiscal year ending the preceding June 30.

(4) By November 1. The SFPUC shall deliver to BAWSCA a finalized updated Table 1, signed by the SFPUC General Manager, or appropriate designee, representing the water usage rates agreed upon by the SFPUC and BAWSCA, for the fiscal year ended June 30.

(5) By November 15. BAWSCA shall return the finalized Table 1 to the SFPUC, counter-signed by the BAWSCA General Manager/CEO. If the SFPUC does not receive the countersigned Table 1 from BAWSCA by November 15, it may use the water use data as contained in the Table 1 delivered pursuant to paragraph (4) above, subject to arbitration as provided in section 8.01 of the Agreement.

SECTION D. COUNTY LINE AND IN-CITY TERMINAL RESERVOIR METER CALIBRATION AND MAINTENANCE

1. General

This section refers only to the County-Line and In-City Terminal Reservoir Meters. The term "meter(s)" includes the primary meter itself (most of the primary meters in the SFPUC's water system are Venturi-type flow meters) as well as any and all of the associated equipment used to measure, record, and transmit flow and water level data. The metering equipment associated with the primary metering device (also referred to as the secondary metering equipment) includes differential pressure transmitters, recorders, telecommunications equipment and the portion of the SFPUC's Supervisory Control and Data Acquisition (SCADA) System that is used to transmit flow and water level measurements from the water meter to the computer terminal that records the measured data.

The County-Line and In-City Terminal Reservoir meters, their general locations, and their associated metering equipment are listed in Table 4.

2. Frequency and Type of Work to be Performed

The meters, water level sensors, and associated metering equipment are to be inspected, tested, calibrated, and maintained according to the applicable meter calibration and maintenance frequency specified in Table 5.

3. Components of the Calibration and Maintenance Work

The SFPUC will contract with an independent metering consultant to perform periodic inspections, testing, servicing and calibrations of the meters and metering equipment for the County-line meters and In-City Terminal Reservoirs. The metering consultant's calibration and maintenance work will include the following components:

- Annual Pitot Tube Tests: Pitot tube flow tests shall be performed once a year on all Venturi-type flow meters. See Sections 4.b and 4.c for further detail.

- Quarterly Secondary Meter Equipment Testing and Calibration: The secondary metering equipment shall be tested for accuracy and calibrated quarterly at five input levels (0%, 25%, 50%, 75% and 100% of the full range of flow). See Section 4.a for further detail.

- Cleaning: Clean and remove dust, oils, dirt, etc. from all instruments.

- Flushing: Flush and clean Venturi tube differential pressure (D/P) sensing lines.

- Inspecting: Inspections for mechanical fatigue, leaky pipes and fittings, worn parts, and improper operation of electrical/electronic equipment.

- Lubrication: Mechanical parts shall be lubricated as needed.

4. Calibration Procedures

The metering consultant shall continue to calibrate and maintain the County-line meters and metering equipment listed in Table 4 in accordance with the frequency of work specified in Table 5. The work includes documenting meter readings and accuracy before and after calibration. Specific tasks to be completed by the metering consultant are as follows:

a) Quarterly testing and calibration. The secondary metering equipment shall be tested and calibrated quarterly using NIST Traceable test equipment, and a "dead weight tester."

The system loop error for the secondary metering equipment is determined by connecting its output to the differential pressure transmitter and adjusting the dead weight tester to 5 places over the full range of flow: 0%, 25%, 50%, 75% and 100%, while all instruments in the loop are connected. For water level transmitters, provide simulated test head equal to full range of the transmitter being calibrated, comparing the simulated test head to its 4-20 milliamp output signal to determine transmitter error and calibration requirements. The system loop error for the secondary metering equipment may not exceed +/-2%. The individual components of the secondary metering equipment shall also be tested at the same 5 input levels and calibrated as necessary to ensure the error of the system and individual components does not exceed +/- 2%.

b) Annual Pitot Tube Testing and Calibration. Annual Pitot tube testing shall be conducted for a comparison of flow totalized by the Pitot tube test equipment and the totalizer used by the SFPUC for water measurement and billing purposes. Annual Pitot tube flow testing shall be performed on all flow meters for assessment of Venturi error using the Annubar continuous flow method at 22% of the pipe radius. Pitot tube flow testing must be conducted continuously for a minimum of 30 minutes per test.

The Pitot tube flow tests are first performed before any of the secondary metering instruments are calibrated to determine the total system error (system consisting of the primary metering device and secondary metering equipment). Once the total system loop error has been established, perform secondary loop instrument testing and calibration as per the quarterly testing and calibration procedures described in 4.a above. If the total system error exceeds +/- 2% after calibration of the secondary metering equipment, minor adjustments to the differential pressure transmitter shall be made to correct (calibrate) the error in the Venturi meter. Repeat Pitot tube testing must be performed after the individual instrument calibration and differential pressure transmitter adjustments have been performed to establish that total system loop error is within +/- 2%.

c) Pitot tube testing shall be conducted at a flow rate representing the typical flow for the meter (and, if operationally possible, at three different flows ranging from a minimum to near maximum capacity flow).

d) The metering consultant shall perform the meter testing and calibration procedures utilizing the meter characteristic curves (for example, the pressure drop vs. flow for a Venturi meter) that have been obtained during previous meter calibration and maintenance work.

e) During each quarterly site visit, the metering consultant shall inspect, assess and document the condition of all metering equipment, including meter, gauges, indicators, recorders, transmitters and other instrumentation, used in the measurement and recording of flow rates and cumulative flow totals and shall document all operational problems with the calibration instruments and meters during the calibration process. Problems may include air entrainment, leakage, flow disturbance and unstable meter readings.

f) Prior to each quarterly site visit, the metering consultant shall review prior calibration records and reports for each meter to determine if previously-identified errors or equipment deficiencies were corrected as previously recommended.

g) Each quarter, the metering consultant shall submit a final report (See Section 6) containing all of the calibration results for each meter tested and calibrated during the quarter. The metering consultant's report shall include a narrative description of the work conducted on each meter and meter calibration reports for the individual metering equipment. The quarterly report shall also address deficiencies that were not previously corrected according to the recommendations made in the prior report.

5. Calibration Instruments

The instrument used for flow testing of the primary meter (Venturi) must meet the accuracy standards required by the American Water Works Association (AWWA), and be capable of measuring actual flows with an error of less than +/- 2%. If a particular calibration instrument is not rated for accuracy by the AWWA, its accuracy will be determined by reference to its manufacturer's representations as to accuracy.

6. Calibration Reports

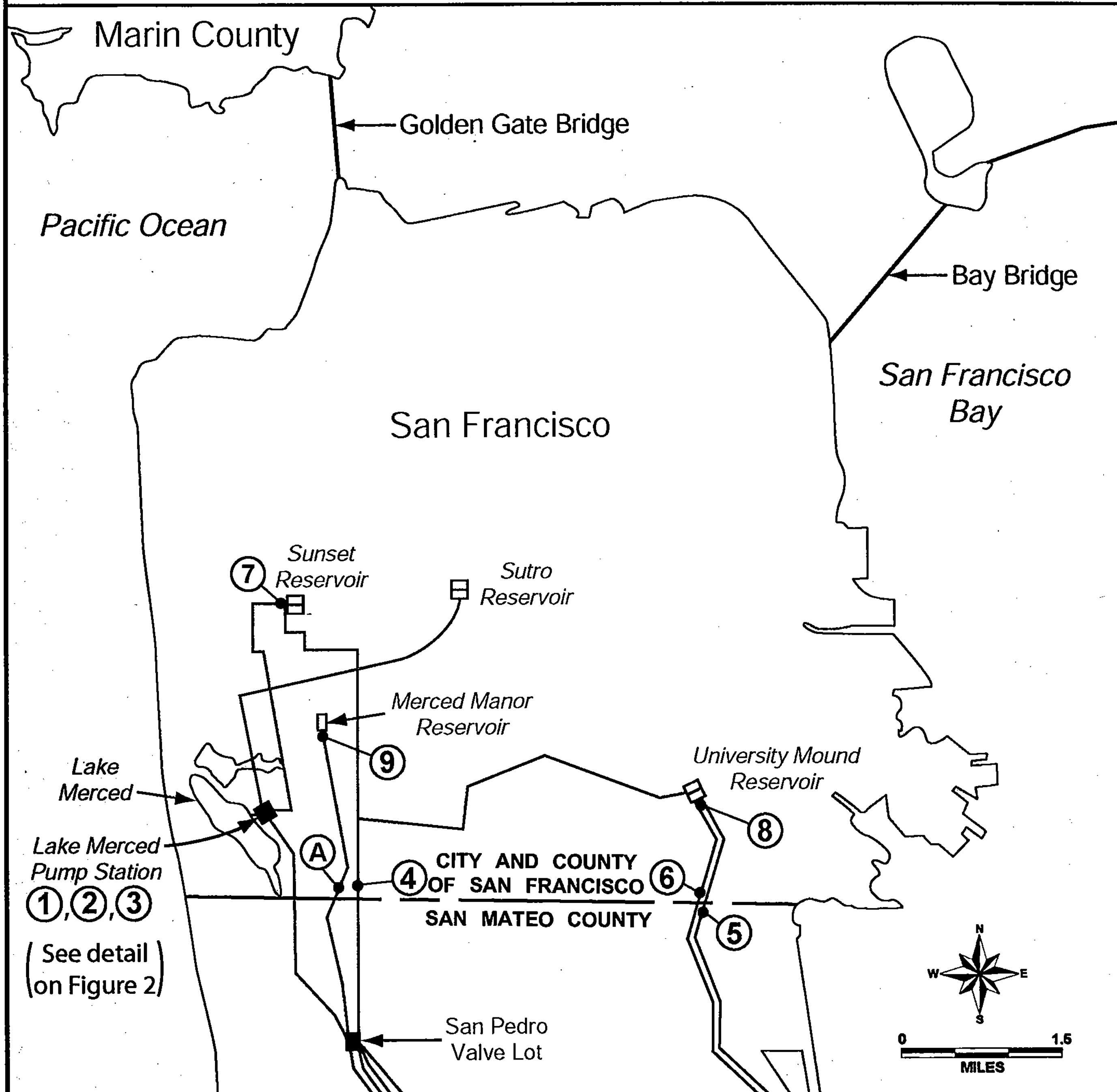
Within fourteen (14) working days after the beginning of each quarter, the metering consultant shall submit a written progress report of the work performed during the previous quarter. Each quarterly report will describe the results of the meter calibrations and any other tasks performed. The report will also include comments regarding any observations of abnormal conditions and any recommendations regarding these meters and their related equipment.

The reports must include complete descriptions and status of meters and related equipment, dates and times of service, all calibration specifics, pipeline dimensions, range of flow rates and totalized volumes, before and after error analysis and accuracy levels achieved, testing equipment used, and the name(s) of the person(s) that performed the work.

When appropriate and necessary, the metering consultant shall provide recommendations for improving the accuracy and reliability of the equipment and/or the methods of data collection. If, in the opinion of the metering consultant, the condition of a meter or its associated metering equipment is found to be defective, damaged, or otherwise in need of immediate repair or replacement, the metering consultant shall: 1) promptly notify the appropriate SFPUC personnel of the problem and recommend a solution to the problem so that the SFPUC can determine how to address it and, 2) include the problem description in its quarterly report.

FIGURE 1

Locations of SFPUC County-Line Meters and In-City Terminal Reservoirs



METER	PIPELINE	LOCATION
1	Sunset	Lake Merced Pump Station
2	Sutro	Lake Merced Pump Station
3	Lake Merced Outfall	Lake Merced Pump Station
4	San Andreas No. 2	Junipero Serra (Hwy. 280) South of Belle Ave.
5	Crystal Springs No. 1	PG&E Martin Service Center Yard
6	Crystal Springs No. 2	Tamasco Ct. South of Sunnydale Ave.
A	San Andreas No. 3 (Planned)	To be determined

METER	RESERVOIR	LOCATION
7	Sunset Reservoir	26th Avenue and Ortega
8	University Mound Reservoir	University Avenue and Bacon
9	Merced Manor Reservoir	23rd Avenue and Ocean

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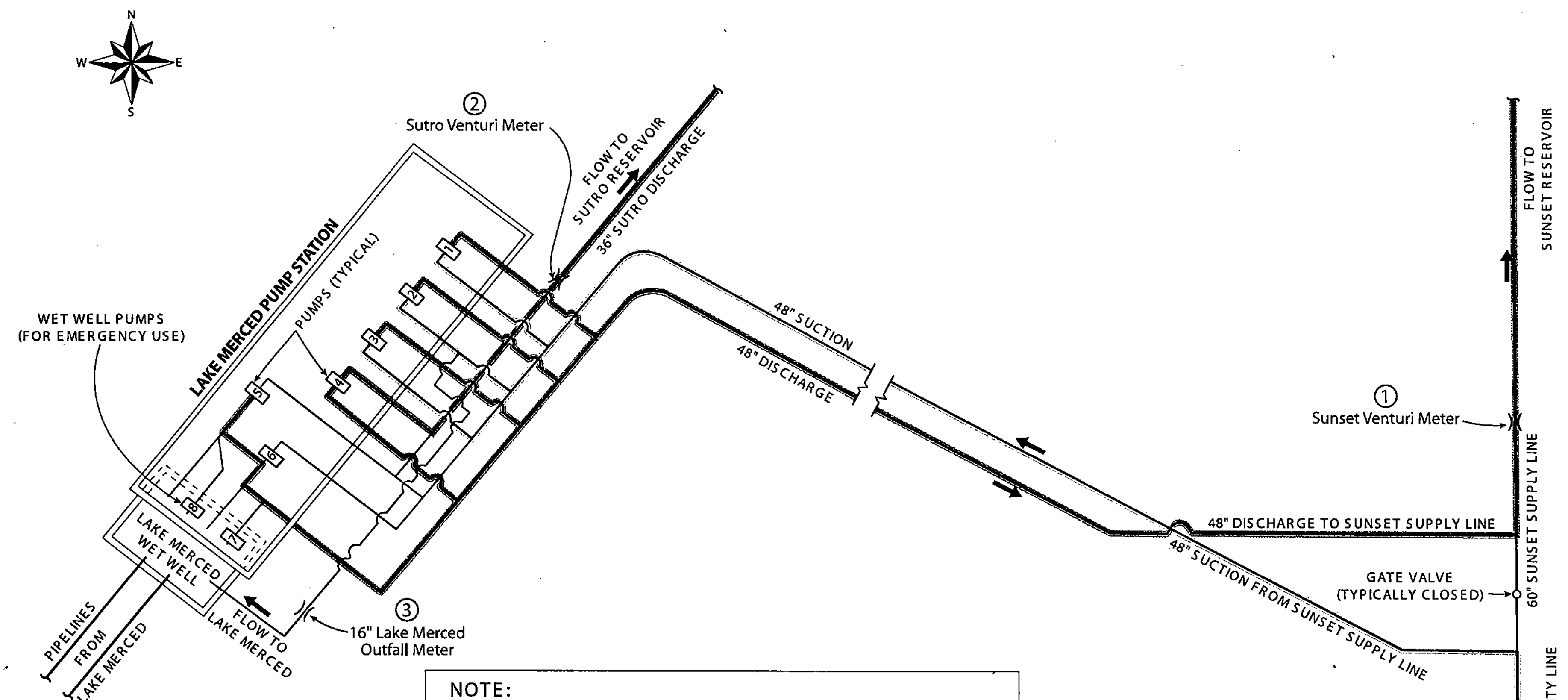
JobFolder/2175/Figure 2(122308)draft.ai

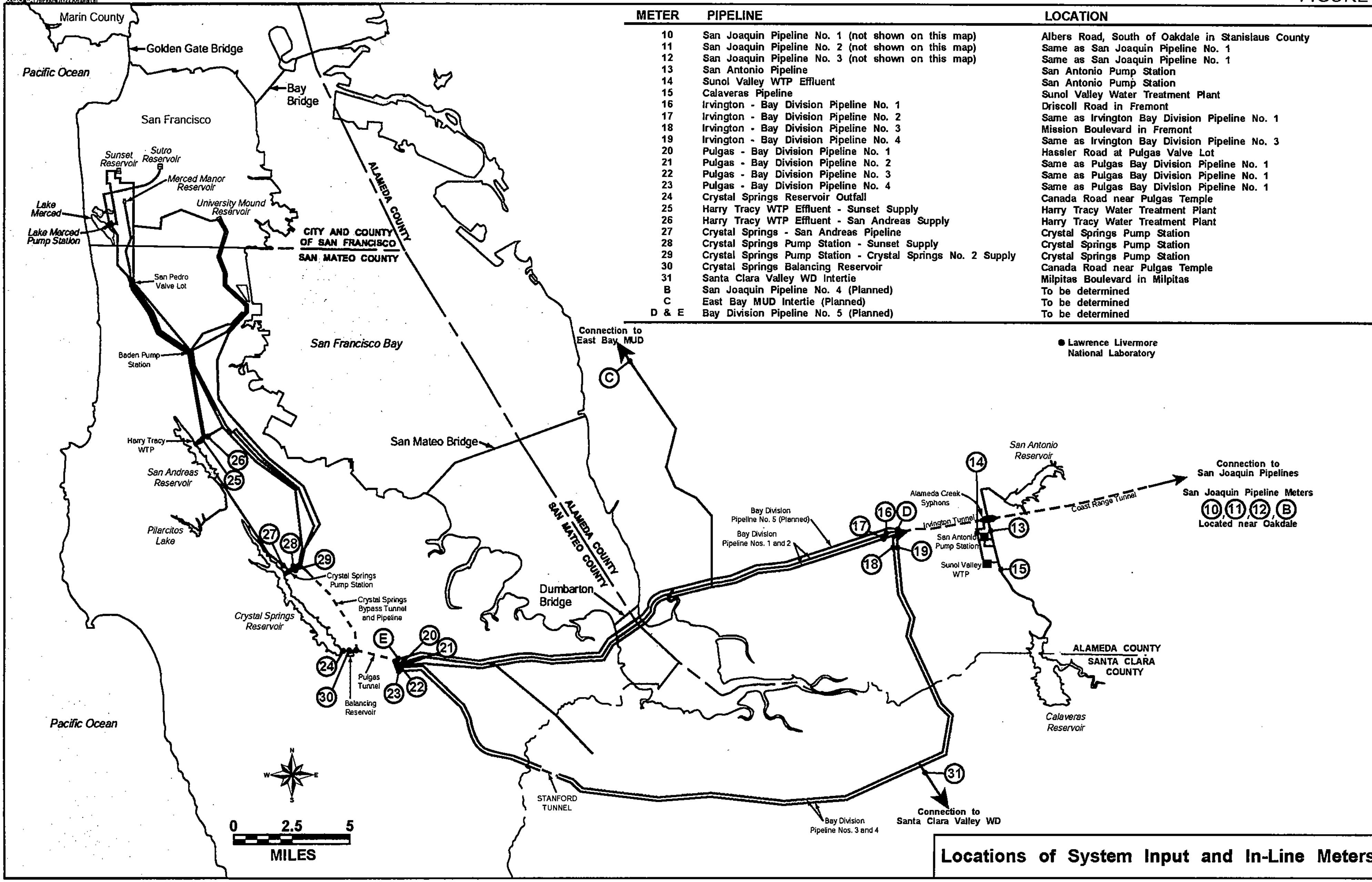


NOTE:
Water enters Lake Merced Pump Station from the Sunset supply line (pipeline highlighted in yellow) and is discharged from the Sunset Pumps (numbered 1, 2, and 3) to Sunset Reservoir located in San Francisco, or to the suction side of the Sutro Pumps (numbered 4, 5, and 6). Sutro Pump Nos. 5 and 6 are typically on standby. Sutro Pump No. 4 delivers water from the pump station to Sutro Reservoir located in San Francisco. Deliveries from the SFPUC water system to Lake Merced are accomplished by gravity through the 16-inch pipeline that connects to the suction side of Sunset Pump No. 2.

Generalized Schematic of Lake Merced Pump Station

FIGURE 2

FIGURE 3



METER	PIPELINE	LOCATION
10	San Joaquin Pipeline No. 1 (not shown on this map)	Albers Road, South of Oakdale in Stanislaus County
11	San Joaquin Pipeline No. 2 (not shown on this map)	Same as San Joaquin Pipeline No. 1
12	San Joaquin Pipeline No. 3 (not shown on this map)	Same as San Joaquin Pipeline No. 1
13	San Antonio Pipeline	San Antonio Pump Station
14	Sunol Valley WTP Effluent	San Antonio Pump Station
15	Calaveras Pipeline	Sunol Valley Water Treatment Plant
16	Irvington - Bay Division Pipeline No. 1	Driscoll Road in Fremont
17	Irvington - Bay Division Pipeline No. 2	Same as Irvington Bay Division Pipeline No. 1
18	Irvington - Bay Division Pipeline No. 3	Mission Boulevard in Fremont
19	Irvington - Bay Division Pipeline No. 4	Same as Irvington Bay Division Pipeline No. 3
20	Pulgas - Bay Division Pipeline No. 1	Hassler Road at Pulgas Valve Lot
21	Pulgas - Bay Division Pipeline No. 2	Same as Pulgas Bay Division Pipeline No. 1
22	Pulgas - Bay Division Pipeline No. 3	Same as Pulgas Bay Division Pipeline No. 1
23	Pulgas - Bay Division Pipeline No. 4	Same as Pulgas Bay Division Pipeline No. 1
24	Crystal Springs Reservoir Outfall	Canada Road near Pulgas Temple
25	Harry Tracy WTP Effluent - Sunset Supply	Harry Tracy Water Treatment Plant
26	Harry Tracy WTP Effluent - San Andreas Supply	Harry Tracy Water Treatment Plant
27	Crystal Springs - San Andreas Pipeline	Crystal Springs Pump Station
28	Crystal Springs Pump Station - Sunset Supply	Crystal Springs Pump Station
29	Crystal Springs Pump Station - Crystal Springs No. 2 Supply	Crystal Springs Pump Station
30	Crystal Springs Balancing Reservoir	Canada Road near Pulgas Temple
31	Santa Clara Valley WD Intertie	Milpitas Boulevard in Milpitas
B	San Joaquin Pipeline No. 4 (Planned)	To be determined
C	East Bay MUD Intertie (Planned)	To be determined
D & E	Bay Division Pipeline No. 5 (Planned)	To be determined

Locations of System Input and In-Line Meters

Table 1
Base Usage (mgd) and Allocation Rates

(1) Usage	(2) Definition	(3) 2004-05	(4) 2005-06	(5) 2006-07	(6) 2007-08	(7) 2008-09	(8) 2009-10
1. Gross S.F. Co. line	B.1	79.5	78.3	75.7			
2. Daly City portion	B.2	0.2	0.2	0.2			
3. Net S.F.	(1-2)	79.3	78.1	75.5			
4. Other suburban raw water	B.4	0.4	0.5	0.7			
5. Other suburban treated water	B.5	4.1	3.4	3.9			
6. Total other suburban	(4+5)	4.5	3.9	4.6			
7. Total City usage	(3+6)	83.8	82.0	80.1			
8. Total wholesale usage	B.8	167.4	164.4	175.8			
9. Total system usage	(7+8)	251.2	246.4	255.9			
10. Wholesale alloc. rate	(8/9)	66.63%	66.72%	68.70%			
11. City alloc. rate	(100%-10)	33.37%	33.28%	31.30%			
12a. HHWPD input (Oakdale)	B.12	194.7	202.6	227.3			
12b. Deliveries to LLNL	B.12	-0.4	-0.9	-0.9			
12c. HH to San Ant. Res.	B.12	-3.8	-1.8	-11.6			
12d. Sunol Valley WTP	B.12	28.5	29.4	17.6			
12e. Harry Tracy WTP	B.12	45.2	40.4	41.2			
12f. Raw water deliveries	B.12	0.4	0.4	0.7			
12g. Deliveries to Coastside Co. WD	B.12	1.8	1.6	2.1			
12h. Crys. Sprs. Bal. Res.	B.12	0.0	0.0	0.0			
12i. Spill to CS Res.	B.12	-19.9	-42.6	-37.1			
12j. Terminal Reservoirs	B.12	0.0	0.0	0.0			
12k. Other sources	B.12	0.0	1.9	3.8			
13. Total system input	B.13	246.5	231.0	243.1			
14. Jt. sys. loss red. fact.	(9/13)	1.0000	1.0000	1.0000			
15. Daly City red. factor	(3/1)	0.9975	0.9974	0.9974			
16. Total suburban	(6+8)	171.9	168.3	180.4			
17. Suburban red. factor	(8/16)	0.9736	0.9768	0.9745			
18. HHWPD Deliveries above Oakdale	B.18						
19. HH Reduction Factor	B.19	99.56%					

Table 2
Locations of SFPUC County-Line Meters and In-City Terminal Reservoirs

County-Line Meters

Meter	Pipeline	Location
1	Sunset	Lake Merced Pump Station
2	Sutro	Lake Merced Pump Station
3	Lake Merced Outfall	Lake Merced Pump Station
4	San Andreas No. 2	Junipero Serra (Hwy. 280) South of Belle Ave.
5	Crystal Springs No. 1	PG&E Martin Service Center Yard
6	Crystal Springs No. 2	Tamasco Ct. South of Sunnydale Ave.
A	San Andreas No. 3 (Planned)	To be determined

In-City Terminal Reservoirs

Meter	Reservoir	Location
7	Sunset Reservoir	26th Avenue and Ortega
8	University Mound Reservoir	University Avenue and Bacon
9	Merced Manor Reservoir	23rd Avenue and Ocean

Table 3
Locations of SFPUC System Input and In-Line Meters

Meter	Pipeline	Location
10	San Joaquin Pipeline No. 1	Albers Road, South of Oakdale in Stanislaus County
11	San Joaquin Pipeline No. 2	Same as San Joaquin Pipeline No. 1
12	San Joaquin Pipeline No. 3	Same as San Joaquin Pipeline No. 1
13	San Antonio Pipeline	San Antonio Pump Station
14	Sunol Valley WTP Effluent	San Antonio Pump Station
15	Calaveras Pipeline	Sunol Valley Water Treatment Plant
16	Irvington – Bay Division Pipeline No. 1	Driscoll Road in Fremont
17	Irvington – Bay Division Pipeline No. 2	Same as Irvington Bay Division Pipeline No.1
18	Irvington – Bay Division Pipeline No. 3	Mission Boulevard in Fremont
19	Irvington – Bay Division Pipeline No. 4	Same as Irvington Bay Division Pipeline No.3
20	Pulgas – Bay Division Pipeline No. 1	Hassler Road at Pulgas Valve Lot
21	Pulgas – Bay Division Pipeline No. 2	Same as Pulgas Bay Division Pipeline No. 1
22	Pulgas – Bay Division Pipeline No. 3	Same as Pulgas Bay Division Pipeline No. 1
23	Pulgas – Bay Division Pipeline No. 4	Same as Pulgas Bay Division Pipeline No. 1
24	Crystal Springs Reservoir Outfall	Canada Road near Pulgas Temple
25	Harry Tracy WTP Effluent – Sunset Supply	Harry Tracy Water Treatment Plant
26	Harry Tracy WTP Effluent – San Andreas Supply	Harry Tracy Water Treatment Plant
27	Crystal Springs – San Andreas Pipeline	Crystal Springs Pump Station
28	Crystal Springs Pump Station – Sunset Supply	Crystal Springs Pump Station
29	Crystal Springs Pump Station – Crystal Springs No. 2 Supply	Crystal Springs Pump Station
30	Crystal Springs Balancing Reservoir	Canada Road near Pulgas Temple
31	Santa Clara Valley WD Intertie	Milpitas Boulevard in Milpitas
B	San Joaquin Pipeline No. 4 (Planned)	To be determined
C	East Bay MUD Intertie (Planned)	To be determined
D&E	Bay Division Pipeline No. 5 (Planned)	To be determined

TABLE 4
SFPUC COUNTY-LINE METERS, IN-CITY TERMINAL RESERVOIRS, AND ASSOCIATED METERING EQUIPMENT

County-Line Meter	Meter Type	Location
1. **Sunset**	60" Venturi	Lake Merced Pump Station
Associated Metering Equipment:	• Rosemount D/P transmitter • Honeywell recorder • SCADA	
2. **Sutro**	36" Venturi	Lake Merced Pump Station
Associated Metering Equipment:	• Rosemount D/P transmitter • Honeywell recorder • SCADA	
3. **Lake Merced Outfall**	16" Mag. Meter	Lake Merced Pump Station
Associated Metering Equipment:	• Honeywell recorder • SCADA	
4. **San Andreas No. 2**	36" Venturi	Junipero Serra (Hwy. 280) south of Belle Avenue
Associated Metering Equipment:	• Yokogawa D/P transmitter • NLS display • AGM electronics • Honeywell recorder • SCADA	
5. **Crystal Springs No. 1**	44" Venturi	PG&E Martin Service Center Yard
Associated Metering Equipment:	• Yokogawa D/P transmitter • NLS display • AGM electronics • Honeywell recorder • SCADA	
6. **Crystal Springs No. 2**	60" Venturi	Tamasco Ct. south of Sunnydale Avenue
Associated Metering Equipment:	• Yokogawa D/P transmitter • NLS display • AGM electronics • SCADA	
In-City Terminal Reservoirs		
1. **Sunset**	Pressure Transducer	26th Avenue and Ortega
Associated Metering Equipment:	• Honeywell recorder • SCADA	
2. **Merced-Manor**	Pressure Transducer	23rd Avenue and Ocean
Associated Metering Equipment:	• Honeywell recorder • SCADA	
3. **University Mound**	Pressure Transducer	University Avenue and Bacon
Associated Metering Equipment:	• Honeywell recorder • SCADA	

TABLE 5
METER CALIBRATION AND MAINTENANCE FREQUENCY

METER/ EQUIPMENT	FREQUENCY			WORK TO BE PERFORMED (See Work Codes Listed Below)					
	Quarterly	Semi-Annual	Annual	CA	CL	FL	IN	LU	PT
Venturi Meters			X	X		X (1)	X (1)		X
Magnetic Meters		X		X (2)	X (2)		X (2)		
Yokagowa D/P Transmitters	X			X	X	X	X		
Rosemount D/P Transmitters	X			X	X	X	X		
Honeywell Recorders	X			X	X		X		
Water Level Sensors (Pressure Transducers)	X			X	X		X		
SCADA Electronics	X			X					
AGM Electronics	X			X					
NLS Digital Displays	X			X					
Electrostatic 24V DC Power Supplies			X				X (3)		
ASCO Solenoids			X		X		X (4)	X	

WORK CODES:
CA = CALIBRATE; CL = CLEAN; FL = FLUSH; IN = INSPECT; LU = LUBRICATE; PT = PITOT TUBE TEST.

NOTES:
(1) Inspection and flushing requirements for Venturi meters refer to the pressure tubing from the meter to the differential pressure transmitter.
(2) May calibrate using clamp-on meter where conditions allow. Inspection and cleaning requirements for magnetic meters refer to the sensors or probes that are inserted through the pipe wall.
(3) Adjust voltage if necessary.
(4) Replace rubber ware as needed.

ATTACHMENT K-1
WHOLESALE CUSTOMERS' SHARE OF NET BOOK VALUE OF EXISTING ASSETS
****PRELIMINARY - TO BE SUBSTITUTED WITH FINAL 6/30/09 VALUES****
(Section 5.03)

	Notes	Projected Value		
		Water	Hetch Hetchy	Total
Regional System Net Plant as of 6/30/08 (Actual)	1	$ 435,639,907	$ 66,135,724	
Less: Projected Depreciation on Regional Assets	2	$ (32,526,143)	$ (3,598,189)	
Plus: Projected FY 2008-09 Capital Additions	3	$ 62,771,153	$ -	
Projected Regional System Net Plant as of 6/30/09		$ 465,884,917	$ 62,537,535	
Plus: Projected Construction Work In Progress (CWIP) as of 6/30/09	4	$ 16,928,503	$ 5,807,023	
Projected Regional System Net Plant and CWIP as of 6/30/09		$ 482,813,420	$ 68,344,558	$ 551,157,978
Allocation Factor:	5	70.1%	64.2%	
Wholesale Share of Projected Regional System Net Plant as of 6/30/09		$ 326,585,327	$ 40,149,098	$ 366,734,424
Plus: Wholesale Share of Projected CWIP as of 6/30/09	6	$ 11,866,881	$ 3,728,109	$ 15,594,989
Wholesale Share of Projected Net Plant and CWIP as 6/30/09		$ 338,452,207	$ 43,877,206	$ 382,329,414
Interest Rate:		5.13%	5.13%	
Term (Yrs):		25	25	
Monthly Principal & Interest		$ 2,004,277	$ 259,836	$ 2,264,113
Annual Wholesale Revenue Requirement Amount		$ 24,051,326	$ 3,118,033	$ 27,169,359

Notes

1 FAACS 120A Report as of 6/30/08

2 SFPUC Estimate

3 SFPUC Estimate based on projects and amounts as follows:

	Water Assets
CUW358 Sunset Reservoir (North Basin)	$ 57,382,744
CUW 365 Cross Connection Controls	$ 3,679,415
CUW 394 Watershed Land Acqusition	$ 1,708,994
Total Additions	$ 62,771,153

4 CWIP based on balance as 6/30/08 plus YTD expenditures (see Attachment K-2)

5 Fixed allocation factors based on dollar weighted 5-year average of J-Table allocation factors (2003-04 through 2007-08)

6 Wholesale share CWIP based on balance as 6/30/08 plus YTD expenditures (see Attachment K-2)

ATTACHMENT K-2
WHOLESALE CUSTOMERS' SHARE OF THE BOOK VALUE OF REVENUE FUNDED CAPITAL EXPENDITURES
****PRELIMINARY - TO BE SUBSTITUTED WITH FINAL 6/30/09 VALUES****
(Section 5.03)

[1] Project No.	[2] Project Description	[3] Rate Class	[4] CWIP as of 6/30/08	[5] FY 2008-09 Expenditures	[6] Reduction for 02A Funding	[7] CWIP as 6/30/09	[8] Water Related CWIP	[9] Wholesale Share	
A.	Water Enterprise								
1	Regional Projects								
CUW352	Alameda Creek Fishery	Joint	$ 2,007,607	$ 224,582	$ 2,232,189	$ -		$ -	
CUW353	Seismic Upgrade @ Hayward Fault	Joint	$ 3,129,234	$ 1,967,625	$ 5,096,859	$ -		$ -	
CUW354	LOWER CRYSTAL SPRINGS DAM-REV-SFWD	Joint	$ 7,046,944	$ 1,086,262	$ 8,133,206	$ -		$ -	
CUW355	STANDBY POWER FACILITIES	Joint	$ 3,715,276	$ 6,596,849	$ 10,312,125	$ -		$ -	
CUW357	Adit Leak Repairs	Joint	$ 783	$ 1,129	$ 1,912	$ -		$ -	
CUW359	Irvington Tunnel	Joint	$ 21,391,129	$ 5,176,713	$ 26,567,842	$ -		$ -	
CUW359		Joint	$ 7,837,176	$ -	$ 7,837,176	$ -		$ -	
CUW361		Joint	$ 368,057	$ 1,383,959	$ 1,752,016	$ -		$ -	
CUW361		Joint	$ 1,255,545	$ -	$ 1,255,545	$ -		$ -	
CUW361	Pulgas Balancing Reservoir	Joint	$ 1,248,002	$ -	$ 1,248,002	$ -		$ -	
CUW361		Joint	$ 570,179	$ -	$ 570,179	$ -		$ -	
CUW361		Joint	$ 712,921	$ -	$ 712,921	$ -		$ -	
CUW363	SCADA Phase II	Joint	$ 1,335,371	$ 1,738,045	$ 3,073,416	$ -		$ -	
CUW363		Joint	$ 1,062,050	$ -	$ 1,062,050	$ -		$ -	
CUW365	Cross Connection Control	Joint	$ 3,635,172	$ 547,801	$ 4,182,973	$ -		$ -	Capitalized in FY 2008-09
CUW367	HTWTP LT Impr	Joint	$ 8,011,348	$ 2,479,731	$ 10,491,079	$ -		$ -	
CUW368		Joint	$ 23,640,601	$ -	$ 23,640,601	$ -		$ -	
CUW368	BDPL Hydraulic Capacity	Joint	$ 17,556,905	$ 4,200,442	$ 21,757,347	$ -		$ -	
CUW368		Joint	$ 2,579,847	$ -	$ 2,579,847	$ -		$ -	
CUW370	Pipeline Readiness	Joint	$ 5,320,934	$ 328,070	$ 5,649,004	$ -		$ -	
CUW371	CSPS and Pipeline	Joint	$ 11,420,770	$ 3,872,779	$ 15,293,549	$ -		$ -	
CUW372	University Mound (N)	Joint	$ 4,624,981	$ 1,068,147	$ 5,693,128	$ -		$ -	
CUW373	SJPL	Joint	$ 19,479,341	$ 6,023,849	$ 25,503,190	$ -		$ -	
CUW373		Joint	$ 7,199,051	$ -	$ 7,199,051	$ -		$ -	
CUW374	Calaveras Dam	Joint	$ 31,171,669	$ 4,314,430	$ 35,486,099	$ -		$ -	
CUW374		Joint	$ 2,366,343	$ -	$ 2,366,343	$ -		$ -	
CUW378	CSPL #2	Joint	$ 7,453,098	$ 913,369	$ 8,366,467	$ -		$ -	
CUW379	SAPL #3	Joint	$ 5,728,934	$ 588,346	$ 6,317,280	$ -		$ -	
CUW380	BDPK #3&4 Crossovers	Joint	$ 3,855,357	$ 1,083,888	$ 4,939,245	$ -		$ -	
CUW381		Joint	$ 5,450,995	$ -	$ 5,450,995	$ -		$ -	
CUW381	SVWTP Expansion	Joint	$ 53,222	$ 3,090,520	$ 3,143,742	$ -		$ -	
CUW381		Joint	$ 97,373	$ -	$ 97,373	$ -		$ -	
CUW382	SVWTP Treated Water Reservoir	Joint	$ 5,799,505	$ 575	$ 5,800,080	$ -		$ -	
CUW384	Tesla	Joint	$ 6,102,621	$ 7,444,942	$ 13,547,563	$ -		$ -	
CUW386	SAPS X-CONNECT & PUMP IMP 96A UEB	Joint	$ 1,374,491	$ 971,625	$ 2,346,116	$ -		$ -	
CUW388	PEIR	Joint	$ 896,476	$ 1,641,717	$ 2,538,193	$ -		$ -	
CUW388		Joint	$ 1,331,676	$ -	$ 1,331,676	$ -		$ -	
CUW390	Desalination Pilot	Joint	$ 175,165	$ -	$ 175,165	$ -		$ -	
CUW391	Baden/San Pedro Valve Lots	Joint	$ 3,964,642	$ 948,589	$ 4,913,231	$ -		$ -	
CUW392	Program Management	Joint	$ 2,452,297	$ 5,081,444	$ 7,533,741	$ -		$ -	
CUW393	BDPL #4 Condition Assessment	Joint	$ 25,071	$ 294,634	$ 319,705	$ -		$ -	
CUW394	Watershed Enviroment Improvement	Joint	$ 142,924	$ 96,027	$ 238,951	$ -		$ -	Capitalized in FY 2008-09
CUW101	SAN ANDREAS PLANT EXPANSION #1	Joint	$ 182	$ 96,027		$ 96,209		$ 67,443	
CUW111	LOWER CRYSTAL SPRINGS DAM-REV-SFWD	Joint	$ 40,436	$ -		$ 40,436		$ 28,346	
CUW151	Baden PS	Joint	$ 921	$ 26,760		$ 27,681		$ 19,404	
CUW161	Water Treatment Facilities	Joint	$ 75,801	$ 605		$ 76,406		$ 53,561	
CUW178	SAPS X-CONNECT & PUMP IMP 96A UEB	Joint	$ 104,902	$ -		$ 104,902		$ 73,536	
CUW202		Joint	$ 50,808	$ -		$ 50,808		$ 35,616	
CUW202	Replace PCCP	Joint	$ 285,003	$ 64,256		$ 349,259		$ 244,831	
CUW202		Joint	$ 2,365	$ -		$ 2,365		$ 1,658	
CUW127	SCADA	Joint	$ 50,029	$ 2,481,274		$ 2,531,303		$ 1,774,443	
CUW356	New Crystal Springs Bypass Tunnel	Joint	$ 13,992,264	$ 5,560,862	$ 16,028,397	$ 3,524,729		$ 2,470,835	
CUW358	Sunset (N)	Joint	$ 52,494,764	$ 4,887,980	$ 55,806,081	$ 1,576,663		$ 1,105,241	Capitalized in FY 2008-09
CUW387	Tesla Portal Disinfection	Joint	$ 2,377,262	$ (1,996)	$ 1,223,945	$ 1,151,321		$ 807,076	
CUW135		Joint	$ 45,413	$ -		$ 45,413		$ 31,835	
CUW135	New Lines and Bypass Valves	Joint	$ 153,983	$ 620,156		$ 774,139		$ 542,671	
CUW135		Joint	$ 8,860	$ -		$ 8,860		$ 6,211	
CUW143		Joint	$ 5,656	$ -		$ 5,656		$ 3,965	
CUW143	HH Water Treatment Plan	Joint	$ 709,972	$ 8,817		$ 718,789		$ 503,871	
CUW143		Joint	$ 96,292	$ -		$ 96,292		$ 67,501	
CUW186	SVWTP IMPROVEMENT PROJECT-CPB-SFWD	Joint	$ 3,604	$ -		$ 3,604		$ 2,526	
CUW206		Joint	$ 4,365	$ -		$ 4,365		$ 3,060	
CUW206	Tesla Portal/Thomas Shaft Emergency Disinfection	Joint	$ 283,620	$ 5,665		$ 289,285		$ 202,789	
CUW206		Joint	$ 227,004	$ -		$ 227,004		$ 159,130	
CUW231	Millbrae Labs	Joint	$ 81,856	$ 34,685		$ 116,541		$ 81,695	
CUW236	TELSA/SJVH WQ MONITORING IMPR	Joint	$ 152,963	$ -		$ 152,963		$ 107,227	
CUW366		Joint	$ 16,523	$ -		$ 16,523		$ 11,583	
CUW366	HTWTP ST Improvements	Joint	$ 1,398,798	$ 5,732,626	$ 7,131,424	$ -		$ -	
CUW366		Joint	$ 1,452,901	$ -	$ 1,452,901	$ -		$ -	
CUW120	WATER QUALITY PLANNING STUDY	Joint	$ 577	$ -		$ 577		$ 404	
CUW164	WATER VULNERABILITY STUDY-UEB	Joint	$ 479	$ -		$ 479		$ 336	
CUW181	STANDBY POWER FACILITIES	Joint	$ 5,905	$ -		$ 5,905		$ 4,139	
CUW210	Millbrae Administrative Bldg Remodel	Joint	$ 7,803	$ 321,553		$ 329,356		$ 230,879	
CUW220	Calaveras Dam Evaluation	Joint	$ 308,971	$ -		$ 308,971		$ 216,589	
CUW227	Watershed Facilities and Fencing	Joint	$ 190,552	$ 206,448		$ 397,000		$ 278,297	
CUW228	Watershed Roads	Joint	$ 358,434	$ 85,337		$ 443,771		$ 311,083	
CUW232	Crystal Springs Dam Discharge	Joint	$ 363,823	$ -		$ 363,823		$ 255,040	
CUW242	Demolition of Unsafe Structures	Joint	$ 311,548	$ 22,741		$ 334,289		$ 234,337	
CUW242		Joint	$ 315	$ -		$ 315		$ 221	
CUW261	Regional R&R - Storage	Joint	$ 275,694	$ 277,958		$ 553,652		$ 388,110	
CUW262	Regional R&R - Treatement	Joint	$ 1,236,895	$ 409,282		$ 1,646,177		$ 1,153,970	
CUW262		Joint	$ 277,383	$ -		$ 277,383		$ 194,445	

ATTACHMENT K-2
WHOLESALE CUSTOMERS' SHARE OF THE BOOK VALUE OF REVENUE FUNDED CAPITAL EXPENDITURES
****PRELIMINARY - TO BE SUBSTITUTED WITH FINAL 6/30/09 VALUES****
(Section 5.03)

[1] Project No.	[2] Project Description	[3] Rate Class	[4] CWIP as of 6/30/08	[5] FY 2008-09 Expenditures	[6] Reduction for 02A Funding	[7] CWIP as 6/30/09	[8] Water Related CWIP	[9] Wholesale Share
CUW263	Regional R&R - Transmission	Joint	$ 768,422	$ 797,659		$ 1,566,081	[redacted]	$ 1,097,823
CUW263	Regional R&R - Transmission	Joint	$ 1,224,094	$ -		$ 1,224,094	[redacted]	$ 858,090
CUW360	PLANNING - WSTD Sunol Quarry Reservoirs	Joint	$ 2,513	$ -		$ 2,513	[redacted]	$ 1,762
CUW934	BOA/BAW/13/F2/SFWD-CONT PROJ-OPER FD	Joint	$ 59,479	$ (2,210)	$ 998,005	$ (940,736)	[redacted]	$ (659,456)
	TOTAL REGIONAL WATER PROJECTS		$ 313,100,517	$ 84,802,574	$379,397,925	$ 18,505,166	[redacted]	$ 12,972,121
	Less Projects to be Capitalized in FY 2008-09					$ 1,576,663	[redacted]	$ 1,105,241
	ADJUSTED TOTAL REGIONAL WATER PROJECTS					$ 16,928,503	[redacted]	$ 11,866,881
2	Wholesale Direct							
	None							
B.	Hetch Hetchy Water & Power							
CUH703	Priest Reservoir By-pass	Joint	-	47,164		$ 47,164	$ 21,224	$ 13,626
CUH762	SJPL Reparis	Water	53,616	255,011		$ 308,627	$ 308,627	$ 198,139
CUH766	HH Security Improvements	Joint	164,478	261,601		$ 426,079	$ 191,736	$ 123,094
CUH767	Power Transformers	Power	-	-		$ -	$ -	$ -
CUH803	Street Lights	Power	-	40,506		$ 40,506	$ -	$ -
CUH804	HH Roads	Joint	-	341,240		$ 341,240	$ 153,558	$ 98,584
CUH829	HH SCADA	Joint	-	-		$ -	$ -	$ -
CUH842	Moccasin Cottages Renovations	Joint	-	-		$ -	$ -	$ -
CUH846	New Moccasin Penstock	Power	543,073	-		$ 543,073	$ -	$ -
CUH851	Turbine Generator Renovations	Power	111,755	926,254		$ 1,038,009	$ -	$ -
CUH868	Moccasin Energy Absorber	Power	-	-		$ -	$ -	$ -
CUH876	Moccasin Phone System	Joint	-	15,677		$ 15,677	$ 7,055	$ 4,529
CUH878	O'Shaugnessy Discharge/Toulumne River Channel Impr.	Joint	31,953	168,076		$ 200,029	$ 90,013	$ 57,788
CUH891	Metering Muni Load	Power	18	4,361		$ 4,379	$ -	$ -
CUH893	Cherry/Eleanor Pump Upgrade	Power	-	17,012		$ 17,012	$ -	$ -
CUH896	Street Lights	Power	9,294	568,794		$ 578,088	$ -	$ -
CUH899	Canyon Tunnel Penstock	Power	6,210	21,804		$ 28,014	$ -	$ -
CUH915	UG Assessment/Hunters Point	Power	961,755	1,668,663		$ 2,630,418	$ -	$ -
CUH926	Pipe Purchase	Water	-	13,667		$ 13,667	$ 13,667	$ 8,774
CUH931	Microwave Replacement	Joint	3,157,491	156,270		$ 3,313,761	$ 1,491,192	$ 957,346
CUH932	HH SCADA	Joint	-	-		$ -	$ -	$ -
CUH825	Distribution System	Power	446,419	109,797		$ 556,216	$ -	$ -
CUH941	HHP SCADA Security & Control, East/O'Shaugnessy	Joint	1,433,974	246,948		$ 1,680,922	$ 756,415	$ 485,618
CUH942	O'Shaugnessy Dam Discharge Needle Valves	Joint	-	-		$ -	$ -	$ -
CUH943	Renewable Energy	Power	-	-		$ -	$ -	$ -
CUH945	SJPL Crossovers	Water	-	-		$ -	$ -	$ -
CUH946	Facility Maintenance	Joint	-	239		$ 239	$ 108	$ 69
CUH947	Sustainable Energy Account	Power	441,226	1,838,396		$ 2,279,622	$ -	$ -
CUH948	Facility Maintenance - Transmission Lines	Power	70,631	101,295		$ 171,926	$ -	$ -
CUH949	POW Maintenance	Power	-	-		$ -	$ -	$ -
CUH950	HPH/KPH/MPH	Power	1,236,853	1,167,621		$ 2,404,474	$ -	$ -
CUH955	Solar Monitoring	Power	222	-		$ 222	$ -	$ -
CUH956	Facility Maintenance - Gate Valves	Water	275,213	-		$ 275,213	$ 275,213	$ 176,687
CUH957	Moccasin Corrison Control	Joint	48,023	110,986		$ 159,009	$ 71,554	$ 45,938
CUH958	Generation Metering	Power	-	18,811		$ 18,811	$ -	$ -
CUH959	Moccasin Reservoir Water Quality	Water	109,379	-		$ 109,379	$ 109,379	$ 70,221
CUH960	Solar Power Project	Power	6,480	(5,333)		$ 1,147	$ -	$ -
CUH861	MECA Solar	Power	-	26,369		$ 26,369	$ -	$ -
CUH962	SF Electrical Reliability	Power	9,672,565	2,653		$ 9,675,218	$ -	$ -
CUH964	Watershed Lan Purchase	Water	-	75,756		$ 75,756	$ 75,756	$ 48,635
CUH966	MECA - Demand Reduction	Power	-	-		$ -	$ -	$ -
CUH969	SFIA SCADA	Power	-	-		$ -	$ -	$ -
CUH971	Neward - CCSF Tranmission Project	Power	235,120	54,602		$ 289,722	$ -	$ -
CUH972	Load Metering	Power	145,039	1,274		$ 146,313	$ -	$ -
CUH973	Distribution Assessment	Power	-	-		$ -	$ -	$ -
CUH975	Hetch Hetchy Water R&R	Power	-	130,100		$ 130,100	$ -	$ -
CUH975	Hetch Hetchy Water R&R	Water	52,613	516,524		$ 569,137	$ 569,137	$ 365,386
CUH975	Hetch Hetchy Water R&R	Joint	999,854	887,864		$ 1,887,718	$ 849,473	$ 545,362
CUH976	KPH Rewind	Power	1,053,295	1,417,914		$ 2,471,209	$ -	$ -
CUH977	Facilities Maintenance - Water	Joint	770,839	1,049,878		$ 1,820,717	$ 819,323	$ 526,005
CUH978	Community Choice Aggregation	Power	5,571	101,075		$ 106,646	$ -	$ -
CUH979	Hunters Point Distribution	Power	1,926,977	532,011		$ 2,458,988	$ -	$ -
CUH981	Shore Power for Cruise Ships	Power	2,690	-		$ 2,690	$ -	$ -
CUH986	SEA - Energy Efficiency	Power	15,262	-		$ 15,262	$ -	$ -
CUW687	525 Golden Gate	Joint	-	4,105		$ 4,105	$ 1,847	$ 1,186
IUH004	Auto Maintenance	Joint	-	3,882		$ 3,882	$ 1,747	$ 1,122
PUH501	SF Environment Energy/Green Power	Power	-	66,107		$ 66,107	$ -	$ -
PYEAES	Youth Employment	Joint	-	-		$ -	$ -	$ -
	TOTAL HHWP PROJECTS		23,987,888	12,964,974	-	36,952,862	5,807,023	$ 3,728,109
C	TOTAL COMBINED WATER AND HHWP		$ 337,088,405	$ 97,767,548	$379,397,925	$ 55,458,028		$ 15,594,990

Notes
1. 6/30/08 CWIP per FAMIS
2. FY 2008-09 Expenditures posted through 3/20/09 per FAMIS
3. Wholesale share of CWIP 70.1% (see Note 5 Attachment K-1)
4. Water Related HHWP CWIP includes 100% of Water and 45% of Joint
5. Wholesale share of CWIP 64.2% (see Note 5 Attachment K-1)
6. Fund 2A expenditures are funded by Series 2006A bond proceeds, proceeds of commercial paper redeemed from 2006A proceeds and earnings on such proceeds, as applicable.

ATTACHMENT K-3
25 YEAR PAYOFF SCHEDULE FOR EXISITING RATE BASE
WATER ENTERPRISE REGIONAL ASSETS AND ONE DIRECT WHOLESALE ASSET
****PRELIMINARY - TO BE SUBSTITUTED WITH FINAL 6/30/09 VALUES****
(Section 5.03)

	Water Assets
6/30/09 Wholesale Share of Net Plant & CWIP (Attachment K-1)	338,452,207
Interest Rate:	5.13%
Term:	25
Monthly Principal & Interest Calculation:	2,004,277
Annual Wholesale Revenue Requirement:	24,051,326

Fiscal Yr Ending	Principal	Interest	**Annual Payment (Wtr)**	Year End Balance
Jun-10	6,848,259	17,203,067	**24,051,326**	331,603,948
Jun-11	7,207,954	16,843,372	**24,051,326**	324,395,994
Jun-12	7,586,541	16,464,785	**24,051,326**	316,809,453
Jun-13	7,985,013	16,066,313	**24,051,326**	308,824,439
Jun-14	8,404,415	15,646,911	**24,051,326**	300,420,024
Jun-15	8,845,844	15,205,482	**24,051,326**	291,574,180
Jun-16	9,310,459	14,740,867	**24,051,326**	282,263,721
Jun-17	9,799,478	14,251,848	**24,051,326**	272,464,243
Jun-18	10,314,181	13,737,145	**24,051,326**	262,150,062
Jun-19	10,855,919	13,195,407	**24,051,326**	251,294,143
Jun-20	11,426,110	12,625,216	**24,051,326**	239,868,033
Jun-21	12,026,250	12,025,076	**24,051,326**	227,841,784
Jun-22	12,657,911	11,393,415	**24,051,326**	215,183,873
Jun-23	13,322,749	10,728,577	**24,051,326**	201,861,123
Jun-24	14,022,507	10,028,819	**24,051,326**	187,838,616
Jun-25	14,759,019	9,292,307	**24,051,326**	173,079,597
Jun-26	15,534,215	8,517,111	**24,051,326**	157,545,382
Jun-27	16,350,127	7,701,199	**24,051,326**	141,195,254
Jun-28	17,208,894	6,842,432	**24,051,326**	123,986,361
Jun-29	18,112,766	5,938,560	**24,051,326**	105,873,594
Jun-30	19,064,113	4,987,213	**24,051,326**	86,809,482
Jun-31	20,065,428	3,985,898	**24,051,326**	66,744,054
Jun-32	21,119,335	2,931,991	**24,051,326**	45,624,719
Jun-33	22,228,597	1,822,729	**24,051,326**	23,396,122
Jun-34	23,396,122	655,204	**24,051,326**	0
Totals:	338,452,207	262,830,943	601,283,150	

ATTACHMENT K-4
25 YEAR PAYOFF SCHEDULE FOR EXISTING RATE BASE
HETCH HETCHY WATER ASSETS AND WATER-RELATED PORTION OF JOINT ASSETS
****PRELIMINARY - TO BE SUBSTITUTED WITH FINAL 6/30/09 VALUES****
(Section 5.03)

	Hetch Hetchy
6/30/09 Wholesale Share of Net Plant & CWIP (Attachment K-1)	43,877,206
Interest Rate:	5.13%
Term:	25
Monthly Principal & Interest Calculation:	259,836
Annual Wholesale Revenue Requirement:	3,118,033

Fiscal Yr Ending	Principal	Interest	**Annual Payment (HH)**	Year End Balance
Jun-10	887,814	2,230,219	**3,118,033**	42,989,393
Jun-11	934,445	2,183,588	**3,118,033**	42,054,948
Jun-12	983,525	2,134,507	**3,118,033**	41,071,423
Jun-13	1,035,183	2,082,849	**3,118,033**	40,036,239
Jun-14	1,089,555	2,028,478	**3,118,033**	38,946,685
Jun-15	1,146,782	1,971,250	**3,118,033**	37,799,903
Jun-16	1,207,015	1,911,017	**3,118,033**	36,592,887
Jun-17	1,270,412	1,847,621	**3,118,033**	35,322,475
Jun-18	1,337,138	1,780,894	**3,118,033**	33,985,337
Jun-19	1,407,370	1,710,663	**3,118,033**	32,577,967
Jun-20	1,481,290	1,636,743	**3,118,033**	31,096,678
Jun-21	1,559,092	1,558,940	**3,118,033**	29,537,585
Jun-22	1,640,981	1,477,051	**3,118,033**	27,896,604
Jun-23	1,727,172	1,390,861	**3,118,033**	26,169,432
Jun-24	1,817,889	1,300,144	**3,118,033**	24,351,544
Jun-25	1,913,371	1,204,662	**3,118,033**	22,438,173
Jun-26	2,013,868	1,104,165	**3,118,033**	20,424,305
Jun-27	2,119,643	998,389	**3,118,033**	18,304,662
Jun-28	2,230,974	887,058	**3,118,033**	16,073,688
Jun-29	2,348,153	769,880	**3,118,033**	13,725,535
Jun-30	2,471,486	646,546	**3,118,033**	11,254,048
Jun-31	2,601,298	516,735	**3,118,033**	8,652,751
Jun-32	2,737,927	380,106	**3,118,033**	5,914,824
Jun-33	2,881,733	236,300	**3,118,033**	3,033,091
Jun-34	3,033,091	84,941	**3,118,033**	0
	43,877,206	34,073,607	77,950,813	

ATTACHMENT K-5
UNEXPENDED APPROPRIATIONS FOR REVENUE-FUNDED REGIONAL ASSETS
CONSTRUCTION WORK IN PROGRESS AS OF MARCH 30, 2009
(Section 5.04)

Project	Project Title	Fund Type	Subfund	Classification	Appropriation	YTD Expenditures	PTD Expenditures	Encumbrances	Available Balances	Notes
				Water Assets						
CUW257	WATERSHED PROTECTION	5W	AAAACP	REGIONAL	1,448,720	29,653	413,529	141,643	893,548	
CUW250	WATERSHED TRAILS&RECREATION IMPRO\	5W	AAAACP	REGIONAL	387,639	9,431	112,689	6,675	268,275	
CUW261	REGIONAL WATER STORAGE RNR -BUDGE1	5W	AAAACP	REGIONAL	1,750,000	250,970	526,664	26,687	1,196,648	Annual R&R
CUW242	DEMOLITION UNSAFE STRUCTURES	5W	AAAACP	REGIONAL	1,000,000	22,647	407,820	21,524	570,656	
CUW263	CONVEYANCE/TRANSMISSION - BUDGET	5W	AAAACP	REGIONAL	7,825,000	763,603	3,378,543	125,990	4,320,466	Annual R&R
CUW264	WATERSHED ROADS - BUDGET	5W	AAAACP	REGIONAL	3,000,000	77,074	1,391,500	162,401	1,446,099	Annual R&R
CUW262	TREATMENT FACS/WQ IMPROVE-BUDGET	5W	AAAACP	REGIONAL	4,801,000	399,073	2,704,204	349,016	1,747,780	Annual R&R
CUW168	ALAMEDA CREEK FISH RELEASE	5W	AAAACP	REGIONAL	1,537,398	46,624	1,040,919	152,647	343,832	
CUW231	MILLBRAE LAB CAPITAL IMPROVEMENTS	5W	AAAACP	REGIONAL	770,000	19,119	532,135	0	237,865	
CUW227	WATERSHED FENCES/FACILITES	5W	AAAACP	REGIONAL	3,000,000	206,222	2,223,776	581,926	194,298	
CUW253	FACILITIES SECURITY PROJECT	5W	AAAACP	REGIONAL	5,300,000	73,048	4,146,944	113,124	1,039,931	
CUW210	MILLBRAE ADMIN BLDG INTERIM REMODEL	5W	AAAACP	REGIONAL	2,407,700	284,902	1,935,204	160	472,337	
CUW228	WATERSHED ROADS RECONSTRUCTION	5W	AAAACP	REGIONAL	5,170,000	82,992	4,413,061	18,598	738,340	
CUW202	SAN ANTONIO PIPELINE EMERGENCY REPA	5W	AAAACP	REGIONAL	1,400,000	6,012	1,269,190	61,727	69,083	
CUW148	ENVIRONMENTAL & REGULATORY COMP	5W	AAAACP	REGIONAL	3,241,279	0	3,014,995	184,774	41,510	
CUW135	NEW LINE & BYPASS VALVES	5W	AAAACP	REGIONAL	4,829,680	2,103	4,689,067	0	140,613	
CUW143	HETCH HETCHY WATER TREATMENT PLAN	5W	AAAACP	REGIONAL	18,821,529	0	18,452,053	47,947	321,529	
CUW161	TREATMENT FACILITIES IMPROVEMENTS	5W	AAAACP	REGIONAL	15,028,319	334	14,747,873	0	280,446	
CUW241	FACILITIES MAINT SUPPORT STRUCTURES	5W	AAAACP	REGIONAL	5,000,000	8,390	4,988,882	0	11,118	
CUW392	PROGRAM MANAGEMENT SERVICES - WSIF	5W	AAAACP	LOCAL/REGIONAL	1,837,000	(98,519)	751,659	71,973	1,013,368	
CUW127	INST SCADA SYSTEM	5W	AAAACP	LOCAL/REGIONAL	13,156,681	2,481,274	8,653,641	0	4,503,040	
CUW710	OCIP PROJECT CONTROL	5W	AAAACP	LOCAL/REGIONAL	2,497,881	235,706	2,496,959	0	922	
	TOTAL ALL PROJECTS				104,209,826	4,900,661	82,291,307	2,066,813	19,851,706	
	LOCAL PROJECTS			LOCAL	0	0	0	0	0	
	JOINT LOCAL AND REGIONAL PROJECTS			LOCAL/REGIONAL	17,491,562	2,618,462	11,902,259	71,973	5,517,330	
	REGIONAL PROJECTS			REGIONAL	86,718,264	2,282,199	70,389,048	1,994,840	14,334,376	
	TOTAL ALL PROJECTS				104,209,826	4,900,661	82,291,307	2,066,813	19,851,706	
				Hetchy Hetchy Assets						
CUH975	WATER INFRASTRUCTURE - BUDGET	5T	AAAACP	WATER	9,000,000	1,534,488	2,806,592	3,565,023	2,628,385	
CUH964	WATERSHED PROPERTY PURCHASES	5T	AAAACP	WATER	800,000	75,756	454,756	0	345,244	
CUH957	FAC MAINTENANCE-WATER TRANSPORTAT	5T	AAAACP	WATER	3,400,000	110,986	2,885,394	209,138	305,469	
CUH703	PRIEST RESERVOIR DIVERSION CHANNEL	5T	AAAACP	WATER	21,210,344	47,164	20,166,993	0	1,043,351	
CUH926	PIPELINE PURCHASE REPLACEMENT PIPE	5T	AAAACP	WATER	159,860	13,667	157,489	0	2,371	
CUH762	SAN JOAQUIN PIPELINE REPAIRS	5T	AAAACP	WATER	41,469,206	255,011	41,215,761	134,652	118,792	
CUW687	525 GOLDEN GATE	5T	AAAACP	JOINT	280,600	4,105	26,437	0	254,163	
CUH977	FACILITIES MAINTENANCE - BUDGET	5T	AAAACP	JOINT	9,300,000	1,049,878	3,578,478	803,231	4,918,290	
CUH931	HH MICROWAVE REPLACEMENT	5T	AAAACP	JOINT	4,767,000	156,270	3,313,761	1,227,242	225,997	
CUH941	HH SCADA SECURITY & CONTROL, EAST	5T	AAAACP	JOINT	2,068,180	246,948	1,680,922	256,198	131,060	
CUH804	HETCH-HETCHY ROADS REBUILDING	5T	AAAACP	JOINT	4,175,027	341,240	3,544,483	113,314	517,230	
CUH766	HETCHY FACILITIES SECURITY IMPROV.	5T	AAAACP	JOINT	2,086,692	261,601	1,960,386	62,470	63,836	
CUH876	MOCCASIN PHONE SYSTEM	5T	AAAACP	JOINT	1,610,000	15,677	1,528,780	0	81,220	
CUH878	O'SHAUGENESSY DIS.REPAIRS	5T	AAAACP	JOINT	7,179,009	33,750	7,101,644	9,297	68,068	
CUH810	VARIOUS OLD JOB	5T	AAAACP	JOINT	7,613,638	18,690	7,538,034	1,561	74,044	
CUH946	FAC MAINTENANCE-SUPPORT STRUCTURE	5T	AAAACP	JOINT	2,281,454	239	2,273,485	0	7,969	
CUH949	RIGHT OF WAY MAINTENANCE	5T	AAAACP	JOINT	815,000	0	814,208	166	626	
	TOTAL ALL PROJECTS				118,216,010	4,165,470	101,047,602	6,382,292	10,786,117	
	POWER PROJECTS			POWER	0	0	0	0	0	
	WATER PROJECTS			WATER	76,039,410	2,037,072	67,686,985	3,908,812	4,443,613	
	JOINT PROJECTS			JOINT	42,176,600	2,128,397	33,360,617	2,473,480	6,342,504	
	TOTAL ALL PROJECTS				118,216,010	4,165,470	101,047,602	6,382,292	10,786,117	

ATTACHMENT L-1
IDENTIFICATION OF WSIP PROJECTS AS REGIONAL/RETAIL
(Section 5.04)

Project Number		Project Description
REGIONAL		
		San Joaquin Region
CUW373	Regional	San Joaquin Pipeline System Rehabilitation
CUW384	Regional	Tesla Advance Disinfection
CUW387	Regional	Tesla Portal Disinfection
		Sunol Valley Region
CUW352	Regional	Alameda Creek Fishery Enhancement
CUW355	Regional	Stand-by Power - Various Locations
CUW359	Regional	New Irvington Tunnel/Alameda Siphon No. 4
CUW370	Regional	Pipeline Readiness Improvements
CUW374	Regional	Calaveras Dam Replacement
CUW381	Regional	SVWTP 40 mgd Addition
CUW382	Regional	SVWTP Finished Water Reservoir
CUW386	Regional	San Antonio Pump Station Upgrade
		Bay Division Region
CUW353	Regional	Seismic Upgrade BDPL 3 & 4
CUW363	Regional	SCADA Phase II/Security Upgrades
CUW368	Regional	BDPL Reliability Upgrades
CUW380	Regional	BDPL 3 & 4 Crossover
CUW389	Regional	EBMUD Intertie
CUW393	Regional	BDPL 4 Slipline
		Peninsula Region
CUW354	Regional	Lower Crystal Springs Dam Improvement
CUW356	Regional	Crystal Springs Bypass Tunnel
CUW357	Regional	Adit Leak Repairs
CUW361	Regional	Pulgas Balancing Reservoir Rehabilitation and Improvements
CUW365	Regional	Cross Connection Control
CUW366	Regional	HTWTP Short Term Improvemetns
CUW367	Regional	HTWTP Long Term Improvements
CUW369	Regional	Capuchino Valve Lot Improvements
CUW371	Regional	Crystal Springs/San Andreas Transmission
CUW378	Regional	Crystal Springs Pipleine 2 Replacement
CUW379	Regional	San Andreas Pipeline 3 Installation
CUW390	Regional	Desalination
CUW391	Regional	Baden & San Pedro Valve Lots Improvements

ATTACHMENT L-1
IDENTIFICATION OF WSIP PROJECTS AS REGIONAL/RETAIL
(Section 5.04)

Project Number		Project Description
		San Francisco Region
CUW358	Regional	Sunset Reservoir Upgrades - North Basin
CUW372	Regional	University Mound Reservoir Upgrades - North Basin
		System-Wide
CUW388	Regional	PEIR
CUW392	Regional	Program Management Services
CUW394	Regional	Watershed Land Acquisition

RETAIL

		Reservoirs
CUW307	Local	Summit Reservoir Rehabilitation
CUW310	Local	New Northwest Reservoir
CUW319	Local	Hunters Point Reservoir Rehabilitation
CUW334	Local	Stanford Heights Reservoir Rehabilitation
CUW335	Local	Potrero Heights Reservoir Rehabiliation
CUW337	Local	Sutro Reservoir Rehabilitation
		Pump Stations/Tanks
CUW306	Local	Crocker Amazon Pump Station Upgrade
CUW309	Local	Lake Merced Pump Station Upgrade
CUW314	Local	La Grande Tank Upgrade
CUW318	Local	Forest Hill Tank Rehabilitation
CUW320	Local	Forest Hilll Pump Station Upgrade
CUW321	Local	Forest Knoll Pump Station Upgrade
CUW322	Local	Lincoln Park Pump Station Upgrade
CUW323	Local	Alemany Pump Station Upgrade
CUW324	Local	Mount Davidson Pump Station Upgrade
CUW326	Local	Palo Alto Pump Station Upgrade
CUW326	Local	Sktview-AquaVista Pump Station Upgrade
CUW327	Local	Summit Pump Station Upgrade
CUW328	Local	McLaren #1 Tank Rehabilitation
CUW329	Local	Potrero Heights Tank Seismic Upgrade
CUW330	Local	Forest Knoll Tank Seismic Upgrade
CUW331	Local	Lincoln Park Tank Seismic Upgrade
CUW332	Local	McLaren #2 Tank Rehabilitation
CUW333	Local	Mount Davidson Tank Seismic Upgrade
CUW338	Local	La Grande Pump Station Upgrade
CUW339	Local	Potrero Heights Pump Station Upgrade
CUW340	Local	Vista Francisco Pump Station Upgrade

ATTACHMENT L-1
IDENTIFICATION OF WSIP PROJECTS AS REGIONAL/RETAIL
(Section 5.04)

Project Number		Project Description
		Pipelines/Valves
CUW304	Local	North University Mound System Upgrade
CUW308	Local	Motorize Key Valves
CUW311	Local	Sunset Circulation Improvements
CUW312	Local	Lincoln Way Transmission Line
CUW313	Local	Noe Valley Transmission Main, Phase 2
CUW315	Local	East/West Transmission Main
CUW316	Local	Fulton @ Sixthe Ave Main Replacement
		Water Supply/Water Quality
CUW301	Local	Groundwater
CUW302	Local	Recycled Water
CUW364	Local	Lawrence-Livermore National Laboratory Water Quality Improvements
		Miscellaneous
CUW303	Local	Vehicle Service Facility Upgrade
CUW305	Local	Fire Protection at CCD

03/13/06

$507,815,000
PUBLIC UTILITIES COMMISSION
OF THE CITY AND COUNTY OF SAN FRANCISCO
SAN FRANCISCO WATER REVENUE BONDS, 2006 SERIES A

$110,065,000
PUBLIC UTILITIES COMMISSION
OF THE CITY AND COUNTY OF SAN FRANCISCO
SAN FRANCISCO WATER REVENUE BONDS, 2006 REFUNDING SERIES B

CERTIFICATE REGARDING USE OF PROCEEDS

The undersigned hereby states and certifies as follows:

(i) The undersigned is the General Manager of the Public Utilities Commission of the City and County of San Francisco (the "Commission"), and is authorized to execute this certificate on behalf of the Commission and is knowledgeable with respect to the matters set forth herein.

(ii) On the date hereof, the Commission is issuing the two series of bonds captioned above (the "2006 Series A Bonds," the "2006 Refunding Series B Bonds" and, together, the "Bonds") pursuant to an Amended and Restated Indenture dated as of August 1, 2002 and the First Supplemental Indenture dated as of March 1, 2006 (collectively, the "Indenture"), both by and between the Commission and U.S. Bank National Association, as trustee (the "Trustee").

(iii) The Trustee will transfer and deposit the proceeds of the 2006 Series A Bonds received by the Trustee on the date hereof as follows:

(1) $48,212,528.32 will be deposited in the 2006 Series A Capitalized Interest Account established within the Interest Fund;

(2) $15,958,031.25 will be deposited in the 2006 Series A Reserve Account of the Bond Reserve Fund;

(3) $623,906.09 will be deposited in the 2006 Series A Costs of Issuance Fund;

(4) $120,622,352.19 will be deposited in the 2006 Series A Refunding Fund and transferred pursuant to Irrevocable Refunding Instructions of the Commission dated the date hereof; and

(5) the remaining $338,600,816.86 will be transferred to the Treasurer for deposit to the 2006 Series A Project Fund.

(iv) The proceeds of the 2006 Series A Bonds transferred pursuant to the Irrevocable Refunding Instructions of the Commission will be used to defease and refund the Commission's Commercial Paper Notes (Water Series) on a current basis. The Notes were issued to finance a portion of the facilities described in Exhibit A hereto.

(v) The proceeds of the Bonds deposited in the 2006 Series A Project Fund will be used to finance a portion of the facilities described in Exhibit A hereto.

(vi) The Trustee will transfer and deposit the proceeds of the 2006 Refunding Series B Bonds received by the Trustee on the date hereof as follows:

(1) $192,498.04 will be deposited in the 2006 Refunding Series B Costs of Issuance Fund; and

(2) $111,178,241.95 will be deposited in the 2006 Refunding Series B Refunding Fund.

(vii) The proceeds of the Bonds deposited in the 2006 Refunding Series B Refunding Fund, together with amounts on deposit in the funds and accounts established under the Indenture for the Commission's San Francisco Water Revenue Bonds, 1996 Series A (the "1996 Series A Bonds") and its San Francisco Water Revenue Bonds, 2001 Series A (the "2001 Series A Bonds"), will be used to refund on an advance basis a portion of the outstanding 1996 Series A Bonds and a portion of the outstanding 2001 Series A Bonds. The portion of the 1996 Series A Bonds being refunded were issued to finance the facilities (the "1996 Project") described in Exhibit B hereto, and the portion of the 2001 Series A Bonds being refunded were used to finance the facilities (the "2001 Project") described in Exhibit B hereto.

(viii) Exhibit C hereto attached describes (A) each use to be made by any person of the Project, the 1996 Project and the 2001 Project other than use by the Commission and other non-federal governmental units and other than use by members of the public generally, and (B) payments (if any) directly or indirectly in respect of such use which are to be made after the date hereof;

(ix) Other than as set forth in Exhibit A and Exhibit B, no portion of the proceeds of the Bonds will be used, directly or indirectly, to make or finance a loan to any person (other than a State or local government unit) or to acquire property which will be sold or leased to any person (other than a State or local government unit) on an installment a sale basis except as referenced in Exhibit C.

(x) The Commission expects to use the Project for the purposes referenced and discussed in Exhibit A, Exhibit B, Exhibit C and Exhibit D or for other governmental purposes of the Commission during the entire term of the Bonds.

(xi) Set forth on Exhibit D is the Commission's methodology for determining governmental use and private use with respect to the water enterprise.

(xii) To the best knowledge of the undersigned, the above statements are reasonable and there are no other facts, estimates or circumstances, other than those set forth herein, that would materially affect the statements made herein.

Capitalized terms used but not defined herein have the meanings set forth in the Indenture.

IN WITNESS WHEREOF, I have hereunto set my name this 15th day of March, 2006.

PUBLIC UTILITIES COMMISSION OF THE
CITY AND COUNTY OF SAN FRANCISCO

By:______________________
General Manager

ATTACHMENT L-2 (CONTINUED)
WATER ENTERPRISE REVENUE BOND 2006 SERIES A
SUMMARY OF SOURCES AND USES OF FUNDS
(Section 5.04)

Source: Closing Documents (Certificate Regarding Use of Proceeds)

Proceeds		
Principal	507,815,000.00	
Plus Premium	19,109,138.35	
Minus Underwriter's Discount	(932,940.06)	
Minus Insurance	(1,973,563.58)	
Net Proceeds	524,017,634.71	
Use of Proceeds		
Capitalized Interest Fund	48,212,528.32	
Bond Reserve Fund	15,958,031.25	
Insurance Fund	623,906.09	
Series A Refunding Fund	120,622,352.19	459,223,169.05
Series A Project Fund	338,600,816.86	
Total Uses	524,017,634.71	

	Commercial Paper	**Project Fund**	**Total**
Hetch Hetchy			
Tesla Portal Disinfection	251,262.58	1,147,302.42	1,398,565.00
Advance Disinfection	429,714.76	5,611,554.24	6,041,269.00
SJPL	4,737,937.28	17,784,667.72	22,522,605.00
Total Hetch Hetchy	5,418,914.62	24,543,524.38	29,962,439.00
SF Regional			
University Mound - North	55,728.10	5,964,279.90	6,020,008.00
Sunset - North	7,525,896.84	28,782,094.16	36,307,991.00
Groundwater	3,400,973.67	2,963,110.33	6,364,084.00
Recycled Water	1,548,036.76	11,316,958.24	12,864,995.00
Total SF Regiona1	12,530,635.37	49,026,442.63	61,557,078.00
SF Local	45,405,787.71	106,407,313.30	151,813,101.01
Sunol Valley Subregional			
Calaveras Dam	9,065,945.51	15,993,818.49	25,059,764.00
Stand-by Power	556,398.67	1,207,319.33	1,763,718.00
Pipeline Readiness	649,566.31	4,942,205.69	5,591,772.00
SAPS Upgrade	213,423.44	1,748,134.56	1,961,558.00
SVWTP Finished Water Res	3,317,203.82	7,838,383.18	11,155,587.00
Irvington Tunnel	4,084,139.65	18,247,176.35	22,331,316.00
Alameda Creek Fishery	656,765.00	1,327,119.00	1,983,884.00
SVWTP 40 mgd Addition	25,378.75	3,474,585.25	3,499,964.00
Total Sunol Valley Subregional	18,568,821.15	54,778,741.85	73,347,563.00

ATTACHMENT L-2 (CONTINUED)
WATER ENTERPRISE REVENUE BOND 2006 SERIES A
SUMMARY OF SOURCES AND USES OF FUNDS
(Section 5.04)

Miscellaneous				
PEIR	3,204,177.44	5,103,872.56	8,308,050.00	
PPPCMS Services	2,964,786.31	10,358,811.69	13,323,598.00	
Watershed Land Acquisition	-	502,660.00	502,660.00	
Total Miscellaneous	6,168,963.75	15,965,344.25	22,134,308.00	
LLNL	133,156.60	282,702.40	415,859.00	
Bay Division Subregional				
Seismic Upgrade BDPL 3 & 4	4,758,306.54	16,481,539.46	21,239,846.00	
BDPL Reliability	4,360,664.44	40,874,800.56	45,235,465.00	
BDPL 3 & 4 Crossover	802,494.94	493,817.06	1,296,312.00	
SCADA Phase II	65,497.37	1,247,963.63	1,313,461.00	
EBMUD Intertie	6,668,906.37	4,075,015.63	10,743,922.00	
BDPL 4 Slipline	-	1,219,251.00	1,219,251.00	
Total Bay Division Subregional	16,655,869.66	64,392,387.34	81,048,257.00	
Peninsula Subregional				
Capuchino Valve Lot	162,584.69	753,779.31	916,364.00	
CS/SA Transmission	2,288,853.10	3,448,975.90	5,737,829.00	
Adit Leak Repair	255,334.99	1,650,368.01	1,905,703.00	
HTWTP Short Term	2,874,763.69	3,582,860.31	6,457,624.00	
Cross Connection Control	1,150,559.48	324,549.52	1,475,109.00	
CS Bypass Tunnel	2,873,475.22	15,532,584.78	18,406,060.00	
LCS Dam Improvement	931,587.07	3,278,932.93	4,210,520.00	
Pulgas Balancing Reservoir	1,218,341.39	2,706,284.61	3,924,626.00	
HTWTP Long Term	1,107,185.77	2,549,793.23	3,656,979.00	
Baden & San Pedro Valve Lots	60,203.48	2,963,540.52	3,023,744.00	
Total Peninsula Subregional	12,922,888.88	36,791,669.12	49,714,558.00	
San Francisco Subregional				
CSPL 2 Replacement	1,269,111.95	5,019,824.05	6,288,936.00	
SAPL 3	1,492,584.40	1,942,479.60	3,435,064.00	
Desalination	55,618.10	596,473.90	652,092.00	
Total San Francisco Subregional	2,817,314.45	7,558,777.55	10,376,092.00	
Grand Total	120,622,352.19	359,746,902.82	480,369,255.01	
Regional			328,140,295.00	68.31%
Local			152,228,960.01	31.69%
			480,369,255.01	

This certificate is for illustration only. It was prepared in 2006 and shown groundwater and recycled water projects as regional instead of local. In addition, it does not reflect expenditures for the portions of regional assets which in rate base as of June 30, 2008 nor what is expected to be added to rate base through June 30, 2009. For these reasons, the percentages shown for regional and local projects are not accurate.

ATTACHMENT L-3
WATER ENTERPRISE REVENUE BOND 2006 SERIES A
ANNUAL REPORT ON EXPENDITURES OF AND EARNINGS ON PROCEEDS
AS OF JUNE 30, 2009
(Section 5.04 A)

Project Number		Project Description	Net Financing Proceeds[1]	Appropriated Interest Earnings[2]	Adjusted Project Funding	Expenditures Thru 6/30/09[3]	Remaining Balance
REGIONAL PROGRAM							
		San Joaquin Region					
CUW373	Regional	San Joaquin Pipeline System Rehabilitation	1,398,565				
CUW384	Regional	Tesla Advance Disinfection	6,041,269				
CUW387	Regional	Tesla Portal Disinfection	22,522,605				
		Total San Joaquin Region	29,962,439				
		Sunol Valley Region					
CUW352	Regional	Alameda Creek Fishery Enhancement	1,983,884				
CUW355	Regional	Stand-by Power - Various Locations	1,763,718				
CUW359	Regional	New Irvington Tunnel/Alameda Siphon No. 4	22,331,316				
CUW370	Regional	Pipeline Readiness Improvements	5,591,772				
CUW374	Regional	Calaveras Dam Replacement	25,059,764				
CUW381	Regional	SVWTP 40 mgd Addition	3,499,964				
CUW382	Regional	SVWTP Finished Water Reservoir	11,155,587				
CUW386	Regional	San Antonio Pump Station Upgrade	1,961,558				
		Total Sunol Valley Region	73,347,563				
		Bay Division Region					
CUW353	Regional	Seismic Upgrade BDPL 3 & 4	21,234,846				
CUW363	Regional	SCADA Phase II/Security Upgrades	1,313,461				
CUW368	Regional	BDPL Reliability Upgrades	45,235,465				
CUW380	Regional	BDPL 3 & 4 Crossover	21,239,846				
CUW389	Regional	EBMUD Intertie	10,743,922				
CUW393	Regional	BDPL 4 Slipline	1,219,251				
		Total Bay Division Region	100,986,791				
		Peninsula Region					
CUW354	Regional	Lower Crystal Springs Dam Improvement	4,210,520				
CUW356	Regional	Crystal Springs Bypass Tunnel	18,406,060				
CUW357	Regional	Adit Leak Repairs	1,905,703				
CUW361	Regional	Pulgas Balancing Reservoir Rehabilitation and Improvements	3,924,626				
CUW365	Regional	Cross Connection Control	1,475,109				
CUW366	Regional	HTWTP Short Term Improvemetns	6,457,624				
CUW367	Regional	HTWTP Long Term Improvements	3,656,979				
CUW369	Regional	Capuchino Valve Lot Improvements	916,364				
CUW371	Regional	Crystal Springs/San Andreas Transmission	5,737,829				
CUW378	Regional	Crystal Springs Pipleine 2 Replacement	6,288,936				
CUW379	Regional	San Andreas Pipeline 3 Installation	3,435,064				
CUW390	Regional	Desalination	652,092				
CUW391	Regional	Baden & San Pedro Valve Lots Improvements	3,023,744				
		Total Peninsula Region	60,090,650				
		San Francisco Region					
CUW358	Regional	Sunset Reservoir Upgrades - North Basin	6,020,008				
CUW372	Regional	University Mound Reservoir Upgrades - North Basin	36,307,991				
		Total San Francisco Region	42,327,999				
		System-Wide					
CUW388	Regional	PEIR	8,308,050				
CUW392	Regional	Program Management Services	13,323,598				
CUW394	Regional	Watershed Land Acquisition	502,660				
		Total System-Wide	22,134,308				
		Total Regional Program	328,849,750				
LOCAL PROGRAM							
		Reservoirs					
CUW307	Local	Summit Reservoir Rehabilitation					
CUW310	Local	New Northwest Reservoir					
CUW319	Local	Hunters Point Reservoir Rehabilitation					
CUW334	Local	Stanford Heights Reservoir Rehabilitation					
CUW335	Local	Potrero Heights Reservoir Rehabilitation					
CUW337	Local	Sutro Reservoir Rehabilitation					
		Total Reservoirs					
		Pump Stations/Tanks					
CUW306	Local	Crocker Amazon Pump Station Upgrade					
CUW309	Local	Lake Merced Pump Station Upgrade					
CUW314	Local	La Grande Tank Upgrade					
CUW318	Local	Forest Hill Tank Rehabilitation					
CUW320	Local	Forest Hilll Pump Station Upgrade					
CUW321	Local	Forest Knoll Pump Station Upgrade					
CUW322	Local	Lincoln Park Pump Station Upgrade					
CUW323	Local	Alemany Pump Station Upgrade					
CUW324	Local	Mount Davidson Pump Station Upgrade					

WATER ENTERPRISE REVENUE BOND 2006 SERIES A
ANNUAL REPORT ON EXPENDITURES OF AND EARNINGS ON PROCEEDS
AS OF JUNE 30, 2009
(Section 5.04 A)

Project Number		Project Description	Net Financing Proceeds[1]	Appropriated Interest Earnings[2]	Adjusted Project Funding	Expenditures Thru 6/30/09[3]	Remaining Balance
CUW326	Local	Palo Alto Pump Station Upgrade					
CUW326	Local	Sktview-AquaVista Pump Station Upgrade					
CUW327	Local	Summit Pump Station Upgrade					
CUW328	Local	McLaren #1 Tank Rehabilitation					
CUW329	Local	Potrero Heights Tank Seismic Upgrade					
CUW330	Local	Forest Knoll Tank Seismic Upgrade					
CUW331	Local	Lincoln Park Tank Seismic Upgrade					
CUW332	Local	McLaren #2 Tank Rehabilitation					
CUW333	Local	Mount Davidson Tank Seismic Upgrade					
CUW338	Local	La Grande Pump Station Upgrade					
CUW339	Local	Potrero Heights Pump Station Upgrade					
CUW340	Local	Vista Francisco Pump Station Upgrade					
		Total Pump Stations/Tanks					
		Pipelines/Valves					
CUW304	Local	North University Mound System Upgrade					
CUW308	Local	Motorize Key Valves					
CUW311	Local	Sunset Circulation Improvements					
CUW312	Local	Lincoln Way Transmission Line					
CUW313	Local	Noe Valley Transmission Main, Phase 2					
CUW315	Local	East/West Transmission Main					
CUW316	Local	Fulton @ Sixth Ave Main Replacement					
		TtoalPipelines/Valves					
		Water Supply/Water Quality					
CUW301	Local	Groundwater					
CUW302	Local	Recycled Water					
CUW364	Local	Lawrence-Livermore National Laboratory Water Quality Improvements					
		Total Water Supply/Water Quality					
		Miscellaneous					
CUW303	Local	Vehicle Service Facility Upgrade					
CUW305	Local	Fire Protection at CCD					
		Total Miscellaneous					
		Total Local Program					
		Grand Total Regional and Local Programs					
		Unappropriated Interest Earnings					
		Percent of Net Proceeds[4]					
		Percent of Net Proceeds and Earnings[4]					

[1]Net financing proceeds available on date of issue (i.e. deposit to project fund)
[2]Cumulative net of arbitrage rebate liability
[3]Cumulative
[4]If financing sources Substantially Expended, proceed allocations are then fixed

REVENUE-FUNDED CAPITAL ADDITIONS (Section 5.04.B)
Subfund: 5W CPF WCF - Wholesale Customer Capital Fund (Water)

Projected FAMIS as of July 1, 2009 (Day 1 of New Budget Year)

Based on Proportionate Annual Water Deliveries of ... 68.7%

		A	B	C	D	E	F	G=C-D-F	H	I=G-H
			Wholesale Customer Capital Fund (5W CPF WCF)							
Project	Title	FY 2009-10 Approved Budget* - Total Regional	FY 2009-10 Approved Budget - WHOLESALE SHARE	Total Appropriation - All Years^	All Years Actual Expenditures^	Fiscal Year 2009-10 Actual Expenditures^	Encumbered But Not Expended^	Appropriated, Unencumbered Balance^	Projected Expended & Encumbered through 6/30/2010	Projected Surplus / (Shortfall)
CUW262	Regional Water RnR - Treatment Facilities	$ 1,000,000	$ 687,000	$ 687,000	$ -	$ -	$ -	$ 687,000	$ 229,000	$ 458,000
CUW263	Regional Water RnR - Conveyance/Transmission Systems	$ 7,000,000	$ 4,809,000	$ 4,809,000	$ -	$ -	$ -	$ 4,809,000	$ 1,603,000	$ 3,206,000
CUW264	Regional Water - Watersheds / ROW Management	$ 500,000	$ 343,500	$ 343,500	$ -	$ -	$ -	$ 343,500	$ 114,000	$ 229,500
FUW100	Regional Water - Facilities Maintenance	$ 3,700,000	$ 2,541,900	$ 2,541,900	$ -	$ -	$ -	$ 2,541,900	$ 847,000	$ 1,694,900
CUW261	Regional Water - Storage									
	Regional Total	$ 12,200,000	$ 8,381,400	$ 8,381,400	$ -	$ -	$ -	$ 8,381,400	$ 2,793,000	$ 5,588,400

Source: * SFPUC Commission Approved Budget, February 2009, Same Format
^ FAMIS - City's Official Financial System of Record

Ties to Budget Hearing Materials

REVENUE-FUNDED CAPITAL ADDITIONS (Section 5.04.B)
Subfund: 5W CPF WCF - Wholesale Customer Capital Fund (Water)

Projected FAMIS as of June 30, 2010 (Last Day of Budget Year)

Based on Proportionate Annual Water Deliveries of ... 68.7%

Project	Title	FY 2009-10 Approved Budget* - Total Regional	FY 2009-10 Approved Budget - WHOLESALE SHARE	Total Appropriation - All Years^	All Years Actual Expenditures^	Fiscal Year 2009-10 Actual Expenditures^	Encumbered But Not Expended^	Appropriated, Unencumbered Balance^	Projected Expended & Encumbered through 6/30/2011	Projected Surplus / (Shortfall)
			Wholesale Customer Capital Fund (5W CPF WCF)							
CUW262	Regional Water RnR - Treatment Facilities	$ 1,000,000	$ 687,000	$ 687,000	$ 235,000	$ 235,000	$ -	$ 452,000	$ 409,000	$ 43,000
CUW263	Regional Water RnR - Conveyance/Transmission Systems	$ 7,000,000	$ 4,809,000	$ 4,809,000	$ 1,395,000	$ 1,395,000	$ 25,000	$ 3,389,000	$ 1,589,000	$ 1,800,000
CUW264	Regional Water - Watersheds / ROW Management	$ 500,000	$ 343,500	$ 343,500	$ 115,000	$ 115,000	$ 50,000	$ 178,500	$ 35,500	$ 143,000
FUW100	Regional Water - Facilities Maintenance	$ 3,700,000	$ 2,541,900	$ 2,541,900	$ 850,000	$ 850,000	$ 123,000	$ 1,568,900	$ 768,900	$ 800,000
CUW261	Regional Water - Storage	$ -	$ -							
	Regional Total	$ 12,200,000	$ 8,381,400	$ 8,381,400	$ 2,595,000	$ 2,595,000	$ 198,000	$ 5,588,400	$ 2,802,400	$ 2,786,000

Source: * SFPUC Commission Approved Budget, February 2009, Same Format
^ FAMIS - City's Official Financial System of Record

Ties to Budget Hearing Materials
Shown on Attachment N-2, Schedule 3

Shown On Attachment N-2, Schedule 3
Revenue Capital - Actual Expenditures

Shown on Attachement N-2, Schedule 3
Continuing Appropriation
Needed for Mulit-Year
Revenue Funded Capital

REVENUE-FUNDED CAPTIAL ADDITIONS (Section 5.04.B)
Subfund: 5T CPF WCF - Wholesale Customer Capital Fund (Hetch Hetchy)

Projected FAMIS as of July 1, 2009 (Day 1 of New Budget Year)

Based on Proportionate Annual Water Deliveries of ...

		A		B	C	D	E	F	G=C-D-F	H	I=G-H
					Wholesale Customer Capital Fund (5W CPF WCF)						
				68.1%							
Project	Title	FY 2009-10 Approved Budget* - Total Regional		FY 2009-10 Approved Budget - WHOLESALE SHARE	Total Appropriation - All Years^	All Years Actual Expenditures^	Fiscal Year 2009-10 Actual Expenditures^	Encumbered But Not Expended^	Appropriated, Unencumbered Balance^	Projected Expended & Encumbered through 6/30/2010	Projected Surplus / (Shortfall)
CUH931	HH Microwave Replacement	$ 4,000,000	J	$ 1,224,900	$ 1,224,900	$ -	$ -	$ -	$ 1,224,900	$ 408,000	$ 816,900
CUH977	HH Water R&R - Facilities Maintenance	$ 3,500,000	J	$ 1,071,788	$ 1,071,788	$ -	$ -	$ -	$ 1,071,788	$ 357,000	$ 714,788
CUH947	SEA - Go Solar Incentive Porject	$ 4,000,000	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH971	Alternative Transmission Studies	$ 1,000,000	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH976	HH Water R&R - Power Infrastructure	$ 16,700,000	P	$ -	$ -					$ -	
CUH979	Hunters Point Municipal Power	$ -	P	$ -	$ -					$ -	
CUH983	Civic Center Sustainability District	$ 1,090,000	P	$ -	$ -					$ -	
CUH986	General Fund Dept - Energy Efficiency	$ 7,365,158	P	$ -	$ -					$ -	
	Renewable/Generation	$ 3,501,307	P	$ -	$ -					$ -	
	Treasure Island Improvement Project	$ 2,700,000	P	$ -	$ -					$ -	
	Enterprise Fund Dept - Energy Efficiency	$ 325,722	P	$ -	$ -					$ -	
CUH975	HH Water R&R - Water Infrastructure	$ 6,000,000	W	$ 4,083,000	$ 4,083,000					$ 1,361,000	
	Toulumne River Watershed Protection	$ 2,000,000	W	$ 1,361,000	$ 1,361,000					$ 454,000	
	Regional Total	$ 52,182,187		$ 7,740,688	$ 7,740,688	$ -	$ -	$ -	$ 2,296,688	$ 2,580,000	$ 1,531,688

Source: * SFPUC Commission Approved Budget, February 2009, Same Format
^ FAMIS - City's Official Financial System of Record

Ties to Budget Hearing Materials

REVENUE-FUNDED CAPTIAL ADDITIONS (Section 5.04.B)
Subfund: 5T CPF WCF - Wholesale Customer Capital Fund (Hetch Hetchy)

Projected FAMIS as of June 30, 2010 (Last Day of Budget Year)

Based on Proportionate Annual Water Deliveries of ...

					Wholesale Customer Capital Fund (5W CPF WCF)						
				68.1%							
Project	Title	FY 2009-10 Approved Budget* - Total Regional		FY 2009-10 Approved Budget - WHOLESALE SHARE	Total Appropriation - All Years^	All Years Actual Expenditures^	Fiscal Year 2009-10 Actual Expenditures^	Encumbered But Not Expended^	Appropriated, Unencumbered Balance^	Projected Expended & Encumbered through 6/30/2011	Projected Surplus / (Shortfall)
CUH931	HH Microwave Replacement	$ 4,000,000	J	$ 1,224,900	$ 1,224,900	$ 1,224,900	$ 1,224,900	$ -	$ -	$ -	$ -
CUH977	HH Water R&R - Facilities Maintenance	$ 3,500,000	J	$ 1,071,788	$ 1,071,788	$ 1,071,788	$ 1,071,788	$ -	$ (1)	$ (1)	$ -
CUH947	SEA - Go Solar Incentive Porject	$ 4,000,000	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH971	Alternative Transmission Studies	$ 1,000,000	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH976	HH Water R&R - Power Infrastructure	$ 16,700,000	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH979	Hunters Point Municipal Power	$ -	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH983	Civic Center Sustainability District	$ 1,090,000	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH986	General Fund Dept - Energy Efficiency	$ 7,365,158	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Renewable/Generation	$ 3,501,307	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Treasure Island Improvement Project	$ 2,700,000	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	Enterprise Fund Dept - Energy Efficiency	$ 325,722	P	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CUH975	HH Water R&R - Water Infrastructure	$ 6,000,000	W	$ 4,083,000	$ 4,083,000	$ 4,083,000	$ 4,083,000	$ -	$ -	$ -	$ -
	Toulumne River Watershed Protection	$ 2,000,000	W	$ 1,361,000	$ 1,361,000	$ 1,361,000	$ 1,361,000	$ -	$ -	$ -	$ -
	Regional Total	$ 52,182,187		$ 7,740,688	$ 7,740,688	$ 7,740,688	$ 7,740,688	$ -	$ (1)	$ (1)	$ -

Source: * SFPUC Commission Approved Budget, February 2009, Same Format
^ FAMIS - City's Official Financial System of Record

Ties to Budget Hearing Materials
Shown on Attachment N-2, Schedule 6

Shown On Attachment N-2, Schedule 6
Revenue Capital - Actual Expenditures

Show on Attachment N-2, Schedule 6
Continuing Appropriation
Needed for Mulit-Year
Revenue Funded Capital

ATTACHMENT M-2

REVENUE FUNDED CAPITAL
ANNUAL REPORTING REQUIREMENTS
(Section 5.04B)

Part A. Updated Actual Information Through Most Recent Fiscal Year (Due in November)

Each year, the SFPUC will provide a report on the status of the regional revenue funded projects with the following information:

Project-level information (through close-out)

1 Scope of project
2 Current cost estimate/budget.
3 Expected milestone dates (ie, design, environmental, construction period, close-out, etc.)
4 Contract status
5 Reasons for status changes from prior report.
6 Other information relevant to whether project is on time/on budget.
7 For most recently completed fiscal year and estimated for current year:
8 Total expenditures (capital and operating); amounts paid from other sources.
9 Amount of encumbered and unencumbered appropriations
10 Application of any unused appropriations

Wholesale Capital Fund

11 Beginning balance, deposits, capital expenditures (by project), earnings, ending balance.
12 Components of ending balance; wholesale portion of:
13 Appropriated and encumbered
14 Appropriated but unencumbered

Part B. Proposed Appropriations for Upcoming Year (Due in March)

15 Project information, to the extent not provided in Part A
16 Expected funding needs for regional projects
17 Unused or excess appropropriations carried over.
18 Proposed appropriation for upcoming fiscal year.

ATTACHMENT M-3
WHOLESALE REVENUE-FUNDED CAPITAL FUND - BALANCING ACCOUNT ADJUSTMENT
**** EXAMPLE REPORTING FORMAT ****
(Section 6.08)

		(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)	(1)
		FY 2009-10	**FY 2010-11**	**FY 2011-12**	**FY 2012-13**	**FY 2013-14**	**FY 2014-15**	**FY 2015-16**	**FY 2016-17**	**FY 2017-18**	**FY 2018-19**	**FY 2019-20**
a.	Beginning balance	$0	$5,671,414	$8,960,834	$9,669,194	$10,420,781	$11,217,991	$5,498,801	$6,198,022	$6,944,933	$7,742,299	$8,593,037
b.	Transfer to Balancing Account	$0					($6,467,533)					($2,574,995)
	Year 1											
c.	Budgeted appropriation	$8,381,400					$10,697,026					$13,652,417
d.	Encumbrance/Expenditure	($2,793,800)	($2,793,800)	($2,793,800)			($3,565,675)	($3,565,675)	($3,565,675)			($4,550,806)
	Year 2											
e.	Budgeted appropriation		$8,800,470					$11,231,878				
f.	Encumbrance/Expenditure		($2,933,490)	($2,933,490)	($2,933,490)			($3,743,959)	($3,743,959)	($3,743,959)		
	Year 3											
g.	Budgeted appropriation			$9,240,494					$11,793,471			
h.	Encumbrance/Expenditure			($3,080,165)	($3,080,165)	($3,080,165)			($3,931,157)	($3,931,157)	($3,931,157)	
	Year 4											
i.	Budgeted appropriation				$9,702,518					$12,383,145		
j.	Encumbrance/Expenditure				($3,234,173)	($3,234,173)	($3,234,173)			($4,127,715)	($4,127,715)	($4,127,715)
	Year 5											
k.	Budgeted appropriation					$10,187,644					$13,002,302	
l.	Encumbrance/Expenditure					($3,395,881)	($3,395,881)	($3,395,881)			($4,334,101)	($4,334,101)
m.	Subtotal	$5,587,600	$8,744,594	$9,393,873	$10,123,885	$10,898,206	$5,251,755	$6,025,163	$6,750,702	$7,525,246	$8,351,628	$6,657,838
n.	Interest earnings (e.g., 3%)	$83,814	$216,240	$275,321	$296,896	$319,785	$247,046	$172,859	$194,231	$217,053	$241,409	$228,763
o.	Ending fund balance (unencumbered, unexpende	$5,671,414	$8,960,834	$9,669,194	$10,420,781	$11,217,991	$5,498,801	$6,198,022	$6,944,933	$7,742,299	$8,593,037	$6,886,601
p.	Five Year Cumulative Appropriations w/ interest					$47,504,581					$60,180,421	
q.	10% of Cumulative Appropriations w/ interest					$4,750,458					$6,018,042	
r.	Ending fund balance					$11,217,991					$8,593,037	
s.	Excess balance transferred to Balancing Account*					($6,467,533)					($2,574,995)	

*Test: Any balance in excess of 10% of the cumulative five-year appropriation total is credited to the balancing account.

BALANCING ACCOUNT / RATE SETTING CALCULATION
REFERENCE SECTION 6.03.A.3.a

	FY 2007-08	FY 2008-09	FY 2009-10
Step 1:			
A. Balancing Account as of June 30, 2007	$12,882,000		
B. Interest on Balancing Account at Pooled Investment Rate for Fiscal Year	$554,000		
C. Wholesale Revenues for Fiscal Year	($113,932,000)		
D. Wholesale Revenue Requirement for Fiscal Year	$119,224,000		
E. Settlement Credits or Other Adjustments	$2,448,614		
F. 1984 Agreement Balancing Account Credits	$0		
G. Balancing Account as of June 30, 2008	$21,176,614		
Step 2:			
A. Balancing Account as of June 30, 2008		$21,176,614	
B. Interest on Balancing Account at Pooled Investment Rate for Fiscal Year		$529,000	
C. Wholesale Revenues for Fiscal Year		-$123,604,000	
D. Wholesale Revenue Requirement for Fiscal Year		$120,562,000	
E. Settlement Credits or Other Adjustments		$21,000	
F. 1984 Agreement Balancing Account Credits		$0	
G. Balancing Account as of June 30, 2009		$18,684,614	
Step 3:			
A. Balancing Account as of June 30, 2009			$0
B. Interest on Balancing Account at Pooled Investment Rate for Fiscal Year			$0
C. Wholesale Revenues for Fiscal Year			-$127,485,900
D. Wholesale Revenue Requirement for Fiscal Year			$140,994,733
E. Settlement Credits or Other Adjustments			$21,000
F. 1984 Agreement Balancing Account Credits			$1,997,220
G. Balancing Account as of June 30, 2010			$15,527,053
H. Net Change in Wholesale Revenue Coverage			$4,488,233
I. Total Revenue Deficiency or Surplus			$20,015,286
J. Projected Water Sales in Ccf	84,621,240	83,205,600	85,920,000
K. Deficiency or (Surplus) $/Ccf			$0.23
L. Deficiency or (Surplus) Ccf as a Percentage of Revenues			15.7%

Note: Dollar amounts are for illustrative purposes only. The Parties have not agreed on the amount of the balancing account as of June 30, 2007, revenue requirement for FY 2007-08, settlement credits for FY 2007-08, and the amount of the balancing account as of June 30, 2009.

BALANCING ACCOUNT / RATE SETTING CALCULATION
METHOD OF CALCULATION
REFERENCE SECTION 6.03.A.3.a

N = The year for which rates are being set

N-1 = The current year

N-2 = The most recently completed year for which actual results are available

Calculation Method:

Step 1 Determine the actual revenue differential for year N-2
- A. Enter the beginning amount of the Balancing Account
- B. Calculate the interest earned at the Pooled Investment Account Rate for (A)
- C. Enter the actual Wholesale revenues billed
- D. Enter the Wholesale Revenue Requirement
- E. Enter settlement credits or adjustments, if any
- F. Enter carry-over 1984 Agreement credits owed the City, if any
- G. Calculate the ending amount of the Balancing Account

Step 2 Determine the projected revenue differential for year N-1
- A. Enter the beginning amount of the Balancing Account; this is the same amount as G in Step 1
- B. Calculate the interest earned at the Pooled Investment Account Rate for (A)
- C. Enter the actual Wholesale revenues billed
- D. Enter the Wholesale Revenue Requirement
- E. Enter settlement credits or adjustments, if any
- F. Enter carry-over 1984 Agreement credits owed the City, if any
- G. Calculate the ending amount of the Balancing Account

Step 3 Determine the projected revenue differential for year N
- A. Enter the beginning amount of the Balancing Account; this is the same amount as G in Step 2
- B. Calculate the interest earned at the Pooled Investment Account Rate for (A)
- C. Enter the actual Wholesale revenues billed
- D. Enter the Wholesale Revenue Requirement
- E. Enter settlement credits or adjustments, if any
- F. Enter carry-over 1984 Agreement credits owed the City, if any
- G. Calculate the ending amount of the Balancing Account
- H. Enter the net change in the Wholesale Revenue Coverage, if applicable
- I. Calculate the total revenue deficiency or surplus (G) + (H)
- J. Enter the projected water sales to Wholesale Customers in Ccf
- K. Calculate the required increase in the commodity portion of the rate by dividing (I) by (J)
- L. Calculate the required increase in revenues by dividing (I) by (C)

WHOLESALE REVENUE REQUIREMENT SCHEDULES
CALCULATION OF WHOLESALE REVENUE REQUIREMENT
FISCAL YEAR 2009-10
REFERENCE ARTICLE 5

ATTACHMENT N-2
SCHEDULE 1

EXPENSE CATEGORY	CONTRACT REFERENCE	SCHEDULE REFERENCE	TOTAL	DIRECT RETAIL	DIRECT WHOLESALE	REGIONAL	JOINT EXPENSE ALLOCATION FACTOR	WHOLESALE SHARE
OPERATING AND MAINTENANCE EXPENSE:								
SOURCE OF SUPPLY	5.05 (A)	SCH 8.1	$ 14,943,953	$ 1,251,062	$ -	$ 13,692,891	ANNUAL USE[1]	$ 9,364,568
PUMPING	5.05 (B)	SCH 8.1	$ 4,342,682	$ 3,854,000	$ -	$ 488,682	ANNUAL USE[1]	$ 334,210
TREATMENT	5.05 (C)	SCH 8.1	$ 30,445,053	$ -	$ -	$ 30,445,053	ANNUAL USE[1]	$ 20,821,372
TRANSMISSION & DISTRIBUTION	5.05 (D)	SCH 8.1	$ 53,416,232	$ 30,163,286	$ -	$ 23,252,946	ANNUAL USE[1]	$ 15,902,690
CUSTOMER ACCOUNTS[2]	5.05 (E)	SCH 8.1	$ 7,552,213	$ 7,401,169	$ 151,044	$	2%	$ 151,044
TOTAL O&M			$ 110,700,133	$ 42,669,517	$ 151,044	$ 67,879,572		46,573,883
COMPOSITE % (WHOLESALE SHARE / TOTAL O&M)	5.06 (C)							42.07%
ADMINISTRATIVE AND GENERAL EXPENSES:								
COWCAP	5.06 (A)	SCH 8.1	$ 1,238,009	$ -	$ -	$ 1,238,009	COMPOSITE O&M	$ 520,857
SERVICES OF SFPUC BUREAUS	5.06 (B)	SCH 7	$ 22,465,291	$ 8,178,424	$ -	$ 14,286,867	ANNUAL USE[1]	$ 9,770,788
OTHER A&G	5.06 (C)	SCH 8.1	$ 12,972,477	$ 4,009,891	$ -	$ 8,962,586	COMPOSITE O&M	$ 3,770,749
COMPLIANCE AUDIT	5.06 (D)	SCH 8.1	$ 200,000	$ -	$ -	$ 200,000	50%	$ 100,000
TOTAL A&G			$ 36,875,777	$ 12,188,315	$ -	$ 24,687,462		$ 14,162,394
PROPERTY TAXES	5.07	SCH 8.1	$ 1,417,293	$ -	$ -	$ 1,417,293	ANNUAL USE[1]	$ 969,287
CAPITAL COST RECOVERY								
PRE-2009 ASSETS	5.03	ATT K						$ 24,051,326
DEBT SERVICE ON NEW ASSETS	5.04 (A)	SCH 2						$ 17,952,931
REVENUE FUNDED ASSETS - APPROPRIATED TO WHOLESALE CAPITAL FUND	5.04 (B)	SCH 3						$ 8,381,400
TOTAL CAPITAL COST RECOVERY								$ 50,385,657
WHOLESALE SHARE HETCH HETCHY WATER & POWER	5.04	SCH 4						$ 28,903,512
WHOLESALE REVENUE REQUIREMENT								$ 140,994,733
WHOLESALE REVENUE COVERAGE[3]								$ 4,488,233

[1]Proportional Annual Use (68.39%)
[2]Water Enterprise Share of Customer Accounts Expenses (62% of Total Customer Accounts Expenses)
[3]25% of Wholesale Share of Debt Service

WHOLESALE REVENUE REQUIREMENT SCHEDULES
WATER ENTERPRISE CAPITAL COST RECOVERY - ANNUAL DEBT SERVICE
FISCAL YEAR 2009-10
REFERENCE SECTION 5.04.A

ATTACHMENT N-2
SCHEDULE 2

	2006 BOND ISSUE SERIES A	2008 BOND ISSUE ALL SERIES	2009 BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	TOTAL ALL OUTSTANDING BONDS
USE OF BOND PROCEEDS								
RETAIL PROJECTS	31.61%	22.95%	19.42%	XX.XX%	XX.XX%	XX.XX%	XX.XX%	[redacted]
REGIONAL PROJECTS	68.39%	77.05%	80.58%	YY.YY%	YY.YY%	YY.YY%	YY.YY%	[redacted]
PRINCIPAL PAYMENT	$ 8,765,000	-	-	-	-	-	-	$ 8,765,000
RETAIL PROJECTS	$ 2,770,617	-	-	-	-	-	-	$ 2,770,617
REGIONAL PROJECTS	$ 5,994,384	-	-	-	-	-	-	$ 5,994,384
INTEREST PAYMENT (GROSS)	$ 23,353,388	$ 5,561,386	$ 56,181,932	-	-	-	-	$ 85,096,706
RETAIL PROJECTS	$ 7,382,006	$ 1,276,338	$ 10,910,531	-	-	-	-	$ 19,568,875
REGIONAL PROJECTS	$ 15,971,382	$ 4,285,048	$ 45,271,401	-	-	-	-	$ 65,527,831
INTEREST PAYMENT (CAPITALIZED)	-	-	$ 56,181,932					
RETAIL PROJECTS	-	-	$ 10,910,531					
REGIONAL PROJECTS	-	-	$ 45,271,401					
INTEREST PAYMENT (NET)	$ 23,353,388	$ 5,561,386	-					
RETAIL PROJECTS	$ 7,382,006	$ 1,276,338	-					
REGIONAL PROJECTS	$ 15,971,382	$ 4,285,048	-					
TOTAL PRINCIPAL AND INTEREST PAYMENT	32,118,388	5,561,386	-	-	-	-	-	$ 37,679,774
RETAIL PROJECTS	10,152,622	1,276,338	-	-	-	-	-	$ 11,428,961
REGIONAL PROJECTS	21,965,766	4,285,048	-	-	-	-	-	$ 26,250,813
PROPORTIONAL ANNUAL USE	68.39%	68.39%	68.39%	ZZ.ZZ%	ZZ.ZZ%	ZZ.ZZ%	ZZ.ZZ%	[redacted]
WHOLESALE SHARE	$ 15,022,387	$ 2,930,544	-	-	-	-	-	$ 17,952,931 (TO SCHEDULE 1)

Note: Allocation of bond proceeds shown are for illustrative purposes only. Regional projects will not include bond proceeds used to construct or acquire assets capitalized prior to 7/1/09. Regional projects also will not include in-city groundwater or in-city recycled water projects.

WHOLESALE REVENUE REQUIREMENT SCHEDULES
WATER ENTERPRISE CAPITAL COST RECOVERY - REVENUE FUNDED CAPITAL PROJECTS
FISCAL YEAR 2009-10
REFERENCE SECTION 5.04.B

ATTACHMENT N-2
SCHEDULE 3

		PROJECT APPROPRIATION	CLASSIFICATION	ALLOCATION FACTOR	WHOLESALE SHARE	TOTAL APPROPRIATION ALL YEARS	ALL YEARS ACTUAL EXPENDITURES	FY 2009-10 ACTUAL EXPENDITURES	ENCUMBERED, NOT EXPENDED	APPROPRIATED, UNENCUMBERED BALANCE
CUH980	Treasure Island Improvement Project	3,800,000	RETAIL	0.0%	$ -	$ -	$ -	$ -	$ -	$ -
CUW253	Facilities Security	500,000	RETAIL	0.0%	$ -	$ -	$ -	$ -	$ -	$ -
CUW260	Local Water R&R	22,347,520	RETAIL	0.0%	$ -	$ -	$ -	$ -	$ -	$ -
CUW686	Automated Meter Reading System	36,001,000	RETAIL	0.0%	$ -	$ -	$ -	$ -	$ -	$ -
	Total Local	62,648,520			$ -	$ -	$ -	$ -	$ -	$ -
CUW202	Replace Prestressed Concrete Cylr Pipe	-	REGIONAL	68.7%	$ -	$ -	$ -	$ -	$ -	$ -
CUW261	Regional Water R&R - Storage	-	REGIONAL	68.7%	$ -	$ -	$ -	$ -	$ -	$ -
CUW262	Regional Water R&R -Treatment Facilities	1,000,000	REGIONAL	68.7%	$ 687,000	$ 667,000	$ 235,000	$ 235,000	$ -	$ 452,000
CUW263	Regional Water R&R Conveyance/Transmission	7,000,000	REGIONAL	68.7%	$ 4,809,000	$ 4,809,000	$ 1,395,000	$ 1,395,000	$ 25,000	$ 3,389,000
CUW264	Regional Watersheds/ROW Management	500,000	REGIONAL	68.7%	$ 343,500	$ 343,500	$ 115,000	$ 115,000	$ 50,000	$ 178,500
FUW100	Regional Facilities Maintenance	3,700,000	REGIONAL	68.7%	$ 2,541,900	$ 2,541,900	$ 850,000	$ 850,000	$ 123,000	$ 1,568,900
	Total Regional	12,200,000			$ 8,381,400	$ 8,381,400	$ 2,595,000	$ 2,595,000	$ 198,000	$ 5,588,400
	TOTAL ALL PROJECTS	74,848,520			$ 8,381,400	$ 8,381,400	$ 2,595,000	$ 2,595,000	$ 198,000	$ 5,588,400
								(TO SCHEDULE 1)	(TO SCHEDULE 1)	(TO SCHEDULE 1)

WHOLESALE REVENUE REQUIREMENT SCHEDULES
CALCULATION OF WHOLESALE SHARE OF HETCH HETCHY WATER & POWER
FISCAL YEAR 2009-10
REFERENCE ARTICLE 5

EXPENSE CATEGORY	CONTRACT REFERENCE	SCHEDULE REFERENCE	TOTAL	POWER SPECIFIC	WATER SPECIFIC	JOINT	JOINT ALLOCATION PERCENTAGE	WATER-RELATED TOTAL	WHOLESALE ALLOCATION FACTOR	WHOLESALE SHARE
OPERATION AND MAINTENANCE										
OPERATION	5.08 B 1	SCH 8.2	$ 44,612,220	$ 31,853,965	$ 9,557,861	$ 3,200,394	45%	$ 10,998,038	ADJUSTED PROPORTIONAL ANNUAL USE	$ 7,484,165
MAINTENANCE	5.08 B 1	SCH 8.2	$ 16,868,612	$ 5,048,039	$ 3,238,622	$ 8,581,951	45%	$ 7,100,500	ADJUSTED PROPORTIONAL ANNUAL USE	$ 4,831,890
TOTAL OPERATION AND MAINTENANCE			$ 61,480,832	$ 36,902,004	$ 12,796,483	$ 11,782,345		$ 18,098,538		$ 12,316,055
ADMINISTRATIVE AND GENERAL										$ -
COWCAP	5.08 B 2	SCH 8.2	$ 1,139,579	$ -	$ -	$ 1,139,579	45%	$ 512,811	ADJUSTED PROPORTIONAL ANNUAL USE	$ 348,968
SERVICES OF SFPUC BUREAUS	5.08 B 2	SCH 7	$ 8,255,307	$ 5,375,656	$ 2,879,651	$ -	45%	$ 2,879,651	ADJUSTED PROPORTIONAL ANNUAL USE	$ 1,959,603
OTHER A&G	5.08 B 2	SCH 8.2	$ 25,581,481	$ 14,913,071	$ 36,070	$ 10,632,340	45%	$ 4,820,623	ADJUSTED PROPORTIONAL ANNUAL USE	$ 3,280,434
CUSTOMER ACCOUNTS	5.08 B 2	SCH 8.2	$ 347,403	$ 347,403	$ -	$ -	45%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -
TOTAL ADMINISTRATIVE AND GENERAL			$ 35,323,770	$ 20,636,130	$ 2,915,721	$ 11,771,919		$ 8,213,085		$ 5,589,004
PROPERTY TAXES	5.08 B 3	SCH 8.2	$ 452,000	$ -	$ -	$ 456,305	45%	$ 205,337	ADJUSTED PROPORTIONAL ANNUAL USE	$ 139,732
CAPITAL COST RECOVERY										
PRE-2009 ASSETS	5.09 B 1	ATT K-4								$ 3,118,033
DEBT SERVICE ON NEW ASSETS	5.09 B 2	SCH 5								$ -
REVENUE FUNDED ASSETS-APPROPRIATIONS TO WHOLESALE CAPITAL FUND	5.09 B 3	SCH 6								$ 7,740,688
TOTAL CAPITAL COST RECOVERY										$ 10,858,721
WHOLESALE SHARE OF HETCH HETCHY WATER & POWER										$ 28,903,512 (TO SCHEDULE 1)
WHOLESALE REVENUE COVERAGE[1]										$ -

[1]Adjusted Proportional Annual Use (68.39% X 99.50% = 68.05%)
[2]25% of Wholesale Share of Debt Service

WHOLESALE REVENUE REQUIREMENT SCHEDULES
HETCH HETCHY CAPITAL COST RECOVERY - ANNUAL DEBT SERVICE
FISCAL YEAR 2009-10
REFERENCE SECTION 5.09.B.1

ATTACHMENT N-2
SCHEDULE 5

	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	XXXX BOND ISSUE ALL SERIES	TOTAL ALL OUTSTANDING BONDS
USE OF BOND PROCEEDS								
POWER PROJECTS	XX.XX%	XX.XX%	XX.XX%	XX.XX%	XX.XX%	XX.XX%	XX.XX%	[redacted]
WATER PROJECTS	YY.YY%	YY.YY%	YY.YY%	YY.YY%	YY.YY%	YY.YY%	YY.YY%	[redacted]
JOINT PROJECTS	ZZ.ZZ%	ZZ.ZZ%	ZZ.ZZ%	ZZ.ZZ%	ZZ.ZZ%	ZZ.ZZ%	ZZ.ZZ%	
PRINCIPAL PAYMENT	-	-	-	-	-	-	-	-
POWER SHARE	-	-	-	-	-	-	-	-
WATER SHARE	-	-	-	-	-	-	-	-
JOINT SHARE	-	-	-	-	-	-	-	
INTEREST PAYMENT (NET)	-	-	-	-	-	-	-	-
POWER SHARE	-	-	-	-	-	-	-	-
WATER SHARE	-	-	-	-	-	-	-	-
JOINT SHARE								
TOTAL PRINCIPAL AND INTEREST PAYMENT	-	-	-	-	-	-	-	-
POWER SHARE	-	-	-	-	-	-	-	-
WATER SHARE	-	-	-	-	-	-	-	-
JOINT SHARE								
WATER RELATED PRINCIPAL AND INTEREST PAYMENT[1]								
ADJUSTED PROPORTIONAL ANNUAL USE	68.05%	68.05%	68.05%	68.05%	68.05%	68.05%	68.05%	[redacted]
WHOLESALE SHARE	-	-	-	-	-	-	-	-

(TO SCHEDULE 4)

[1]Water Related = 100% of Water Share + 45% of Joint Share

WHOLESALE REVENUE REQUIREMENT SCHEDULES
HETCH HETCHY CAPITAL COST RECOVERY - REVENUE FUNDED CAPITAL PROJECTS
FISCAL YEAR 2009-10
REFERENCE SECTION 5.04.B

ATTACHMENT N-2
SCHEDULE 6

		PROJECT APPROPRIATION	CLASSIFICATION	WATER RELATED PERCENTAGE	WATER RELATED SHARE	ALLOCATION FACTOR	WHOLESALE SHARE	TOTAL APPROPRIATION ALL YEARS	ALL YEARS ACTUAL EXPENDITURES	FY 2009-10 ACTUAL EXPENDITURES	ENCUMBERED, NOT EXPENDED	APPROPRIATED, UNENCUMBERED BALANCE
CUH931	HH Microwave Replacement	$ 4,000,000	JOINT	45%	$ 1,800,000	ADJUSTED PROPORTIONAL ANNUAL USE	$ 1,224,900	$ 1,224,900	$ 1,224,900	$ 1,224,900	$ -	$
CUH977	HH Water R&R - Facilities Maintenance	$ 3,500,000	JOINT	45%	$ 1,575,000	ADJUSTED PROPORTIONAL ANNUAL USE	$ 1,071,788	$ 1,071,788	$ 1,071,788	$ 1,071,788	$ -	$
	Total Joint	$ 7,500,000			$ 3,375,000		$ 2,296,688	$ 2,296,688	$ 2,296,688	$ 2,296,688	$ -	$
CUH947	SEA - Go Solar Incentive Project	$ 4,000,000	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$					
CUH971	Alternative Transmission Studies	$ 1,000,000	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
CUH976	HH Water R&R - Power Infrastructure	$ 16,700,000	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
CUH979	Hunters Point Municipal Power	$ -	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
CUH983	Civic Center Sustainability District	$ 1,090,000	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
CUH986	General Fund Dept - Energy Efficiency	$ 7,365,158	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
	Renewable/Generation	$ 3,501,307	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
	Treasure Island Improvement Project	$ 2,700,000	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
	Enterprise Fund Dept - Energy Efficiency	$ 325,722	POWER	0%	$ -	ADJUSTED PROPORTIONAL ANNUAL USE	$ -					
	Total Power	$ 36,682,187			$ -		$ -					
CUH975	HH Water R&R - Water Infrastructure	$ 6,000,000	WATER	100%	$ 6,000,000	ADJUSTED PROPORTIONAL ANNUAL USE	$ 4,083,000	$ 4,083,000	$ 4,083,000	$ 4,083,000	$ -	$
	Toulumne River Watershed Protection	$ 2,000,000	WATER	100%	$ 2,000,000	ADJUSTED PROPORTIONAL ANNUAL USE	$ 1,361,000	$ 1,361,000	$ 1,361,000	$ 1,361,000	$ -	$
	Total Water	$ 8,000,000			$ 8,000,000		$ 5,444,000	$ 5,444,000	$ 5,444,000	$ 5,444,000	$ -	$
	TOTAL ALL WATER RELATED PROJECTS	$ 96,364,374			$ 11,375,000		$ 7,740,688	$ 7,740,688	$ 7,740,688	$ 7,740,688 (TO SCHEDULE 4)	$ - (TO SCHEDULE 4)	$ - (TO SCHEDULE 4)

WHOLESALE REVENUE REQUIREMENT SCHEDULES
SERVICES OF SFPUC BUREAUS - ALLOCATION TO ENTERPRISES
FISCAL YEAR 2009-10
REFERENCE SECTION 5.05.B

ATTACHMENT N-2
SCHEDULE 7

		EXPENDITURES	ADJUSTMENTS	ADJUSTED EXPENDITURES	HETCH HETCHY POWER	HETCH HETCHY WATER	WATER RETAIL	WATER REGIONAL	WASTEWATER	TOTAL
ALLOCATION FACTORS (SCHEDULE N-7.1)					11.13%	5.96%	16.94%	29.59%	36.37%	
PUC01	General Manager	$ 7,609,114	$ -	$ 7,609,114	$ 847,180	$ 453,820	$ 1,288,884	$ 2,251,548	$ 2,767,682	$ 7,609,114
PUC1101	BizServ-Administration	$ 4,081,981	$ -	$ 4,081,981	$ 454,478	$ 243,456	$ 691,434	$ 1,207,864	$ 1,484,749	$ 4,081,981
PUC1102	Finance	$ 8,817,687	$ -	$ 8,817,687	$ 981,739	$ 525,902	$ 1,493,600	$ 2,609,166	$ 3,207,280	$ 8,817,687
PUC1103	ITS[1]	$ 18,048,158	$ (1,835,357)	$ 16,212,801	$ 1,805,093	$ 966,959	$ 2,746,235	$ 4,797,391	$ 5,897,123	$ 16,212,801
PUC1106	Human Resources	$ 7,678,483	$ -	$ 7,678,483	$ 854,903	$ 457,958	$ 1,300,634	$ 2,272,074	$ 2,792,914	$ 7,678,483
PUC1108	Customer Services	$ 12,262,428	$ (12,262,428)	$ -	$ -	$ -	$ -	$ -	$ -	$ -
PUC12	External Affairs	$ 3,882,455	$ -	$ 3,882,455	$ 432,263	$ 231,556	$ 657,637	$ 1,148,824	$ 1,412,175	$ 3,882,455
	TOTAL	$ 34,752,000	$ (12,731,000)	$ 48,282,521	$ 5,375,656	$ 2,879,651	$ 8,178,424	$ 14,286,867	$ 17,561,923	$ 48,282,521
					(TO SCHEDULE 4)	(TO SCHEDULE 4)	(TO SCHEDULE 1)	(TO SCHEDULE 1)		

[1]Adjustment for Transfer of SCADA Expenditures to T&D Joint ($1,730,000)

WHOLESALE REVENUE REQUIREMENT SCHEDULES
SERVICES OF SFPUC BUREAUS - ANNUAL SALARIES
FISCAL YEAR 2009-10
REFERENCE SECTION 5.05.B

ATTACHMENT N-2
SCHEDULE 7.1

DEPARTMENT/DIVISION	ALLOCATION FACTOR	GROUP CODE	SALARIES	PERCENTAGE
HETCH HETCHY				
POWER		1	$ 6,677,939	6.27%
WATER		2	$ 1,775,910	1.67%
JOINT			$ 9,428,450	
WATER SHARE	45%	2	$ 4,242,803	3.98%
POWER SHARE	55%	1	$ 5,185,648	4.87%
WATER				
ADMINISTRATION (WTR01)			$ 1,009,246	
RETAIL SHARE	33.4%	3	$ 336,415	0.32%
REGIONAL SHARE	33.3%	4	$ 336,415	0.32%
HETCH HETCHY WATER SHARE	33.3%	2	$ 336,416	0.32%
CDD (WTR03)		3	$ 17,356,922	16.29%
WATER QUALITY (WTR04)		4	$ 7,282,589	6.83%
WATER SUPPLY & TREATMENT (WTR05)		4	$ 18,184,689	17.05%
NATURAL RESOURCES (WTR06)		4	$ 4,682,073	4.39%
WATER RESOURCE PLANNING			$ 1,419,760	
WATER CONSERVATION		3	$ 355,703	0.33%
RETAIL WATER RESOURCE PLANNING		3	$ -	
REGIONAL SHARE (NET SALARIES)		4	$ 1,064,057	1.00%
WASTEWATER		5	$ 38,757,578	36.37%
SALARIES BY GROUP CODE				
HETCH HETCHY - POWER		1	$ 11,863,587	11.13% (TO SCHEDULE 7)
HETCH HETCHY - WATER		2	$ 6,355,129	5.96% (TO SCHEDULE 7)
WATER - RETAIL		3	$ 18,049,040	16.94% (TO SCHEDULE 7)
WATER- REGIONAL		4	$ 31,529,823	29.59% (TO SCHEDULE 7)
WASTEWATER		5	$ 38,757,578	36.37% (TO SCHEDULE 7)
TOTAL SALARIES			$ 106,555,156	100.00%

WHOLESALE REVENUE REQUIREMENT SCHEDULES — **ATTACHMENT N-2**
CALCULATION OF THE WHOLESALE REVENUE REQUIREMENT — **SCHEDULE 8.1**
FISCAL YEAR 2009-10
WATER ENTERPRISE SUMMARY OF OPERATING EXPENSES

	Retail	Wholesale	Regional	Total
Operating Expenses				
Transmission & Distributions	$ 30,163,286	$ -	$ 23,252,946	$ 53,416,232
Adjustments to Transmission & Distribution	$ -	$ -	$ -	$ -
Adjusted Transmission & Distribution	$ 30,163,286	$ -	$ 23,252,946	$ 53,416,232
Source of Supply	$ 1,251,062	$ -	$ 13,692,891	$ 14,943,953
Adjustments to Source of Supply	$ -	$ -	$ -	$ -
Adjusted Source of Supply	$ 1,251,062	$ -	$ 13,692,891	$ 14,943,953
Pumping	$ 3,854,000	$ -	$ 488,682	$ 4,342,682
Adjustments to Pumping	$ -	$ -	$ -	$ -
Adjusted Pumping	$ 3,854,000	$ -	$ 488,682	$ 4,342,682
Treatment	$ -	$ -	$ 30,445,053	$ 30,445,053
Adjustments to Treatment	$ -	$ -	$ -	$ -
Adjusted Treatment	$ -	$ -	$ 30,445,053	$ 30,445,053
Customer Accounts	$ 7,401,169	$ 151,044	$ -	$ 7,552,213
Adjustments to Customer Accounts	$ -	$ -	$ -	$ -
Adjusted Customer Accounts	$ 7,401,169	$ 151,044	$ -	$ 7,552,213
Total Adjusted Operating Expense	$ 42,669,517	$ 151,044	$ 67,879,572	$ 110,700,133
General & Administrative Expense				
COWCAP	$ -	$ -	$ 1,238,009	$ 1,238,009
Services of SFPUC Bureaus	$ 8,178,424	$ -	$ 14,286,867	$ 22,465,291
Other General & Administrative	$ 4,009,891	$ -	$ 8,962,586	$ 12,972,477
Adjustments to General & Administrative	$ -	$ -	$ -	$ -
Adjusted General & Administrative	$ 4,009,891	$ -	$ 8,962,586	$ 12,972,477
Compliance Audit	$ 100,000	$ 100,000	$ -	$ 200,000
Total General & Administrative	$ 12,288,315	$ 100,000	$ 24,487,462	$ 36,875,777
Property Taxes	$ -	$ -	$ 1,417,293	$ 1,417,293
Total	$ 54,957,832	$ 251,044	$ 93,784,327	$ 148,993,203

Source: FAMIS/EIS
Note: All adjustments to be separately identified above

WHOLESALE REVENUE REQUIREMENT SCHEDULES
CALCULATION OF THE WHOLESALE REVENUE REQUIREMENT
FISCAL YEAR 2009-10
HETCHY HETCHY WATER & POWER SUMMARY OF OPERATING EXPENSES

ATTACHMENT N-2
SCHEDULE 8.2

	Power	Water	Joint	Total
Operating Expenses				
Purchased Power & Wheeling	$ 28,953,676	[redacted]		$ 28,953,676
Adjustments to Purchased Power & Wheeling	$ -			$ -
Adjusted Purchased Power & Wheeling	$ 28,953,676			$ 28,953,676
Operations				
Hydraulic Generation	$ 2,900,291	$ -	$ 3,200,394	$ 6,100,685
Transmission & Distribution	$ -	$ -	$ -	$ -
Water Quality Expense	$ -	$ 9,557,862	$ -	$ 9,557,862
Adjustments to Operations	$ -	$ -	$ -	$ -
Adjusted Operations	$ 2,900,291	$ 9,557,862	$ 3,200,394	$ 15,658,547
Maintenance				
Hydraulic Generation	$ 1,840,096	$ 3,238,622	$ 8,581,952	$ 13,660,670
Transmission & Distribution	$ 3,359,385	$ -	$ -	$ 3,359,385
Water Quality Expense	$ -	$ -	$ -	$ -
Adjustments to Maintenance	$ (151,442)	$ -	$ -	$ (151,442)
Adjusted Maintenance	$ 5,048,039	$ 3,238,622	$ 8,581,952	$ 16,868,613
Total Adjusted Operating Expense	$ 36,902,006	$ 12,796,484	$ 11,782,346	$ 61,480,836
General & Administrative Expense				
COWCAP	$ -	$ -	$ 1,139,579	$ 1,139,579
Services of SFPUC Bureaus	$ 5,375,656	$ 2,879,651	$ -	$ 8,255,307
Customer Accounts	$ 347,403	$ -	$ -	$ 347,403
Adjustments to Customer Accounts	$ -	$ -	$ -	$ -
Adjusted Customer Accounts	$ 347,403	$ -	$ -	$ 347,403
Other General & Administrative	$ 14,913,071	$ 36,070	$ 10,632,340	$ 25,581,481
Adjustments to General & Administrative	$ -	$ -	$ -	$ -
Adjusted General & Administrative	$ 14,913,071	$ 36,070	$ 10,632,340	$ 25,581,481
Total General & Administrative	$ 20,636,130	$ 2,915,721	$ 11,771,919	$ 35,323,770
Property Taxes	$ -	$ -	$ 452,000	$ 452,000
Total	$ 57,538,136	$ 15,712,205	$ 24,006,265	$ 97,256,606

Source: FAMIS/EIS
Note: All adjustments to be separately identified above

SCHEDULE OF PROJECTED WATER SALES, WHOLESALE REVENUE REQUIREMENTS, AND WHOLESALE RATES
CONTRACT REFERENCE: ARTICLE 6.03.A.3

ATTACHMENT N-3

	FISCAL YEAR N	N+1	N+2	N+3	N+4
OPERATION AND MAINTENANCE EXPENSES					
SOURCE OF SUPPLY	$ 9,364,568	$ -	$ -	$ -	$ -
PUMPING	$ 334,210	$ -	$ -	$ -	$ -
TREATMENT	$ 20,821,372	$ -	$ -	$ -	$ -
TRANSMISSION & DISTRIBUTION	$ 15,902,690	$ -	$ -	$ -	$ -
CUSTOMER ACCOUNTS	$ 151,044	$ -	$ -	$ -	$ -
TOTAL OPERATION AND MAINTENANCE EXPENSES	$ 46,573,884	$ -	$ -	$ -	$ -
ADMINISTRATIVE AND GENERAL EXPENSES					
COWCAP	$ 520,857	$ -	$ -	$ -	$ -
SF PUBLIC UTILITIES COMMISSION	$ 9,770,788	$ -	$ -	$ -	$ -
OTHER A&G	$ 3,770,749	$ -	$ -	$ -	$ -
COMPLIANCE AUDIT	$ 100,000	$ -	$ -	$ -	$ -
TOTAL ADMINISTRATIVE AND GENERAL EXPENSES	$ 14,162,394	$ -	$ -	$ -	$ -
PROPERTY TAXES	$ 969,287	$ -	$ -	$ -	$ -
CAPITAL COST RECOVERY					
PRE 2009 ASSETS	$ 24,051,326	$ -	$ -	$ -	$ -
DEBT SERVICE ON NEW ASSETS	$ 17,952,931	$ -	$ -	$ -	$ -
REVENUE FUNDED CAPITAL	$ 8,381,400	$ -	$ -	$ -	$ -
TOTAL CAPITAL COST RECOVERY	$ 50,385,657	$ -	$ -	$ -	$ -
WHOLESALE SHARE HHW&P	$ 28,903,512	$ -	$ -	$ -	$ -
WHOLESALE REVENUE REQUIREMENT	$ 140,994,734	$ -	$ -	$ -	$ -
BALANCING ACCOUNT AS OF JUNE 30	$ -	$ -	$ -	$ -	$ -
INTEREST ON BALANCING ACCOUNT	$ -	$ -	$ -	$ -	$ -
WHOLESALE REVENUES AT EXSITING RATE	$ (127,485,900)	$ -	$ -	$ -	$ -
WHOLESALE EXCESS USE CHARGES	$ -	$ -	$ -	$ -	$ -
SETTLEMENT CREDITS AND OTHER ADJUSTMENTS	$ 21,000	$ -	$ -	$ -	$ -
1984 AGREEMENT BALANCING ACCOUNT CREDITS	$ 1,997,220	$ -	$ -	$ -	$ -
WHOLESALE DEBIT SERVICE COVERAGE RESERVE	$ 4,488,233	$ -	$ -	$ -	$ -
WHOLESALE DEFICIENCY OR CREDIT	$ 20,015,287	$ -	$ -	$ -	$ -
PERCENT WHOLESALE DEFICIENCY OR CREDIT OF REVENUES AND EXCESS USE CHARGES	15.7%				
PROJECTED WATER SALES (CCF)	85,920,000	0	0	0	0
WHOLESALE DEFICIENCY OR CREDIT ($/CCF)	0.23	0	0	0	0
PROJECTED WHOLESALE RATE (UNIT COST ($/CCF)	1.66	0	0	0	0
PROJECTED SERVICE CHARGE REVENUES	$ 4,620,300				
PROJECTED VOLUME CHARGE REVENUES	$ 142,627,200				
TOTAL WHOLESALE REVENUES	$ 147,247,500				

ATTACHMENT O
STATEMENT OF WHOLESALE REVENUE REQUIREMENT/ CHANGES IN BALANCING ACCOUNT
YEAR ENDED JUNE 30
(Section 7.02.B)

	FY 2008-09 Allocation to Wholesale Customers	FY 2009-10 Allocation to Wholesale Customers	Difference
Wholesale Revenue Requirement Calculation:			
Operating and maintenance (O&M) expense:			
San Francisco Water Enterprise:			
Source of supply	$ 9,133,025	$ 9,364,568	$ 231,543
Pumping	$ 325,946	$ 334,210	$ 8,264
Purification	$ 20,437,460	$ 20,821,372	$ 383,912
Transmission and distribution	$ 9,350,279	$ 15,902,690	$ 6,552,411
Customer Accounts	$ 224,255	$ 151,044	$ (73,211)
Total SFWE operating and maintenance	$ 39,470,965	$ 46,573,884	$ 7,102,919
Hetch Hetchy Water and Power (HHWP):			
Operating expenses	$ 10,359,786	$ 7,484,165	$ (2,875,621)
Maintenance expenses	$ 4,526,240	$ 4,831,890	$ 305,650
Total HHWP operating and maintenance	$ 14,886,026	$ 12,316,055	$ (2,569,971)
Administrative and general (A&G) expenses:			
COWCAP			
SFWE	$ 512,438	$ 520,857	$ 8,419
HHWP	$ 162,364	$ 348,968	$ 186,604
SF Public Utilities Commission:			
SFWE	$ 7,461,835	$ 9,770,788	$ 2,308,953
HHWP	$ 2,357,622	$ 1,959,603	$ (398,019)
Other A&G – SFWE	$ 8,234,799	$ 3,770,749	$ (4,464,050)
Other A&G – HHWP	$ -	$ 3,280,434	$ 3,280,434
Compliance audit	$ 95,338	$ 100,000	$ 4,662
Total administrative and general expenses	$ 18,824,396	$ 19,751,399	$ 927,003
Property taxes (outside city only):			
SFWE	$ 964,040	$ 969,287	$ 5,247
HHWP	$ 120,923	$ 139,732	$ 18,809
Total property taxes	$ 1,084,963	$ 1,109,019	$ 24,056
Capital Cost Recovery			
Pre-2009 Assets			
SFWE		$ 24,051,326	
HHWP		$ 3,118,033	
Debt Service on New Assets			
SFWE		$ 17,952,931	
HHWP		$ -	
Revenue Funded Assets			
SFWE		$ 8,381,400	
HHWP		$ 7,740,688	
Total Capital Cost Recovery	$ 46,378,941	$ 61,244,378	$14,865,437
Total Wholesale Revenue Requirement	$ 120,645,291	$ 140,994,735	$20,349,444
Balancing Account July 1	$ 21,176,614	$ -	
Interest on adjusted beginning balance	$ 529,415	$ -	
Wholesale revenues billed	$ (123,604,000)	$ (147,247,500)	
Excess use charges billed	$ -	$ -	
Wholesale Revenue Coverage Reserve	$ -	$ 4,488,233	
Other adjustments	$ -	$ -	
Settlement adjustments	$ 21,006	$ 21,006	
1984 Agreement Balancing Account Credits	$ -	$ 1,997,220	
Balancing Account June 30	$ 18,768,326	$ 253,694	

Attachment P

REPRESENTATION LETTER

Certification Pursuant to Water Sales Agreement (the Agreement) between the City and County of San Francisco (San Francisco) and certain wholesale customers in the counties of San Mateo, Santa Clara, and Alameda (the Wholesale Customers) effective July 1, 2009.

Each of the undersigned certifies that:

1. I have reviewed San Francisco Water Department and Hetch Hetchy Water & Power Department Report on the Calculation of the Wholesale Revenue Requirement and Statement of Changes in the Balancing Account (the Statement) for the year ended June 30, 200X;

Based on my knowledge, this report and Statement do not contain any untrue statements of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by the report;

Based on my knowledge, the Statement and other financial information included in the report, fairly presents in all material respects the proper costs incurred and allocated to the Wholesale Customers in accordance with the provisions of the Agreement.

The below certifying officers and I are responsible for establishing and maintaining internal control over financial reporting and have:

Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting for purposes of the preparation of the Statement.

Evaluated the effectiveness of the allocation procedures to ensure compliance with the terms of the Agreement.

The Statement fully complies with the contractual requirements of the Agreement and fairly presents, in all material respects, the allocation of costs to the Wholesale Customers in accordance with the Agreement.

General Manager, SFPUC — Date

Assistant General Manager & Chief Financial Officer, SFPUC — Date

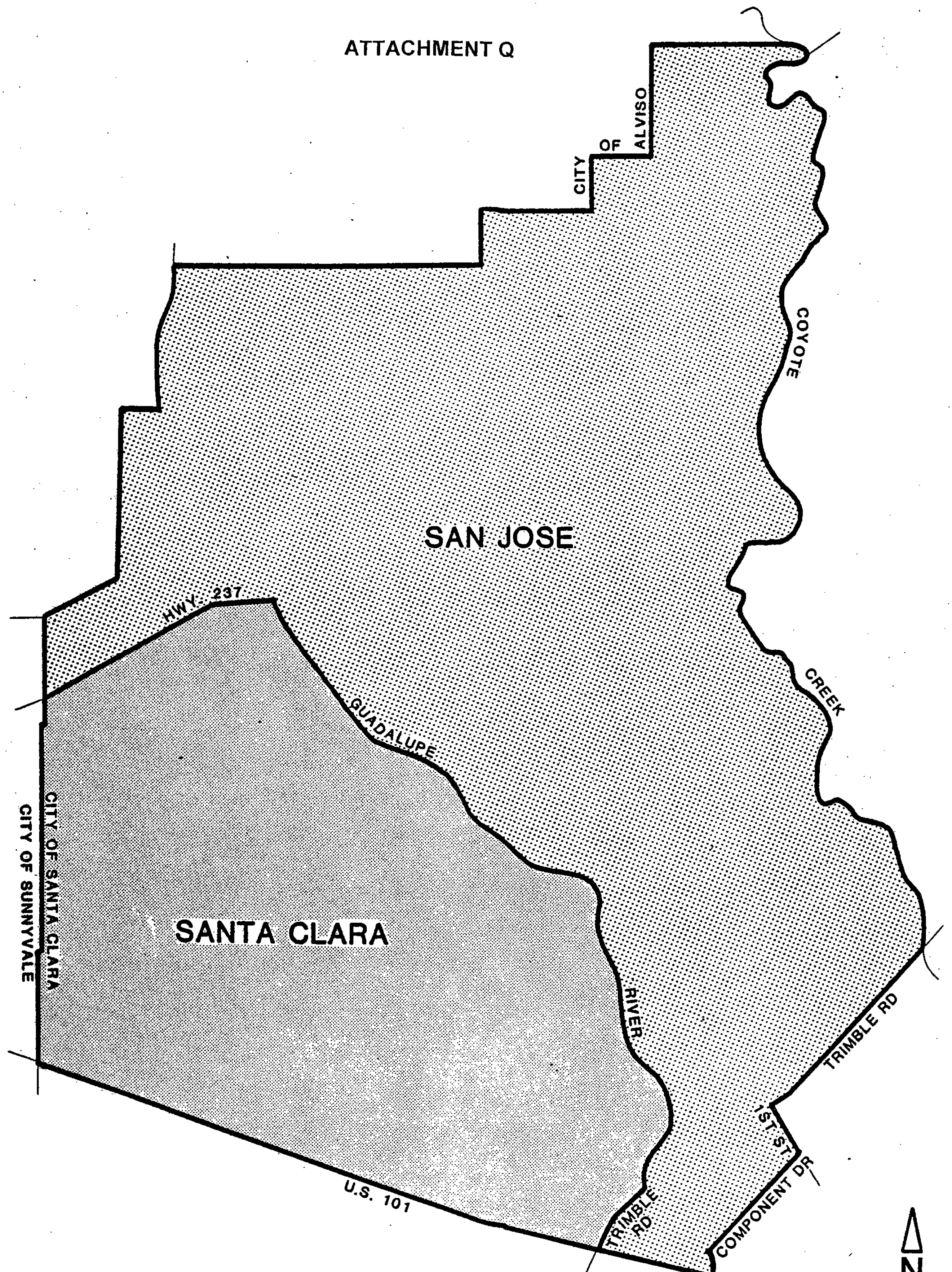
Finance Director, SFPUC — Date

Accounting Manager, SFPUC — Date

Financial Planning Manager, SFPUC — Date

Senior Rates Administrator, SFPUC — Date

ATTACHMENT Q



MAXIMUM SERVICE AREAS

Appendix B

SFPUC
WATER
WASTEWATER
POWER

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

1145 Market St., 4th Floor, San Francisco, CA 94103 • Tel. (415) 554-3271 • Fax (415) 554-3161 • TTY (415) 934-5770

March 31, 2011

Nicole Sandkulla
Senior Water Resources Engineer
Bay Area Water Supply and Conservation Agency
155 Bovet Road, Suite 302
San Mateo, CA 94402

Dear Nicole,

Attached please find additional information through 2035 on the Regional Water System's supply reliability for use in the Wholesale Customer's 2010 Urban Water Management Plan updates. The SFPUC has assessed the water supply reliability under the following planning scenarios:

- Projected Single dry-year supply for 2010
- Projected Multiple dry-year supply beginning 2010; and
- Projected supply reliability for years 2010-2035.

Table 1 summarizes deliveries to the Wholesale Customers for projected single dry-year supply for 2010 and projected multiple dry-year supply beginning 2010.

With regards to future demands, the SFPUC proposes to expand their water supply portfolio by increasing the types of water supply resources. Table 2 summarizes the water supply resources assumed to be available by 2035.

Concerning allocation of supply during dry years, the Water Shortage Allocation Plan ("Plan") was utilized to allocate shortages between the SFPUC and the Wholesale Customers collectively. The Plan implements a method for allocating water among the individual Wholesale Customers which has been adopted by the Wholesale Customers. The Plan was adopted pursuant to Section 7.03(a) of the 1984 Settlement Agreement and Master Water Sales Contract and has been updated to correspond to the terminology used in the June 2009 Water Supply Agreement between the City and County of San Francisco and Wholesale Customers in Alameda County, San Mateo County and Santa Clara County.

Finally, the SFPUC estimated the frequency and severity of anticipated shortages for the period 2010 though 2035. For this analysis, we assumed that the historical hydrologic period is indicative of future events and evaluated the supply reliability assuming a repeat of the actual historic hydrologic period 1920 through 2002. The results of this analysis are summarized in Table 3.

It is our understanding that you will pass this information on to the Wholesale Customers. If you have any questions or need additional information, please do not hesitate to contact me at (415) 554-0792.

Sincerely,

Paula Kehoe

Paula Kehoe
Director of Water Resources

Table 1
Projected Deliveries for Three Multiple Dry Years

	2010	One Critical Dry Year	Deliveries during Multiple Dry Years in mgd		
			Year 1	Year 2	Year 3
System-Wide Shortage in Percent	0%	10%	10%	20%	20%
Wholesale Allocation (mgd)	184.0	152.6	152.6	132.5	132.5

Table 2

UWMP Studies: Water Supply Reliability Water Supply Options for Years 2010 through 2030						
	2010	2015	2020	2025	2030	2035
Crystal Springs Reservoir (20.28bg)		x	x	x	x	x
Westside Basin Groundwater afa		8,100	8,100	8,100	8,100	8,100
Calaveras Reservoir Recovery (31.5 bg)		x	x	x	x	x
Districts' Transfer afa		2240	2240	2240	2240	2240

Table 3: Projected System Supply Reliability Based on Historical Hydrologic Period

Allocation by Year	Wholesale Demand in mgd					
	184.0	184.0	184.0	184.0	184.0	184.0
	Projected Wholesale Allocation in mgd					
Delivery for Fiscal Year	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**
1920	184.0	184.0	184.0	184.0	184.0	184.0
1921	184.0	184.0	184.0	184.0	184.0	184.0
1922	184.0	184.0	184.0	184.0	184.0	184.0
1923	184.0	184.0	184.0	184.0	184.0	184.0
1924	184.0	184.0	184.0	184.0	184.0	184.0
1925	154.6	184.0	184.0	184.0	184.0	184.0
1926	184.0	184.0	184.0	184.0	184.0	184.0
1927	184.0	184.0	184.0	184.0	184.0	184.0
1928	184.0	184.0	184.0	184.0	184.0	184.0
1929	184.0	184.0	184.0	184.0	184.0	184.0
1930	184.0	184.0	184.0	184.0	184.0	184.0
1931	184.0	184.0	184.0	184.0	184.0	184.0
1932	132.5	152.6	152.6	152.6	152.6	152.6
1933	184.0	184.0	184.0	184.0	184.0	184.0
1934	184.0	184.0	184.0	184.0	184.0	184.0
1935	154.6	184.0	184.0	184.0	184.0	184.0
1936	184.0	184.0	184.0	184.0	184.0	184.0
1937	184.0	184.0	184.0	184.0	184.0	184.0
1938	184.0	184.0	184.0	184.0	184.0	184.0
1939	184.0	184.0	184.0	184.0	184.0	184.0
1940	184.0	184.0	184.0	184.0	184.0	184.0
1941	184.0	184.0	184.0	184.0	184.0	184.0
1942	184.0	184.0	184.0	184.0	184.0	184.0
1943	184.0	184.0	184.0	184.0	184.0	184.0
1944	184.0	184.0	184.0	184.0	184.0	184.0
1945	184.0	184.0	184.0	184.0	184.0	184.0
1946	184.0	184.0	184.0	184.0	184.0	184.0
1947	184.0	184.0	184.0	184.0	184.0	184.0
1948	184.0	184.0	184.0	184.0	184.0	184.0
1949	184.0	184.0	184.0	184.0	184.0	184.0
1950	184.0	184.0	184.0	184.0	184.0	184.0
1951	184.0	184.0	184.0	184.0	184.0	184.0
1952	184.0	184.0	184.0	184.0	184.0	184.0
1953	184.0	184.0	184.0	184.0	184.0	184.0
1954	184.0	184.0	184.0	184.0	184.0	184.0
1955	184.0	184.0	184.0	184.0	184.0	184.0
1956	184.0	184.0	184.0	184.0	184.0	184.0
1957	184.0	184.0	184.0	184.0	184.0	184.0
1958	184.0	184.0	184.0	184.0	184.0	184.0
1959	184.0	184.0	184.0	184.0	184.0	184.0

Delivery for Fiscal Year	2010	2015	2020	2025	2030	2035
1960	184.0	184.0	184.0	184.0	184.0	184.0
1961	152.6	184.0	184.0	184.0	184.0	184.0
1962	132.5	152.6	152.6	152.6	152.6	152.6
1963	184.0	184.0	184.0	184.0	184.0	184.0
1964	184.0	184.0	184.0	184.0	184.0	184.0
1965	184.0	184.0	184.0	184.0	184.0	184.0
1966	184.0	184.0	184.0	184.0	184.0	184.0
1967	184.0	184.0	184.0	184.0	184.0	184.0
1968	184.0	184.0	184.0	184.0	184.0	184.0
1969	184.0	184.0	184.0	184.0	184.0	184.0
1970	184.0	184.0	184.0	184.0	184.0	184.0
1971	184.0	184.0	184.0	184.0	184.0	184.0
1972	184.0	184.0	184.0	184.0	184.0	184.0
1973	184.0	184.0	184.0	184.0	184.0	184.0
1974	184.0	184.0	184.0	184.0	184.0	184.0
1975	184.0	184.0	184.0	184.0	184.0	184.0
1976	184.0	184.0	184.0	184.0	184.0	184.0
1977	152.6	184.0	184.0	184.0	184.0	184.0
1978	136.2	152.6	152.6	152.6	152.6	152.6
1979	184.0	184.0	184.0	184.0	184.0	184.0
1980	184.0	184.0	184.0	184.0	184.0	184.0
1981	184.0	184.0	184.0	184.0	184.0	184.0
1982	184.0	184.0	184.0	184.0	184.0	184.0
1983	184.0	184.0	184.0	184.0	184.0	184.0
1984	184.0	184.0	184.0	184.0	184.0	184.0
1985	184.0	184.0	184.0	184.0	184.0	184.0
1986	184.0	184.0	184.0	184.0	184.0	184.0
1987	184.0	184.0	184.0	184.0	184.0	184.0
1988	152.6	184.0	184.0	184.0	184.0	184.0
1989	132.5	152.6	152.6	152.6	152.6	152.6
1990	132.5	152.6	152.6	152.6	152.6	152.6
1991	132.5	132.5	132.5	132.5	132.5	132.5
1992	132.5	152.6	152.6	152.6	152.6	152.6
1993	136.2	132.5	132.5	132.5	132.5	132.5
1994	184.0	184.0	184.0	184.0	184.0	184.0
1995	154.6	184.0	184.0	184.0	184.0	184.0
1996	184.0	184.0	184.0	184.0	184.0	184.0
1997	184.0	184.0	184.0	184.0	184.0	184.0
1998	184.0	184.0	184.0	184.0	184.0	184.0
1999	184.0	184.0	184.0	184.0	184.0	184.0
2000	184.0	184.0	184.0	184.0	184.0	184.0
2001	184.0	184.0	184.0	184.0	184.0	184.0
2002	184.0	184.0	184.0	184.0	184.0	184.0

APPENDIX K:
TRAFFIC DATA

ConnectMenlo General Plan Update

Appendix K: Transportation Data

City of Menlo Park

June 1, 2016

TJKM

ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Appendix K-1:
Intersection Level of Service Tables

June 1, 2016

TJKM

ConnectMenlo General Plan EIR -- Peak Hour Intersection Level of Service (LOS)

Peak Hour Study Locations					Existing Conditions				2040 No Project Conditions				2040 plus Project Conditions			
Int No.	Intersection	Control	Jurisdiction	LOS Threshold	A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
					LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
1	Sand Hill Rd. & Hwy 280 NB Off-Ramp	Signal	Caltrans	D	D	43.9	B	11.0	**F**	**85.6**	B	10.5	**F**	**86.0**	B	10.3
2	Sand Hill Rd. & Hwy 280 NB On-Ramp	Signal	Caltrans	D	B	14.5	**E**	**74.0**	B	14.5	**E**	**74.0**	B	14.4	**F**	**84.9**
3	Sand Hill Rd. & Addison-Wesley	Signal	Menlo Park	D	B	13.6	B	16.3	B	12.8	B	15.6	B	12.6	B	15.9
4	Saga Ln. & Sand Hill Rd.	Signal	Menlo Park	D	B	15.6	C	32.7	D	35.1	D	42.3	D	38.4	D	42.1
5	Branner Dr. & Sand Hill Rd.	Signal	Menlo Park	D	A	7.5	A	5.7	A	6.5	A	5.5	A	6.5	A	5.5
6	Sharon Park Dr. & Sand Hill Rd.	Signal	Menlo Park	D	D	36.7	C	33.1	D	40.3	D	49.1	D	43.3	D	47.9
7	Alpine Rd./Santa Cruz Ave. & Junipero Serra Blvd.	Signal	Menlo Park	D	D	44.6	D	47.6	D	44.6	D	47.5	D	40.6	D	48.3
8	Santa Cruz Ave. & Sand Hill Rd.	Signal	Menlo Park	D	D	45.4	D	43.6	D	46.1	D	44.5	D	44.8	D	46.0
9	Oak Ave./Vine Rd. & Sand Hill Rd.	Signal	Menlo Park	D	B	17.6	A	8.6	C	20.4	A	8.9	B	13.5	A	6.5
10	Santa Cruz Ave. & Elder Ave.	Signal	Menlo Park	D	A	9.8	A	7.6	A	9.0	A	7.7	A	9.6	A	7.9
11	Valparaiso Ave. & University Dr.	Signal	Menlo Park	D	C	24.7	B	17.7	B	19.9	C	24.3	C	20.4	C	25.6
12	Santa Cruz Ave. & University Dr. (S)	Signal	Menlo Park	D	B	10.2	B	11.2	B	10.2	B	11.3	A	9.9	B	11.8
13	Oak Grove Ave. & Laurel St.	Signal	Menlo Park	C	A	9.5	A	8.2	A	8.1	A	7.8	A	8.3	A	8.1
14	Ravenswood Ave. & Laurel St.	Signal	Menlo Park	D	B	17.4	C	24.0	C	24.0	C	28.8	C	27.3	C	24.8
15	Middlefield Rd. & Ravenswood Ave.	Signal	Menlo Park	D	D	53.1	D	39.4	D	40.4	D	42.7	D	40.4	D	52.1
16	Middlefield Rd. & Ringwood Ave.	Signal	Menlo Park	D	C	23.1	C	32.6	C	22.6	C	34.3	C	22.6	D	42.2
17	Middlefield Rd. & Willow Rd.	Signal	Menlo Park	D	**E**	**61.9**	**F**	**>80 ***	**E**	**58.9**	**F**	**>80 ***	**E**	**59.0**	**F**	**>80 ***
18	Willow Rd. & Gilbert Ave.	Signal	Menlo Park	D	C	20.7	**F**	**>80 ***	C	21.3	**F**	**>80 ***	C	23.5	**F**	**>80 ***
19	Willow Rd. & Coleman Ave.	Signal	Menlo Park	D	C	21.1	**F**	**>80 ***	B	19.4	**F**	**>80 ***	C	20.4	**F**	**>80 ***
20	Willow Rd. & Durham St.	Signal	Menlo Park	D	**E**	**>55 ***	**F**	**>80 ***	**E**	**>55 ***	**F**	**>80 ***	**E**	**>55 ***	**F**	**>80 ***
21	Marsh Rd. & Bay Rd.	Signal	Menlo Park	D	B	19.2	C	23.3	C	26.7	C	22.9	C	21.2	C	21.7
22	Marsh Rd. & Bohannon Dr.	Signal	Menlo Park	D	C	33.9	D	36.3	C	32.4	D	35.4	C	33.3	D	35.2
23	Marsh Rd. & Scott Dr.	Signal	Menlo Park	D	C	29.1	C	21.8	C	27.8	C	22.6	C	28.1	C	22.4
24	El Camino Real & Encinal Ave.	Signal	Caltrans	D	B	15.5	D	39.6	C	33.5	D	38.72	C	22.7	D	39.3
25	El Camino Real & Glenwood Ave.	Signal	Caltrans	D	C	30.2	C	33.3	**E**	**64.9**	D	49.0	D	51.6	D	45.4
26	El Camino Real & Oak Grove Ave.	Signal	Caltrans	D	C	24.9	C	23.0	D	35.1	C	27.3	C	31.8	C	26.1
27	El Camino Real & Santa Cruz Ave.	Signal	Caltrans	D	B	10.4	B	12.4	B	12.7	B	14.0	B	12.4	C	22.9
28	El Camino Real & Ravenswood Ave.	Signal	Caltrans	D	D	37.0	D	45.8	**E**	**73.0**	D	48.1	**E**	**79.2**	**E**	**75.9**
29	El Camino Real & Roble Ave.	Signal	Caltrans	D	A	6.1	A	9.1	A	6.3	A	9.2	A	6.1	A	8.6
30	El Camino Real & Middle Ave.	Signal	Caltrans	D	B	13.6	B	17.3	B	15.4	B	16.4	B	14.0	B	16.1
31	El Camino Real & Cambridge Ave.	Signal	Caltrans	D	A	4.8	B	11.7	A	4.6	A	8.5	A	4.8	A	8.2
32	Willow Rd. & Bay Rd.	Signal	Menlo Park	D	**F**	**>80 ***	**F**	**>80 ***	**F**	**>80 ***	**F**	**>80 ***	**F**	**>80 ***	**F**	**>80 ***
33	Willow Rd. & Newbridge St.	Signal	Caltrans	D	**F**	**>80 ***	D	38.0	**F**	**>80 ***	D	50.2	**F**	**>80 ***	**E**	**58.8**
34	Willow Rd. & O'Brien Dr.	Signal	Caltrans	D	**F**	**>80 ***	D	>35 *	**F**	**>80 ***	D	>35	**F**	**>80 ***	D	>35
35	Willow Rd. & Ivy Dr.	Signal	Caltrans	D	**F**	**>80 ***	D	>35 *	**F**	**>80 ***	D	>35	**F**	**>80 ***	D	>35
36	Willow Rd. & Hamilton Ave.	Signal	Caltrans	D	**F**	**>80 ***	**F**	**>80 ***	**F**	**>80 ***	**F**	**98.5**	**F**	**>80 ***	**F**	**103.3**
37	Willow Rd. & Bayfront Expwy.	Signal	Caltrans	D	**F**	**>80 ***	**F**	**>80 ***	**F**	**141.9**	**F**	**123.9**	**F**	**155.7**	**F**	**113.4**
38	Bayfront Expwy. & University Ave.	Signal	Caltrans	D	**F**	**>80 ***	**F**	**128.3**	**F**	**97.6**	**F**	**151.4**	**F**	**82.1**	**F**	**>160**
39	University Ave. & O'Brien Dr.	Signal	Caltrans	D	A	9.2	B	10.0	A	7.6	A	8.6	C	28.0	B	18.7
40	Bayfront Expwy. & Chilco St.	Signal	Caltrans	D	C	30.9	B	11.9	C	20.8	D	43.5	C	29.8	D	47.5
41	Bayfront Expwy. & Chrysler Dr.	Signal	Caltrans	D	B	10.1	C	30.5	A	9.0	B	18.1	A	8.9	B	18.0

ConnectMenlo General Plan EIR -- Peak Hour Intersection Level of Service (LOS)

Peak Hour Study Locations					Existing Conditions				2040 No Project Conditions				2040 plus Project Conditions			
Int No.	Intersection	Control	Jurisdiction	LOS Threshold	A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour		A.M. Peak Hour		P.M. Peak Hour	
					LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
42	Bayfront Expwy. & Marsh Rd.	Signal	Caltrans	D	**E**	**65.0**	D	44.0	D	42.2	C	29.0	D	50.4	C	29.0
43	Marsh Rd. & US 101 SB	Signal	Caltrans	D	B	19.6	B	18.7	B	19.7	B	18.6	B	19.7	B	18.5
44	Marsh Rd. & US 101 NB	Signal	Caltrans	D	B	13.1	B	15.0	B	12.0	B	13.0	B	14.0	B	13.1
45	Chilco St. & Constitution Dr.	All Way Stop	Menlo Park	C	B	11.6	C	23.7	**F**	**>50**	**F**	**>50**	**F**	**>50**	**F**	**>50**
46	Chrysler Dr. & Constitution Dr.	Signal**	Menlo Park	C	A	8.9	B	14.4	C	26.1	**D**	**51.6**	C	32.4	**E**	**68.1**
47	University Ave. & Adams Dr.	Side-street Stop	Caltrans	D	**F**	**>50**	D	33.2	**F**	**>50**	**F**	**>50**	**F**	**>50**	**F**	**>50**
48	Chrysler Dr. & Jefferson Dr.	Side-street Stop	Menlo Park	C	B	12.2	B	10.4	B	14.6	B	14.9	B	13.8	B	14.9
49	Chrysler Dr. & Independence Dr.	Side-street Stop	Menlo Park	C	B	10.1	A	9.6	B	10.9	B	13.3	A	9.9	B	9.9
50	Jefferson Dr. & Constitution Dr.	Side-street Stop	Menlo Park	C	A	9.7	C	15.5	A	9.5	C	23.1	B	9.7	C	22.3
51	University Ave. & Bay Rd.	Signal	Caltrans	D	D	38.0	**F**	**100.6**	D	37.2	**F**	**107.5**	D	41.1	**F**	**143.4**
52	University Ave. & Runnymede St.	Signal	Caltrans	D	B	11.3	B	15.5	B	11.4	B	15.6	B	15.7	C	25.7
53	Unviersity Ave. & Bell St.	Signal	Caltrans	D	B	10.8	B	13.4	B	18.6	B	16.8	B	13.7	C	32.7
54	University Ave. & Donohoe St.	Signal	Caltrans	D	**F**	**115.5**	**F**	**128.8**	**F**	**120.2**	**F**	**>160**	**F**	**136.4**	**F**	**149.0**
55	Donohoe St. & Capitol Ave./US 101 NB Ramps	Signal	Caltrans	D	D	40.7	C	32.2	D	44.1	C	31.4	D	44.6	C	34.9
56	University Ave. & US 101 SB Ramps	Signal	Caltrans	D	C	30.9	**E**	**59.3**	D	39.8	**E**	**69.7**	D	52.9	**F**	**87.1**
57	University Ave. & Woodland Ave.	Signal	East Palo Alto	D	**E**	**58.6**	**E**	**71.2**	D	49.0	**E**	**58.1**	D	54.2	D	53.8
58	University Ave. & Middlefield Rd.	Signal	Palo Alto	D	D	36.4	D	36.6	D	36.1	D	35.0	D	36.4	C	35.0
59	Middlefield Rd. & Lyton Ave.	Signal	Palo Alto	D	D	41.6	D	47.1	D	37.3	D	41.2	D	37.3	D	41.3
60	Chilco St. & Hamilton Ave.	All-way Stop	Menlo Park	C	A	9.2	C	16.8	A	9.2	**E**	**41.6**	A	8.7	**E**	**48.7**
61	Chilco St. & Terminal Ave.	All-way Stop	Menlo Park	C	A	10.0	C	19.4	A	9.4	C	16.5	B	10.9	C	16.5
62	Chilco St. & Ivy Dr.	All-way Stop	Menlo Park	C	A	9.1	B	12.0	A	8.6	B	13.0	A	8.2	B	11.3
63	Chilco St. & Newbridge St.	All-way Stop	Menlo Park	C	A	9.2	B	10.3	A	8.6	A	9.2	A	8.6	A	9.2
64	Marsh Rd. & Middlefield Rd.	Signal	Menlo Park	D	D	45.0	D	45.7	C	30.7	D	36.5	C	30.5	D	36.5

Notes: **Bold and highlighted indicates unacceptable LOS.**

LOS=Level of Service. Delay=average control delay per vehicle.

*Indicates LOS based on unserved demand. At these locations, upstream & downstream congestion results in delay not captured by VISTRO analysis.

**Indicates planned signal. (Stop-sign controlled under Existing Conditions).

Source: TJKM 2016

ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Appendix K-2: Study Segment ADT

June 1, 2016

TJKM

ConnectMenlo General Plan EIR - Daily Traffic Volumes on Study Segments

Segment	Street	Segment between		Jurisdiction	Classification	Existing Conditions	2040 No Project	2040 plus Project	2040 plus Project Net Increase over Existing Conditions	Significant Impact due to 2040 Net Change from Existing Conditions?	2040 plus Project Net Increase over 2040 No Project	Significant Impact due to 2040 Net Change from 2040 No Project?
1	Alameda De Las Pulgas	*Avy Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Minor Arterial*	12,449	14,710	14,807	*2,358*	YES	*97*	NO
2	Alameda De Las Pulgas	*Valparaiso Ave.*	*Avy Ave.*	*County*	*Minor Arterial*	15,329	18,245	18,130	*2,801*	YES	*-115*	NO
3	Alameda De Las Pulgas	*City Limit*	*Valparaiso Ave.*	*County*	*Minor Arterial*	16,141	19,327	19,276	*3,135*	YES	*-51*	NO
4	Alma St.	*Ravenswood Ave.*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	1,640	1,905	1,822	*182*	NO	*-83*	NO
5	Alma St.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Collector*	3,240	4,907	5,069	*1,829*	YES	*162*	NO
6	Alpine Rd.	*City Limit*	*Junipero Serra Blvd.*	*Menlo Park*	*Minor Arterial*	23,305	26,325	26,171	*2,866*	YES	*-154*	NO
7	Avy Ave.	*City Limit*	*Alameda de las Pulgas*	*Atherton*	*Collector*	4,606	4,700	4,704	*98*	NO	*4*	NO
8	Avy Ave.	*Alameda de las Pulgas*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	5,935	6,431	6,195	*260*	NO	*-236*	NO
9	Bay Rd.	*Greenwood Dr.*	*Marsh Rd.*	*Menlo Park*	*Collector*	5,548	10,190	10,190	*4,642*	YES	*0*	NO
10	Bay Rd.	*Ringwood Ave.*	*Greenwood Dr.*	*Menlo Park*	*Collector*	5,658	10,097	10,112	*4,454*	YES	*15*	NO
11	Bay Rd.	*Willow Rd.*	*Ringwood Ave.*	*Menlo Park*	*Collector*	7,581	9,576	9,667	*2,086*	YES	*91*	NO
12	Bohannon Dr.	*Campbell Ave.*	*Marsh Rd.*	*Menlo Park*	*Collector*	3,908	3,908	3,908	*0*	NO	*0*	NO
13	Chilco St.	*Constitution Dr.*	*Bayfront Expwy.*	*Menlo Park*	*Collector*	6,999	17,379	9,317	*2,318*	YES	*-8,062*	NO
14	Chrysler Dr.	*Constitution Dr.*	*Bayfront Expwy.*	*Menlo Park*	*Collector*	4,068	4,068	4,068	*0*	NO	*0*	NO
15	Constitution Dr.	*Chilco St.*	*Chrysler Dr.*	*Menlo Park*	*Collector*	2,359	6,681	5,304	*2,945*	YES	*-1,377*	NO
16	Crane St.	*Oak Grove Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	2,662	3,284	3,271	*609*	NO	*-13*	NO
17	Crane St.	*Santa Cruz Ave.*	*Menlo Ave.*	*Menlo Park*	*Collector*	2,418	2,465	2,454	*36*	NO	*-11*	NO
18	Encinal Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	5,597	6,049	6,416	*819*	YES	*367*	NO
19	Encinal Ave.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	4,949	5,841	6,275	*1,326*	YES	*434*	NO
20	Glenwood Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	5,979	6,406	6,518	*539*	NO	*112*	NO
21	Hamilton Ave.	*Willow Rd.*	*Chilco St.*	*Menlo Park*	*Collector*	2,773	3,480	3,468	*695*	YES	*-12*	NO
22	Haven Ave.	*Bayfront Expwy./Marsh Rd.*	*City Limit*	*Menlo Park*	*Collector*	7,397	15,123	17,487	*10,090*	YES	*2,364*	YES
23	Junipero Serra Blvd.	*City Limit*	*Alpine Rd.*	*Menlo Park*	*Primary Arterial*	16,010	18,525	18,374	*2,364*	YES	*-151*	NO
24	Laurel St.	*Oak Grove Ave.*	*Glenwood Ave.*	*Menlo Park*	*Collector*	4,055	5,516	5,566	*1,511*	YES	*50*	NO
25	Laurel St.	*Ravenswood Ave.*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	4,408	6,189	5,799	*1,391*	YES	*-390*	NO
26	Laurel St.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Collector*	4,471	5,586	5,643	*1,172*	YES	*57*	NO
27	Marsh Rd.	*City Limit*	*Bay Rd.*	*Menlo Park*	*Minor Arterial*	22,845	25,175	26,084	*3,239*	YES	*909*	YES
28	Marsh Rd.	*Bay Rd.*	*Bohannon Dr.*	*Menlo Park*	*Primary Arterial*	25,828	33,036	33,926	*8,098*	YES	*890*	YES
29	Marsh Rd.	*Bohannon Dr.*	*Scott Dr.*	*Menlo Park*	*Primary Arterial*	32,408	42,393	43,413	*11,005*	YES	*1,020*	YES
30	Menlo Ave.	*University Ave.*	*Crane St.*	*Menlo Park*	*Collector*	7,360	7,613	7,580	*220*	NO	*-33*	NO
31	Menlo Ave.	*Crane St.*	*El Camino Real*	*Menlo Park*	*Collector*	8,647	8,646	8,611	*-36*	NO	*-35*	NO
32	Middle Ave.	*Olive St.*	*University Dr.*	*Menlo Park*	*Collector*	7,249	7,720	7,698	*449*	NO	*-22*	NO
33	Middle Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Collector*	8,916	9,392	9,330	*414*	NO	*-62*	NO
34	Middlefield Rd.	*Ravenswood Ave.*	*Oak Grove Ave.*	*Atherton*	*Minor Arterial*	14,757	16,349	16,630	*1,873*	NO	*281*	NO
35	Middlefield Rd.	*Willow Rd.*	*Ravenswood Ave.*	*Menlo Park*	*Minor Arterial*	19,684	21,921	21,794	*2,110*	YES	*-127*	NO
36	Middlefield Rd.	*City Limit*	*Willow Rd.*	*Menlo Park*	*Minor Arterial*	18,416	21,811	22,310	*3,894*	YES	*499*	YES
37	Newbridge St.	*Willow Rd.*	*Chilco St.*	*Menlo Park*	*Collector*	7,065	12,163	7,995	*930*	YES	*-4,168*	NO
38	Oak Grove Ave.	*University Dr.*	*Crane St.*	*Menlo Park*	*Collector*	6,351	7,673	7,428	*1,077*	YES	*-245*	NO
39	Oak Grove Ave.	*Crane St.*	*El Camino Real*	*Menlo Park*	*Collector*	7,697	10,938	10,540	*2,843*	YES	*-398*	NO

Segment	Street	Segment between		Jurisdiction	Classification	Existing Conditions	2040 No Project	2040 plus Project	2040 plus Project Net Increase over Existing Conditions	Significant Impact due to 2040 Net Change from Existing Conditions?	2040 plus Project Net Increase over 2040 No Project	Significant Impact due to 2040 Net Change from 2040 No Project?
40	Oak Grove Ave.	*El Camino Real*	*Laurel St.*	*Menlo Park*	*Collector*	9,570	11,755	11,486	*1,916*	**YES**	*-269*	NO
41	Oak Grove Ave.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	8,651	8,713	8,803	*152*	NO	*90*	NO
42	O'Brien Dr.	*Kavanaugh Dr.*	*Willow Rd.*	*Menlo Park*	*Collector*	6,374	7,881	13,754	*7,380*	**YES**	*5,873*	**YES**
43	O'Brien Dr.	*University Ave.*	*Kavanaugh Dr.*	*Menlo Park*	*Collector*	3,279	3,603	5,613	*2,334*	**YES**	*2,010*	**YES**
44	Ravenswood Ave.	*El Camino Real*	*Alma St.*	*Menlo Park*	*Minor Arterial*	23,981	25,693	25,914	*1,933*	**YES**	*221*	NO
45	Ravenswood Ave.	*Alma St.*	*Laurel St.*	*Menlo Park*	*Minor Arterial*	18,762	19,225	19,155	*393*	NO	*-70*	NO
46	Ravenswood Ave.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Minor Arterial*	16,553	17,738	17,384	*831*	NO	*-354*	NO
47	Ringwood Ave.	*Middlefield Rd.*	*Bay Rd.*	*County*	*Collector*	7,302	9,503	8,662	*1,360*	**YES**	*-841*	NO
48	Sand Hill Rd.	*I-280*	*Sharon Park Dr.*	*Menlo Park*	*Primary Arterial*	28,048	30,116	29,902	*1,854*	**YES**	*-214*	NO
49	Sand Hill Rd.	*Santa Cruz Ave.*	*Sharon Park Dr.*	*Menlo Park*	*Primary Arterial*	30,785	33,867	33,574	*2,789*	**YES**	*-293*	NO
50	Sand Hill Rd.	*Santa Cruz Ave.*	*City Limit*	*Menlo Park*	*Minor Arterial*	32,742	35,012	35,165	*2,423*	**YES**	*153*	**YES**
51	Santa Cruz Ave.	*Junipero Serra Blvd.*	*Sand Hill Rd.*	*Menlo Park*	*Minor Arterial*	26,484	30,856	30,814	*4,330*	**YES**	*-42*	NO
52	Santa Cruz Ave.	*Sand Hill Rd.*	*Alameda de las Pulgas*	*County*	*Minor Arterial*	23,227	26,731	26,850	*3,623*	**YES**	*119*	**YES**
53	Santa Cruz Ave.	*Alameda de las Pulgas*	*Avy Ave./Orange Ave.*	*Menlo Park*	*Minor Arterial*	10,897	11,951	11,861	*964*	NO	*-90*	NO
54	Santa Cruz Ave.	*Avy Ave./Orange Ave.*	*Olive St.*	*Menlo Park*	*Minor Arterial*	14,524	16,155	15,992	*1,468*	NO	*-163*	NO
55	Santa Cruz Ave.	*Olive St.*	*University Dr.*	*Menlo Park*	*Minor Arterial*	15,314	16,518	16,285	*971*	NO	*-233*	NO
56	Santa Cruz Ave.	*University Dr.*	*Crane St.*	*Menlo Park*	*Minor Arterial*	7,614	8,327	8,197	*583*	NO	*-130*	NO
57	Santa Cruz Ave.	*Crane St.*	*El Camino Real*	*Menlo Park*	*Minor Arterial*	7,373	6,862	6,717	*-656*	NO	*-145*	NO
58	Scott Dr.	*Marsh Rd.*	*Campbell Ave.*	*Menlo Park*	*Collector*	4,815	4,815	4,815	*0*	NO	*0*	NO
59	Sharon Park Dr.	*Sand Hill Rd.*	*Sharon Rd.*	*Menlo Park*	*Collector*	9,970	10,607	10,473	*503*	**YES**	*-134*	NO
60	Sharon Rd.	*Sharon Park Dr.*	*Alameda de las Pulgas*	*Menlo Park*	*Collector*	3,781	4,009	3,891	*110*	NO	*-118*	NO
61	University Dr.	*Middle Ave.*	*Menlo Ave.*	*Menlo Park*	*Collector*	5,840	5,785	5,715	*-125*	NO	*-70*	NO
62	University Dr.	*Menlo Ave.*	*Santa Cruz Ave.*	*Menlo Park*	*Collector*	9,310	9,335	9,222	*-88*	NO	*-113*	NO
63	University Dr.	*Santa Cruz Ave.*	*Oak Grove Ave.*	*Menlo Park*	*Collector*	7,158	7,392	7,381	*223*	NO	*-11*	NO
64	University Dr.	*Oak Grove Ave.*	*Valparaiso Ave.*	*Menlo Park*	*Collector*	5,111	6,675	6,415	*1,304*	**YES**	*-260*	NO
65	Valparaiso Ave.	*Alameda de las Pulgas*	*Cotton St.*	*Menlo Park*	*Minor Arterial*	12,052	12,440	12,543	*491*	NO	*103*	NO
66	Valparaiso Ave.	*Cotton St.*	*University Ave.*	*Menlo Park*	*Minor Arterial*	14,436	14,848	14,973	*537*	NO	*125*	NO
67	Valparaiso Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Minor Arterial*	13,011	14,085	14,058	*1,047*	NO	*-27*	NO
68	Willow Rd.	*Alma St.*	*Laurel St.*	*Menlo Park*	*Collector*	3,362	5,010	5,178	*1,816*	**YES**	*168*	NO
69	Willow Rd.	*Laurel St.*	*Middlefield Rd.*	*Menlo Park*	*Collector*	5,247	7,623	7,824	*2,577*	**YES**	*201*	NO
70	Willow Rd.	*Middlefield Rd.*	*Gilbert Ave.*	*Menlo Park*	*Collector*	24,332	23,607	24,462	*130*	**YES**	*855*	**YES**
71	Chilco St.	*Hamilton Ave.*	*Terminal Ave.*	*Menlo Park*	*Collector*	4,776	10,986	8,280	*3,504*	**YES**	*-2,706*	NO
72	Chilco St.	*Ivy Dr.*	*Hamilton Ave.*	*Menlo Park*	*Collector*	2,654	8,277	5,994	*3,340*	**YES**	*-2,283*	NO
73	Chilco St.	*Newbridge St.*	*Ivy Dr.*	*Menlo Park*	*Collector*	2,114	7,213	4,026	*1,912*	**YES**	*-3,187*	NO
74	Hamilton Ave.	*Willow Rd.*	*Hamilton Ct.*	*Menlo Park*	*Collector*	2,643	2,643	2,643	*0*	NO	*0*	NO
75	Willow Rd.	*Gilbert Ave.*	*Coleman Ave.*	*Menlo Park*	*Minor Arterial*	24,353	24,515	25,924	*1,571*	**YES**	*1,409*	**YES**
76	Willow Rd.	*Coleman Ave.*	*Durham St.*	*Menlo Park*	*Minor Arterial*	41,188	41,294	42,639	*1,451*	**YES**	*1,345*	**YES**
77	Willow Rd.	*Durham St.*	*Bay Rd.*	*Menlo Park*	*Minor Arterial*	34,147	35,852	37,724	*3,577*	**YES**	*1,872*	**YES**
78	Chilco St.	*Terminal Ave.*	*Constitution Dr.*	*Menlo Park*	*Collector*	5,103	11,250	8,492	*3,389*	**YES**	*-2,758*	NO
79	Chrysler Dr.	*Constitution Dr.*	*Independence Dr.*	*Menlo Park*	*Collector*	3,269	3,269	3,269	*0*	NO	*0*	NO

Segment	Street	Segment between		Jurisdiction	Classification	Existing Conditions	2040 No Project	2040 plus Project	2040 plus Project Net Increase over Existing Conditions	Significant Impact due to 2040 Net Change from Existing Conditions?	2040 plus Project Net Increase over 2040 No Project	Significant Impact due to 2040 Net Change from 2040 No Project?
80	Chrysler Dr.	*Independence Dr.*	*Commonwealth Dr.*	*Menlo Park*	*Collector*	1,110	1,110	1,110	*0*	NO	*0*	NO
81	Adams Dr.	*University Dr.*	*Adams Ct.*	*Menlo Park*	*Local*	1,263	3,488	7,762	*6,499*	**YES**	*4,274*	**YES**
82	Olive St.	*Santa Cruz Ave.*	*Middle Ave.*	*Menlo Park*	*Local*	2,449	2,562	2,557	*108*	**YES**	*-5*	NO
83	Olive St.	*Middle Ave.*	*Oak Ave.*	*Menlo Park*	*Local*	3,051	3,280	3,272	*221*	**YES**	*-8*	NO
84	Cambridge Ave.	*University Dr.*	*El Camino Real*	*Menlo Park*	*Local*	1,603	1,566	1,551	*-52*	NO	*-15*	NO
85	Linfield Dr.	*Middlefield Rd.*	*Waverley St.*	*Menlo Park*	*Local*	1,760	1,772	1,794	*34*	**YES**	*22*	NO
86	Waverley St.	*Laurel St.*	*Linfield Dr.*	*Menlo Park*	*Local*	1,652	1,858	1,895	*243*	**YES**	*37*	NO
87	Ivy Dr.	*Chilco St.*	*Willow Rd.*	*Menlo Park*	*Local*	3,200	3,905	4,977	*1,777*	**YES**	*1,072*	**YES**

ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Appendix K-3:
Transportation Count Sheets

June 1, 2016

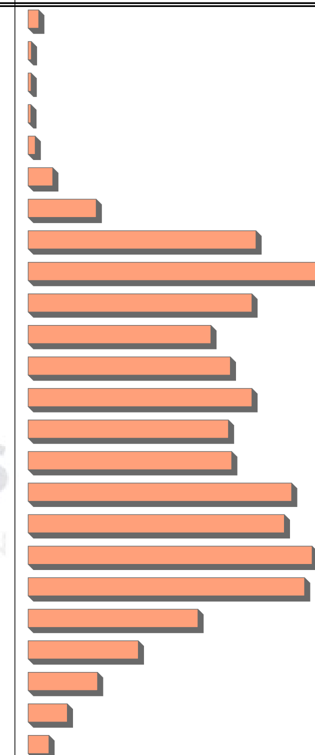
TJKM

ADT Data Sheets

LOCATION: 1. Alameda De Las Pulgas
SPECIFIC LOCATION: 100 ft from Avy Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899401
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		39				39			39	
1:00 AM		12				12			12	
2:00 AM		11				11			11	
3:00 AM		10				10			10	
4:00 AM		26				26			26	
5:00 AM		91				91			91	
6:00 AM		252				252			252	
7:00 AM		844				844			844	
8:00 AM		**1067**				**1067**			**1067**	
9:00 AM		829				829			829	
10:00 AM		677				677			677	
11:00 AM		749				749			749	
12:00 PM		829				829			829	
1:00 PM		742				742			742	
2:00 PM		754				754			754	
3:00 PM		976				976			976	
4:00 PM		949				949			949	
5:00 PM		**1052**				**1052**			**1052**	
6:00 PM		1024				1024			1024	
7:00 PM		629				629			629	
8:00 PM		408				408			408	
9:00 PM		257				257			257	
10:00 PM		145				145			145	
11:00 PM		77				77			77	
Day Total		12449				12449			12449	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1067				8:00 AM 1067			8:00 AM 1067	
PM Peak Volume		5:00 PM 1052				5:00 PM 1052			5:00 PM 1052	



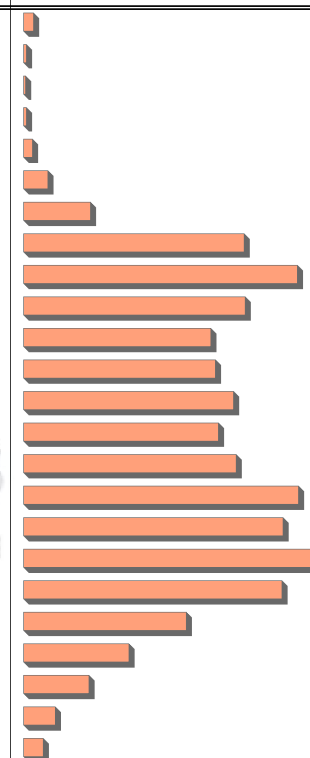
Comments: none

LOCATION: 2. Alameda De Las Pulgas
SPECIFIC LOCATION: 100 ft from Valparaiso Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899402
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		46				46			46
1:00 AM		13				13			13
2:00 AM		9				9			9
3:00 AM		13				13			13
4:00 AM		41				41			41
5:00 AM		113				113			113
6:00 AM		311				311			311
7:00 AM		1026				1026			1026
8:00 AM		**1274**				**1274**			**1274**
9:00 AM		1031				1031			1031
10:00 AM		871				871			871
11:00 AM		893				893			893
12:00 PM		977				977			977
1:00 PM		907				907			907
2:00 PM		989				989			989
3:00 PM		1279				1279			1279
4:00 PM		1207				1207			1207
5:00 PM		**1338**				**1338**			**1338**
6:00 PM		1202				1202			1202
7:00 PM		757				757			757
8:00 PM		490				490			490
9:00 PM		304				304			304
10:00 PM		147				147			147
11:00 PM		91				91			91
Day Total		15329				15329			15329
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 1274				8:00 AM 1274			8:00 AM 1274
PM Peak Volume		5:00 PM 1338				5:00 PM 1338			5:00 PM 1338

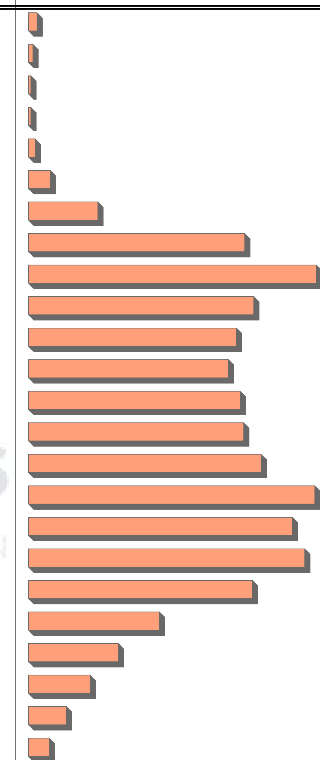
Average Week Profile



Comments: none

LOCATION: 3. Alameda De Las Pulgas
SPECIFIC LOCATION: 100 ft from City Limits
CITY/STATE: Menlo Park, CA

QC JOB #: 12899403
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

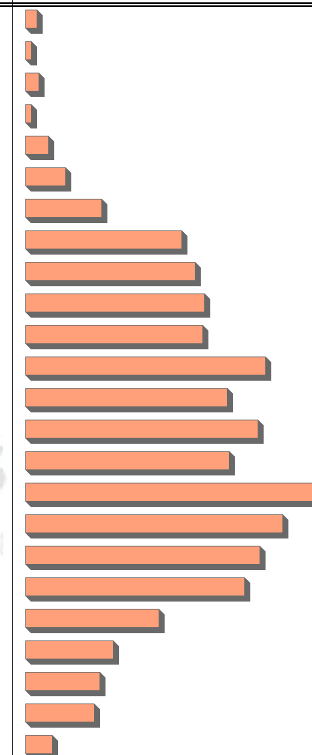
Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				42		42			42	
1:00 AM				22		22			22	
2:00 AM				12		12			12	
3:00 AM				12		12			12	
4:00 AM				33		33			33	
5:00 AM				107		107			107	
6:00 AM				339		339			339	
7:00 AM				1056		1056			1056	
8:00 AM				**1406**		**1406**			**1406**	
9:00 AM				1100		1100			1100	
10:00 AM				1016		1016			1016	
11:00 AM				977		977			977	
12:00 PM				1034		1034			1034	
1:00 PM				1051		1051			1051	
2:00 PM				1136		1136			1136	
3:00 PM				**1398**		**1398**			**1398**	
4:00 PM				1289		1289			1289	
5:00 PM				1349		1349			1349	
6:00 PM				1094		1094			1094	
7:00 PM				640		640			640	
8:00 PM				439		439			439	
9:00 PM				301		301			301	
10:00 PM				186		186			186	
11:00 PM				102		102			102	
Day Total				16141		16141			16141	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1406		8:00 AM 1406			8:00 AM 1406	
PM Peak Volume				3:00 PM 1398		3:00 PM 1398			3:00 PM 1398	

Comments: none

LOCATION: 4. Alma St
SPECIFIC LOCATION: 100 ft from Ravenswood Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899404
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				6		6			6	
1:00 AM				3		3			3	
2:00 AM				7		7			7	
3:00 AM				3		3			3	
4:00 AM				12		12			12	
5:00 AM				21		21			21	
6:00 AM				40		40			40	
7:00 AM				82		82			82	
8:00 AM				89		89			89	
9:00 AM				94		94			94	
10:00 AM				93		93			93	
11:00 AM				**126**		**126**			**126**	
12:00 PM				106		106			106	
1:00 PM				122		122			122	
2:00 PM				107		107			107	
3:00 PM				**151**		**151**			**151**	
4:00 PM				135		135			135	
5:00 PM				123		123			123	
6:00 PM				115		115			115	
7:00 PM				70		70			70	
8:00 PM				46		46			46	
9:00 PM				39		39			39	
10:00 PM				36		36			36	
11:00 PM				14		14			14	
Day Total				1640		1640			1640	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				11:00 AM 126		11:00 AM 126			11:00 AM 126	
PM Peak Volume				3:00 PM 151		3:00 PM 151			3:00 PM 151	

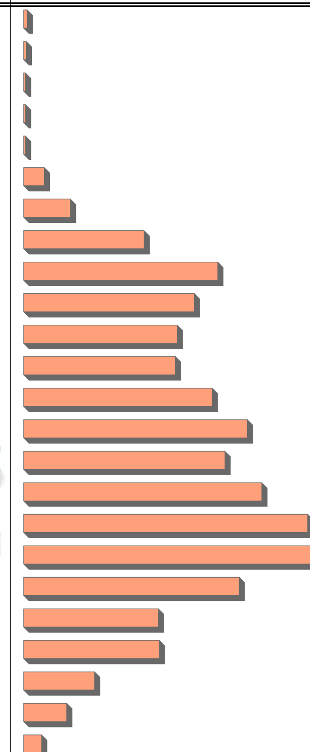


Comments: none

LOCATION: 5. Alma St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899405
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				4		4			4	
1:00 AM				3		3			3	
2:00 AM				2		2			2	
3:00 AM				2		2			2	
4:00 AM				2		2			2	
5:00 AM				23		23			23	
6:00 AM				52		52			52	
7:00 AM				134		134			134	
8:00 AM				**216**		**216**			**216**	
9:00 AM				190		190			190	
10:00 AM				171		171			171	
11:00 AM				169		169			169	
12:00 PM				210		210			210	
1:00 PM				249		249			249	
2:00 PM				224		224			224	
3:00 PM				265		265			265	
4:00 PM				316		316			316	
5:00 PM				**320**		**320**			**320**	
6:00 PM				240		240			240	
7:00 PM				150		150			150	
8:00 PM				151		151			151	
9:00 PM				79		79			79	
10:00 PM				48		48			48	
11:00 PM				20		20			20	
Day Total				3240		3240			3240	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 216		8:00 AM 216			8:00 AM 216	
PM Peak Volume				5:00 PM 320		5:00 PM 320			5:00 PM 320	

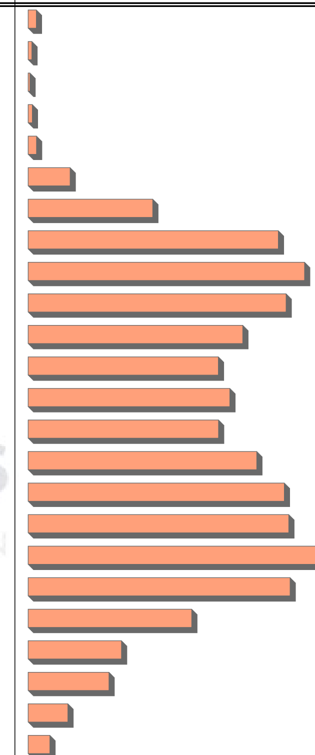


Comments: none

LOCATION: 6. Alpine Rd
SPECIFIC LOCATION: 100 ft from City Limits
CITY/STATE: Menlo Park, CA

QC JOB #: 12899406
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		55				55			55	
1:00 AM		25				25			25	
2:00 AM		12				12			12	
3:00 AM		28				28			28	
4:00 AM		56				56			56	
5:00 AM		282				282			282	
6:00 AM		837				837			837	
7:00 AM		1681				1681			1681	
8:00 AM		**1857**				**1857**			**1857**	
9:00 AM		1733				1733			1733	
10:00 AM		1442				1442			1442	
11:00 AM		1278				1278			1278	
12:00 PM		1355				1355			1355	
1:00 PM		1279				1279			1279	
2:00 PM		1536				1536			1536	
3:00 PM		1721				1721			1721	
4:00 PM		1751				1751			1751	
5:00 PM		**1935**				**1935**			**1935**	
6:00 PM		1760				1760			1760	
7:00 PM		1099				1099			1099	
8:00 PM		627				627			627	
9:00 PM		543				543			543	
10:00 PM		267				267			267	
11:00 PM		146				146			146	
Day Total		23305				23305			23305	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1857				8:00 AM 1857			8:00 AM 1857	
PM Peak Volume		5:00 PM 1935				5:00 PM 1935			5:00 PM 1935	



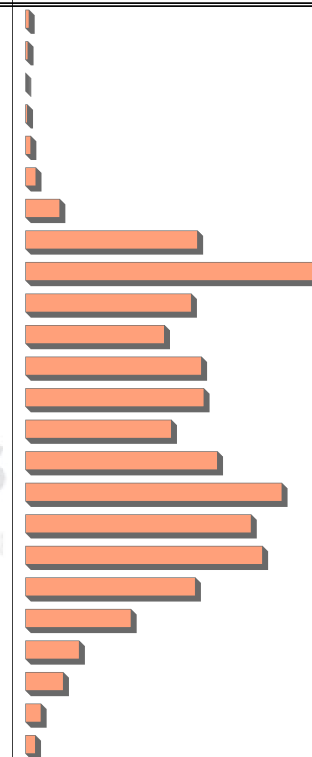
Comments: none

LOCATION: 7. Avy Ave
SPECIFIC LOCATION: 100 ft from City Limit
CITY/STATE: Menlo Park, CA

QC JOB #: 12899407
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		6				6			6
1:00 AM		4				4			4
2:00 AM		0				0			0
3:00 AM		3				3			3
4:00 AM		9				9			9
5:00 AM		18				18			18
6:00 AM		60				60			60
7:00 AM		302				302			302
8:00 AM		**505**				**505**			**505**
9:00 AM		291				291			291
10:00 AM		244				244			244
11:00 AM		309				309			309
12:00 PM		313				313			313
1:00 PM		256				256			256
2:00 PM		337				337			337
3:00 PM		**450**				**450**			**450**
4:00 PM		396				396			396
5:00 PM		416				416			416
6:00 PM		298				298			298
7:00 PM		185				185			185
8:00 PM		94				94			94
9:00 PM		66				66			66
10:00 PM		27				27			27
11:00 PM		17				17			17
Day Total		4606				4606			4606
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 505				8:00 AM 505			8:00 AM 505
PM Peak Volume		3:00 PM 450				3:00 PM 450			3:00 PM 450

Average Week Profile

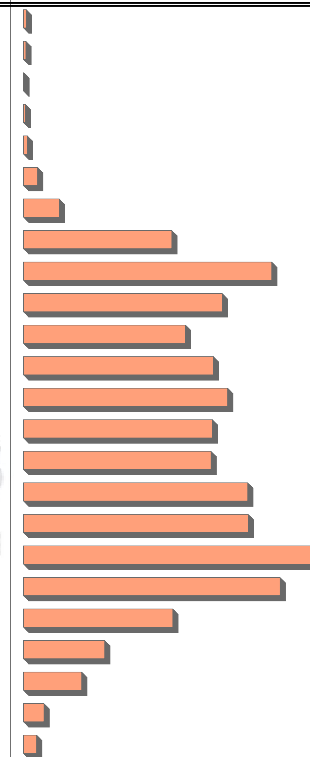


Comments: none

LOCATION: 8. Avy Ave
SPECIFIC LOCATION: 100 ft from Alameda de las Pulgas
CITY/STATE: Menlo Park, CA

QC JOB #: 12899408
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		6				6			6	
1:00 AM		5				5			5	
2:00 AM		1				1			1	
3:00 AM		4				4			4	
4:00 AM		8				8			8	
5:00 AM		29				29			29	
6:00 AM		73				73			73	
7:00 AM		303				303			303	
8:00 AM		**507**				**507**			**507**	
9:00 AM		406				406			406	
10:00 AM		331				331			331	
11:00 AM		388				388			388	
12:00 PM		417				417			417	
1:00 PM		386				386			386	
2:00 PM		383				383			383	
3:00 PM		458				458			458	
4:00 PM		459				459			459	
5:00 PM		**588**				**588**			**588**	
6:00 PM		524				524			524	
7:00 PM		305				305			305	
8:00 PM		166				166			166	
9:00 PM		119				119			119	
10:00 PM		42				42			42	
11:00 PM		27				27			27	
Day Total		5935				5935			5935	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 507				8:00 AM 507			8:00 AM 507	
PM Peak Volume		5:00 PM 588				5:00 PM 588			5:00 PM 588	



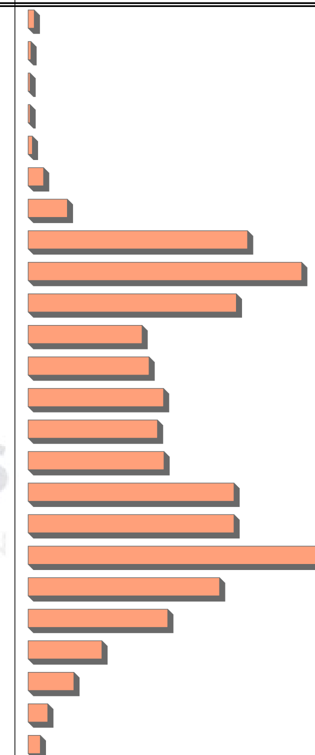
Comments: none

LOCATION: 9. Bay Rd
SPECIFIC LOCATION: 100 ft from Greenwood
CITY/STATE: Menlo Park, CA

QC JOB #: 12899409
DIRECTION: NB/SB
DATE: Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM				13		13			13
1:00 AM				6		6			6
2:00 AM				4		4			4
3:00 AM				4		4			4
4:00 AM				9		9			9
5:00 AM				33		33			33
6:00 AM				84		84			84
7:00 AM				470		470			470
8:00 AM				**586**		**586**			**586**
9:00 AM				446		446			446
10:00 AM				244		244			244
11:00 AM				259		259			259
12:00 PM				290		290			290
1:00 PM				277		277			277
2:00 PM				291		291			291
3:00 PM				441		441			441
4:00 PM				441		441			441
5:00 PM				**617**		**617**			**617**
6:00 PM				410		410			410
7:00 PM				299		299			299
8:00 PM				158		158			158
9:00 PM				98		98			98
10:00 PM				42		42			42
11:00 PM				26		26			26
Day Total				5548		5548			5548
% Weekday Average				100.0%					
% Week Average				100.0%		100.0%			
AM Peak Volume				8:00 AM 586		8:00 AM 586			8:00 AM 586
PM Peak Volume				5:00 PM 617		5:00 PM 617			5:00 PM 617

Average Week Profile

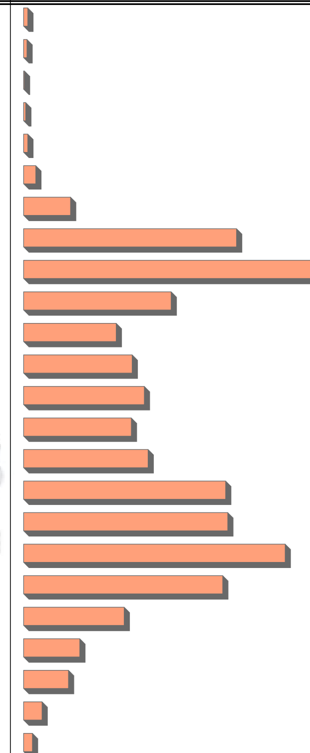


Comments: none

LOCATION: 10. Bay Rd
SPECIFIC LOCATION: 100 ft from Ringwood Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899410
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		10				10			10	
1:00 AM		8				8			8	
2:00 AM		2				2			2	
3:00 AM		5				5			5	
4:00 AM		10				10			10	
5:00 AM		29				29			29	
6:00 AM		112				112			112	
7:00 AM		508				508			508	
8:00 AM		**686**				**686**			**686**	
9:00 AM		352				352			352	
10:00 AM		221				221			221	
11:00 AM		259				259			259	
12:00 PM		288				288			288	
1:00 PM		257				257			257	
2:00 PM		297				297			297	
3:00 PM		482				482			482	
4:00 PM		487				487			487	
5:00 PM		**624**				**624**			**624**	
6:00 PM		475				475			475	
7:00 PM		240				240			240	
8:00 PM		134				134			134	
9:00 PM		107				107			107	
10:00 PM		44				44			44	
11:00 PM		21				21			21	
Day Total		5658				5658			5658	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 686				8:00 AM 686			8:00 AM 686	
PM Peak Volume		5:00 PM 624				5:00 PM 624			5:00 PM 624	



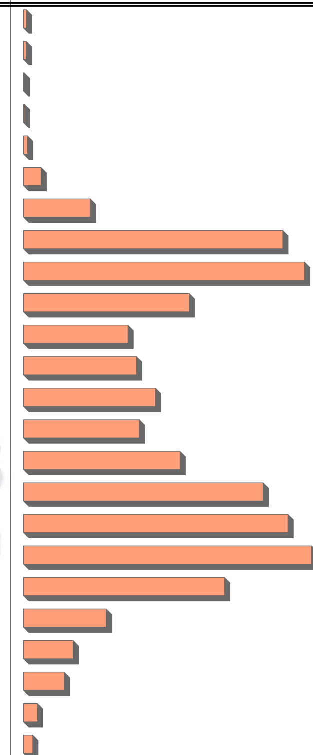
Comments: none

LOCATION: 11. Bay Rd
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899411
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		9				9			9
1:00 AM		8				8			8
2:00 AM		2				2			2
3:00 AM		3				3			3
4:00 AM		12				12			12
5:00 AM		51				51			51
6:00 AM		194				194			194
7:00 AM		752				752			752
8:00 AM		**815**				**815**			**815**
9:00 AM		481				481			481
10:00 AM		303				303			303
11:00 AM		328				328			328
12:00 PM		383				383			383
1:00 PM		336				336			336
2:00 PM		454				454			454
3:00 PM		695				695			695
4:00 PM		767				767			767
5:00 PM		**835**				**835**			**835**
6:00 PM		583				583			583
7:00 PM		240				240			240
8:00 PM		144				144			144
9:00 PM		118				118			118
10:00 PM		41				41			41
11:00 PM		27				27			27
Day Total		7581				7581			7581
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 815				8:00 AM 815			8:00 AM 815
PM Peak Volume		5:00 PM 835				5:00 PM 835			5:00 PM 835

Average Week Profile

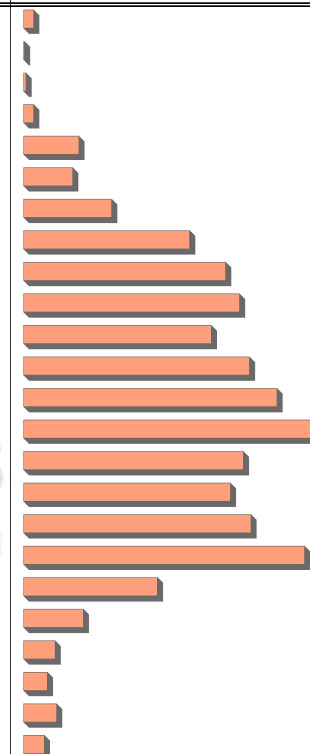


Comments: none

LOCATION: 16. Bohannon Dr
SPECIFIC LOCATION: 100 ft from Campell Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899412
DIRECTION: NB/SB
DATE: Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				13		13			13	
1:00 AM				1		1			1	
2:00 AM				3		3			3	
3:00 AM				13		13			13	
4:00 AM				72		72			72	
5:00 AM				64		64			64	
6:00 AM				115		115			115	
7:00 AM				217		217			217	
8:00 AM				264		264			264	
9:00 AM				282		282			282	
10:00 AM				245		245			245	
11:00 AM				**295**		**295**			**295**	
12:00 PM				331		331			331	
1:00 PM				**377**		**377**			**377**	
2:00 PM				287		287			287	
3:00 PM				270		270			270	
4:00 PM				297		297			297	
5:00 PM				367		367			367	
6:00 PM				175		175			175	
7:00 PM				78		78			78	
8:00 PM				41		41			41	
9:00 PM				31		31			31	
10:00 PM				43		43			43	
11:00 PM				27		27			27	
Day Total				3908		3908			3908	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				11:00 AM 295		11:00 AM 295			11:00 AM 295	
PM Peak Volume				1:00 PM 377		1:00 PM 377			1:00 PM 377	

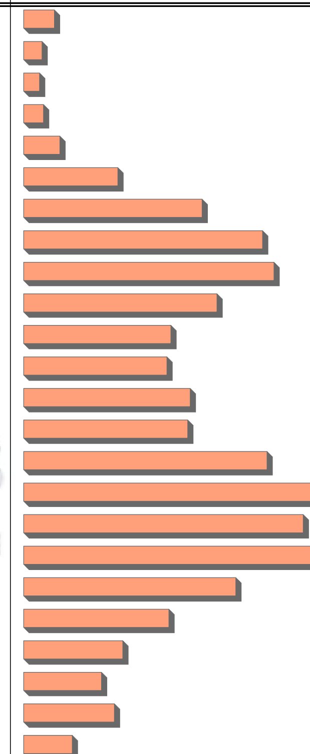


Comments: none

LOCATION: 17. Chilco St
SPECIFIC LOCATION: 100 ft from Constitution Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899413
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		62				62			62	
1:00 AM		37				37			37	
2:00 AM		32				32			32	
3:00 AM		40				40			40	
4:00 AM		73				73			73	
5:00 AM		190				190			190	
6:00 AM		360				360			360	
7:00 AM		482				482			482	
8:00 AM		**505**				**505**			**505**	
9:00 AM		390				390			390	
10:00 AM		297				297			297	
11:00 AM		289				289			289	
12:00 PM		336				336			336	
1:00 PM		331				331			331	
2:00 PM		491				491			491	
3:00 PM		**582**				**582**			**582**	
4:00 PM		564				564			564	
5:00 PM		579				579			579	
6:00 PM		428				428			428	
7:00 PM		293				293			293	
8:00 PM		200				200			200	
9:00 PM		157				157			157	
10:00 PM		183				183			183	
11:00 PM		98				98			98	
Day Total		6999				6999			6999	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 505				8:00 AM 505			8:00 AM 505	
PM Peak Volume		3:00 PM 582				3:00 PM 582			3:00 PM 582	

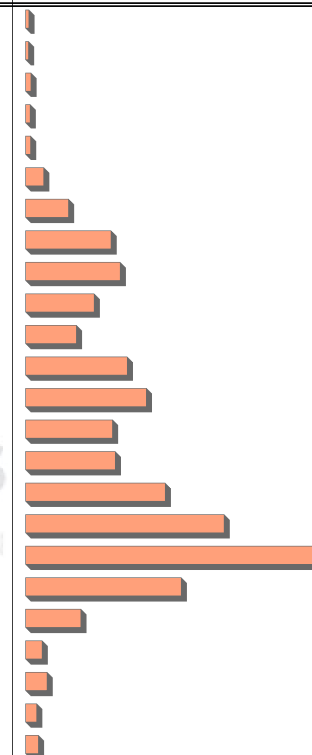


Comments: none

LOCATION: 18. Chrysler Drive
SPECIFIC LOCATION: 100 ft from Constitution Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899414
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		8				8			8	
1:00 AM		7				7			7	
2:00 AM		13				13			13	
3:00 AM		11				11			11	
4:00 AM		12				12			12	
5:00 AM		44				44			44	
6:00 AM		104				104			104	
7:00 AM		207				207			207	
8:00 AM		229				229			229	
9:00 AM		166				166			166	
10:00 AM		123				123			123	
11:00 AM		**246**				**246**			**246**	
12:00 PM		293				293			293	
1:00 PM		211				211			211	
2:00 PM		217				217			217	
3:00 PM		338				338			338	
4:00 PM		481				481			481	
5:00 PM		**697**				**697**			**697**	
6:00 PM		377				377			377	
7:00 PM		134				134			134	
8:00 PM		40				40			40	
9:00 PM		52				52			52	
10:00 PM		27				27			27	
11:00 PM		31				31			31	
Day Total		4068				4068			4068	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		11:00 AM 246				11:00 AM 246			11:00 AM 246	
PM Peak Volume		5:00 PM 697				5:00 PM 697			5:00 PM 697	

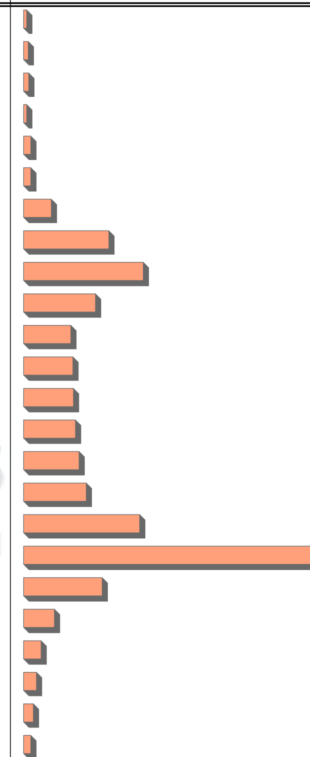


Comments: none

LOCATION: 19. Constitution Dr
SPECIFIC LOCATION: 100 ft from Chilco St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899415
DIRECTION: NB/SB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		6				6			6	
1:00 AM		9				9			9	
2:00 AM		10				10			10	
3:00 AM		6				6			6	
4:00 AM		14				14			14	
5:00 AM		14				14			14	
6:00 AM		54				54			54	
7:00 AM		166				166			166	
8:00 AM		**233**				**233**			**233**	
9:00 AM		140				140			140	
10:00 AM		92				92			92	
11:00 AM		96				96			96	
12:00 PM		97				97			97	
1:00 PM		101				101			101	
2:00 PM		108				108			108	
3:00 PM		122				122			122	
4:00 PM		226				226			226	
5:00 PM		**560**				**560**			**560**	
6:00 PM		153				153			153	
7:00 PM		60				60			60	
8:00 PM		34				34			34	
9:00 PM		25				25			25	
10:00 PM		19				19			19	
11:00 PM		14				14			14	
Day Total		2359				2359			2359	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 233				8:00 AM 233			8:00 AM 233	
PM Peak Volume		5:00 PM 560				5:00 PM 560			5:00 PM 560	

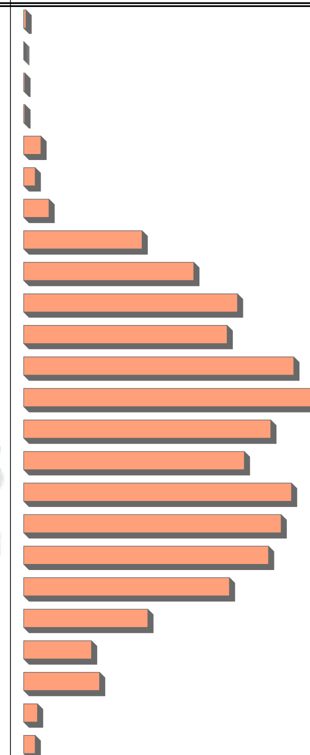


Comments: none

LOCATION: 20. Crane St
SPECIFIC LOCATION: 100 ft from Oak Grove Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899416
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2				2			2	
1:00 AM		0				0			0	
2:00 AM		1				1			1	
3:00 AM		1				1			1	
4:00 AM		15				15			15	
5:00 AM		10				10			10	
6:00 AM		22				22			22	
7:00 AM		103				103			103	
8:00 AM		148				148			148	
9:00 AM		186				186			186	
10:00 AM		177				177			177	
11:00 AM		**235**				**235**			**235**	
12:00 PM		**251**				**251**			**251**	
1:00 PM		215				215			215	
2:00 PM		192				192			192	
3:00 PM		233				233			233	
4:00 PM		224				224			224	
5:00 PM		213				213			213	
6:00 PM		179				179			179	
7:00 PM		108				108			108	
8:00 PM		59				59			59	
9:00 PM		66				66			66	
10:00 PM		12				12			12	
11:00 PM		10				10			10	
Day Total		2662				2662			2662	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		11:00 AM 235				11:00 AM 235			11:00 AM 235	
PM Peak Volume		12:00 PM 251				12:00 PM 251			12:00 PM 251	

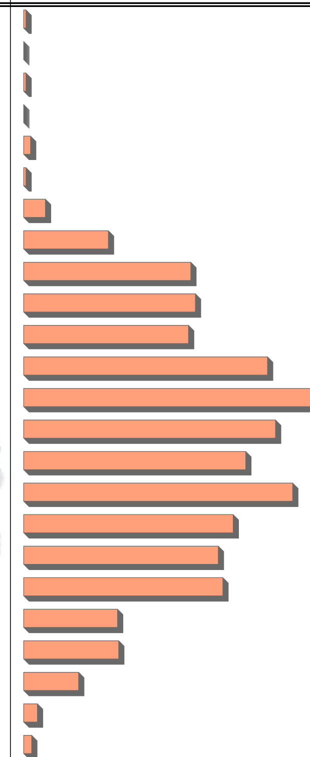


Comments: none

LOCATION: 21. Crane St
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899417
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2				2			2	
1:00 AM		0				0			0	
2:00 AM		2				2			2	
3:00 AM		0				0			0	
4:00 AM		6				6			6	
5:00 AM		2				2			2	
6:00 AM		19				19			19	
7:00 AM		74				74			74	
8:00 AM		146				146			146	
9:00 AM		150				150			150	
10:00 AM		144				144			144	
11:00 AM		**213**				**213**			**213**	
12:00 PM		**252**				**252**			**252**	
1:00 PM		220				220			220	
2:00 PM		194				194			194	
3:00 PM		235				235			235	
4:00 PM		183				183			183	
5:00 PM		170				170			170	
6:00 PM		174				174			174	
7:00 PM		82				82			82	
8:00 PM		83				83			83	
9:00 PM		48				48			48	
10:00 PM		12				12			12	
11:00 PM		7				7			7	
Day Total		2418				2418			2418	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		11:00 AM 213				11:00 AM 213			11:00 AM 213	
PM Peak Volume		12:00 PM 252				12:00 PM 252			12:00 PM 252	

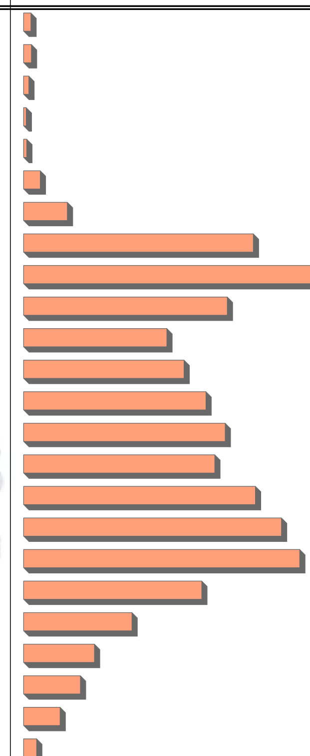


Comments: none

LOCATION: 27. Encinal Ave
SPECIFIC LOCATION: 100 ft from El Camino Real
CITY/STATE: Menlo Park, CA

QC JOB #: 12899418
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				14		14			14	
1:00 AM				15		15			15	
2:00 AM				10		10			10	
3:00 AM				5		5			5	
4:00 AM				6		6			6	
5:00 AM				32		32			32	
6:00 AM				84		84			84	
7:00 AM				441		441			441	
8:00 AM				**552**		**552**			**552**	
9:00 AM				391		391			391	
10:00 AM				275		275			275	
11:00 AM				308		308			308	
12:00 PM				350		350			350	
1:00 PM				387		387			387	
2:00 PM				367		367			367	
3:00 PM				445		445			445	
4:00 PM				495		495			495	
5:00 PM				**530**		**530**			**530**	
6:00 PM				342		342			342	
7:00 PM				208		208			208	
8:00 PM				136		136			136	
9:00 PM				109		109			109	
10:00 PM				70		70			70	
11:00 PM				25		25			25	
Day Total				5597		5597			5597	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 552		8:00 AM 552			8:00 AM 552	
PM Peak Volume				5:00 PM 530		5:00 PM 530			5:00 PM 530	



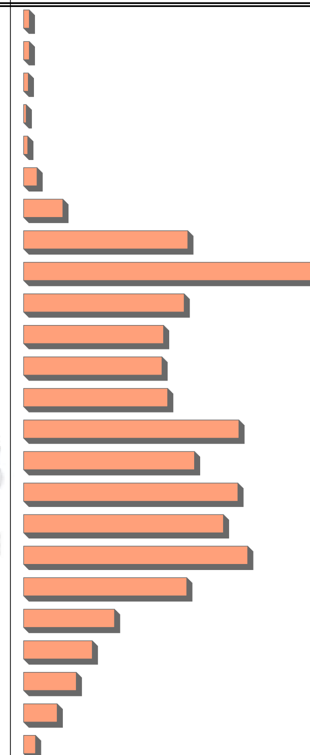
Comments: none

LOCATION: 28. Encinal Ave
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899419
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM				11		11			11
1:00 AM				11		11			11
2:00 AM				9		9			9
3:00 AM				5		5			5
4:00 AM				8		8			8
5:00 AM				26		26			26
6:00 AM				76		76			76
7:00 AM				318		318			318
8:00 AM				**557**		**557**			**557**
9:00 AM				311		311			311
10:00 AM				271		271			271
11:00 AM				268		268			268
12:00 PM				279		279			279
1:00 PM				417		417			417
2:00 PM				331		331			331
3:00 PM				415		415			415
4:00 PM				387		387			387
5:00 PM				**434**		**434**			**434**
6:00 PM				316		316			316
7:00 PM				176		176			176
8:00 PM				133		133			133
9:00 PM				102		102			102
10:00 PM				65		65			65
11:00 PM				23		23			23
Day Total				4949		4949			4949
% Weekday Average				100.0%					
% Week Average				100.0%		100.0%			
AM Peak Volume				8:00 AM 557		8:00 AM 557			8:00 AM 557
PM Peak Volume				5:00 PM 434		5:00 PM 434			5:00 PM 434

Average Week Profile

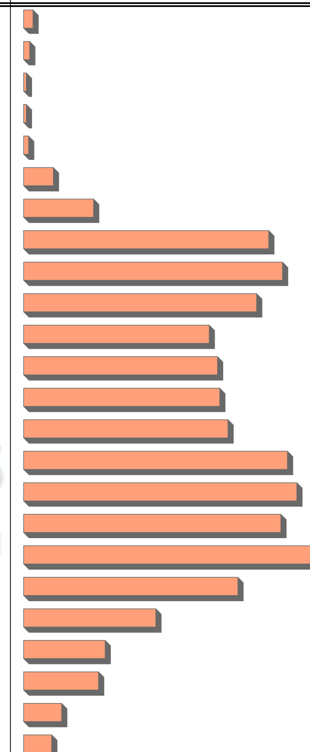


Comments: none

LOCATION: 29. Glenwood Ave
SPECIFIC LOCATION: 100 ft from El Camino Real
CITY/STATE: Menlo Park, CA

QC JOB #: 12899420
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				17		17			17	
1:00 AM				11		11			11	
2:00 AM				5		5			5	
3:00 AM				5		5			5	
4:00 AM				9		9			9	
5:00 AM				54		54			54	
6:00 AM				127		127			127	
7:00 AM				445		445			445	
8:00 AM				**470**		**470**			**470**	
9:00 AM				423		423			423	
10:00 AM				337		337			337	
11:00 AM				352		352			352	
12:00 PM				356		356			356	
1:00 PM				371		371			371	
2:00 PM				479		479			479	
3:00 PM				496		496			496	
4:00 PM				467		467			467	
5:00 PM				**522**		**522**			**522**	
6:00 PM				389		389			389	
7:00 PM				240		240			240	
8:00 PM				148		148			148	
9:00 PM				136		136			136	
10:00 PM				69		69			69	
11:00 PM				51		51			51	
Day Total				5979		5979			5979	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 470		8:00 AM 470			8:00 AM 470	
PM Peak Volume				5:00 PM 522		5:00 PM 522			5:00 PM 522	

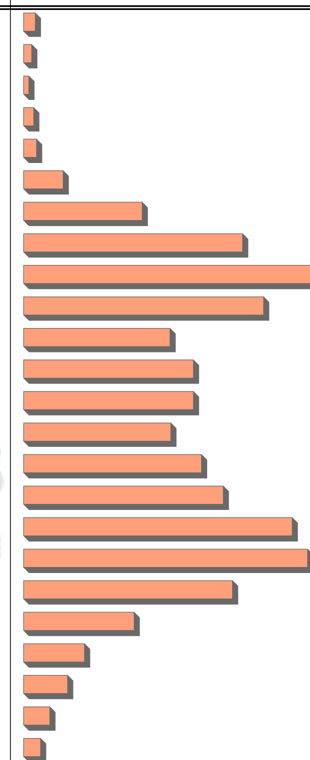


Comments: none

LOCATION: 31. Haven Avenue
SPECIFIC LOCATION: 100 ft from Bayfront Expy/Marsh Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899422
DIRECTION: NB/SB
DATE: Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				29		29			29	
1:00 AM				20		20			20	
2:00 AM				13		13			13	
3:00 AM				25		25			25	
4:00 AM				32		32			32	
5:00 AM				98		98			98	
6:00 AM				294		294			294	
7:00 AM				543		543			543	
8:00 AM				**713**		**713**			**713**	
9:00 AM				595		595			595	
10:00 AM				363		363			363	
11:00 AM				421		421			421	
12:00 PM				421		421			421	
1:00 PM				365		365			365	
2:00 PM				441		441			441	
3:00 PM				495		495			495	
4:00 PM				666		666			666	
5:00 PM				**704**		**704**			**704**	
6:00 PM				518		518			518	
7:00 PM				274		274			274	
8:00 PM				151		151			151	
9:00 PM				109		109			109	
10:00 PM				65		65			65	
11:00 PM				42		42			42	
Day Total				7397		7397			7397	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 713		8:00 AM 713			8:00 AM 713	
PM Peak Volume				5:00 PM 704		5:00 PM 704			5:00 PM 704	

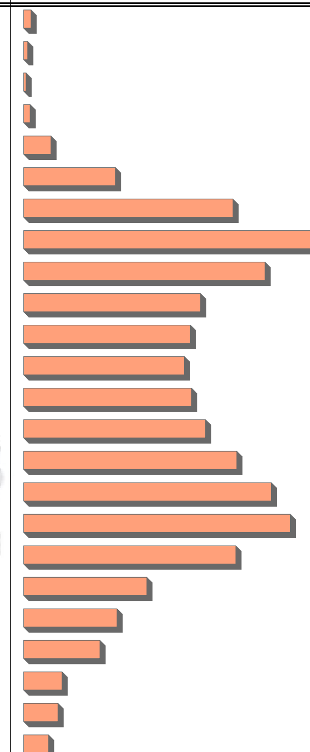


Comments: none

LOCATION: 35. Junipero Serra Blvd
SPECIFIC LOCATION: 100 ft from City Limit
CITY/STATE: Menlo Park, CA

QC JOB #: 12899423
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				39		39			39	
1:00 AM				21		21			21	
2:00 AM				13		13			13	
3:00 AM				34		34			34	
4:00 AM				143		143			143	
5:00 AM				480		480			480	
6:00 AM				1094		1094			1094	
7:00 AM				**1503**		**1503**			**1503**	
8:00 AM				1262		1262			1262	
9:00 AM				925		925			925	
10:00 AM				872		872			872	
11:00 AM				841		841			841	
12:00 PM				878		878			878	
1:00 PM				951		951			951	
2:00 PM				1114		1114			1114	
3:00 PM				1295		1295			1295	
4:00 PM				**1394**		**1394**			**1394**	
5:00 PM				1109		1109			1109	
6:00 PM				644		644			644	
7:00 PM				488		488			488	
8:00 PM				399		399			399	
9:00 PM				201		201			201	
10:00 PM				180		180			180	
11:00 PM				130		130			130	
Day Total				16010		16010			16010	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				7:00 AM 1503		7:00 AM 1503			7:00 AM 1503	
PM Peak Volume				4:00 PM 1394		4:00 PM 1394			4:00 PM 1394	

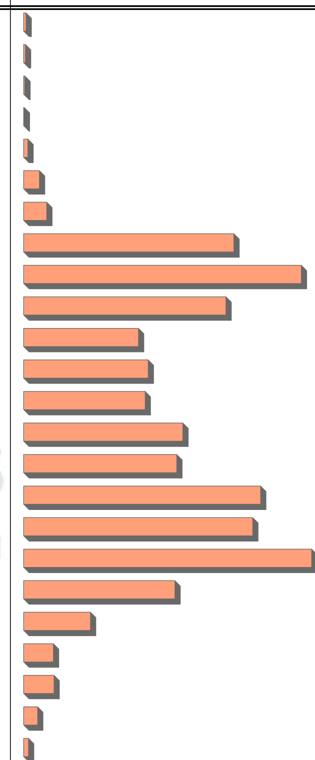


Comments: none

LOCATION: 36. Laurel St
SPECIFIC LOCATION: 100 ft from Oak Grove Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899424
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				4		4			4	
1:00 AM				3		3			3	
2:00 AM				2		2			2	
3:00 AM				1		1			1	
4:00 AM				7		7			7	
5:00 AM				26		26			26	
6:00 AM				38		38			38	
7:00 AM				346		346			346	
8:00 AM				**457**		**457**			**457**	
9:00 AM				333		333			333	
10:00 AM				189		189			189	
11:00 AM				205		205			205	
12:00 PM				200		200			200	
1:00 PM				262		262			262	
2:00 PM				252		252			252	
3:00 PM				390		390			390	
4:00 PM				377		377			377	
5:00 PM				**474**		**474**			**474**	
6:00 PM				249		249			249	
7:00 PM				110		110			110	
8:00 PM				49		49			49	
9:00 PM				50		50			50	
10:00 PM				23		23			23	
11:00 PM				8		8			8	
Day Total				4055		4055			4055	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 457		8:00 AM 457			8:00 AM 457	
PM Peak Volume				5:00 PM 474		5:00 PM 474			5:00 PM 474	

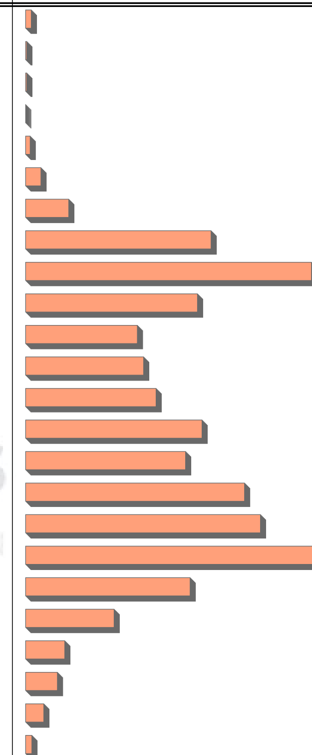


Comments: none

LOCATION: 37. Laurel St
SPECIFIC LOCATION: 100 ft from Ravenswood Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899425
DIRECTION: NB/SB
DATE: Sep 24 2014 - Sep 24 2014

Start Time	Mon	Tue	Wed 24-Sep-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			10			10			10	
1:00 AM			2			2			2	
2:00 AM			2			2			2	
3:00 AM			0			0			0	
4:00 AM			8			8			8	
5:00 AM			27			27			27	
6:00 AM			76			76			76	
7:00 AM			327			327			327	
8:00 AM			**504**			**504**			**504**	
9:00 AM			303			303			303	
10:00 AM			197			197			197	
11:00 AM			208			208			208	
12:00 PM			230			230			230	
1:00 PM			311			311			311	
2:00 PM			282			282			282	
3:00 PM			386			386			386	
4:00 PM			414			414			414	
5:00 PM			**507**			**507**			**507**	
6:00 PM			290			290			290	
7:00 PM			156			156			156	
8:00 PM			69			69			69	
9:00 PM			56			56			56	
10:00 PM			32			32			32	
11:00 PM			11			11			11	
Day Total			4408			4408			4408	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 504			8:00 AM 504			8:00 AM 504	
PM Peak Volume			5:00 PM 507			5:00 PM 507			5:00 PM 507	



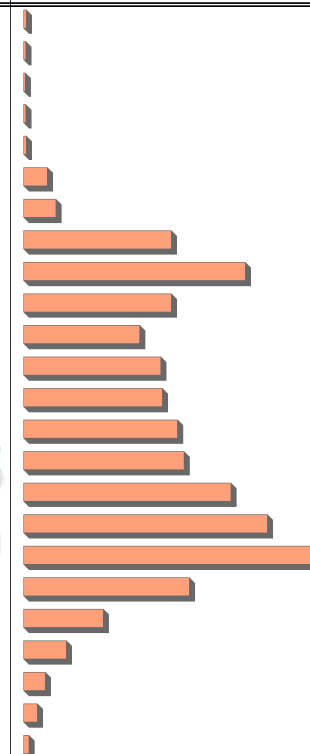
Comments: none

LOCATION: 38. Laurel St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899426
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM				5		5			5
1:00 AM				4		4			4
2:00 AM				3		3			3
3:00 AM				4		4			4
4:00 AM				5		5			5
5:00 AM				45		45			45
6:00 AM				61		61			61
7:00 AM				280		280			280
8:00 AM				**420**		**420**			**420**
9:00 AM				280		280			280
10:00 AM				220		220			220
11:00 AM				260		260			260
12:00 PM				263		263			263
1:00 PM				292		292			292
2:00 PM				304		304			304
3:00 PM				393		393			393
4:00 PM				462		462			462
5:00 PM				**547**		**547**			**547**
6:00 PM				314		314			314
7:00 PM				151		151			151
8:00 PM				81		81			81
9:00 PM				41		41			41
10:00 PM				26		26			26
11:00 PM				10		10			10
Day Total				4471		4471			4471
% Weekday Average				100.0%					
% Week Average				100.0%		100.0%			
AM Peak Volume				8:00 AM 420		8:00 AM 420			8:00 AM 420
PM Peak Volume				5:00 PM 547		5:00 PM 547			5:00 PM 547

Average Week Profile

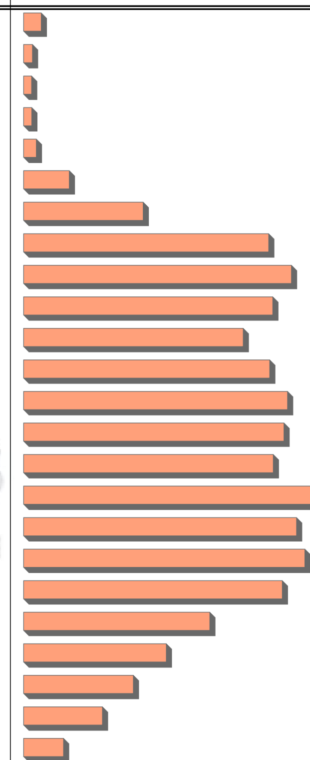


Comments: none

LOCATION: 39. Marsh Rd
SPECIFIC LOCATION: 100 ft from City Limit
CITY/STATE: Menlo Park, CA

QC JOB #: 12899427
DIRECTION: EB/WB
DATE: Oct 02 2014 - Oct 02 2014

Start Time	Mon	Tue	Wed	Thu 02-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				104		104			104	
1:00 AM				52		52			52	
2:00 AM				47		47			47	
3:00 AM				48		48			48	
4:00 AM				75		75			75	
5:00 AM				269		269			269	
6:00 AM				704		704			704	
7:00 AM				1443		1443			1443	
8:00 AM				**1577**		**1577**			**1577**	
9:00 AM				1467		1467			1467	
10:00 AM				1293		1293			1293	
11:00 AM				1449		1449			1449	
12:00 PM				1554		1554			1554	
1:00 PM				1533		1533			1533	
2:00 PM				1470		1470			1470	
3:00 PM				**1693**		**1693**			**1693**	
4:00 PM				1607		1607			1607	
5:00 PM				1656		1656			1656	
6:00 PM				1523		1523			1523	
7:00 PM				1096		1096			1096	
8:00 PM				840		840			840	
9:00 PM				646		646			646	
10:00 PM				464		464			464	
11:00 PM				235		235			235	
Day Total				22845		22845			22845	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1577		8:00 AM 1577			8:00 AM 1577	
PM Peak Volume				3:00 PM 1693		3:00 PM 1693			3:00 PM 1693	

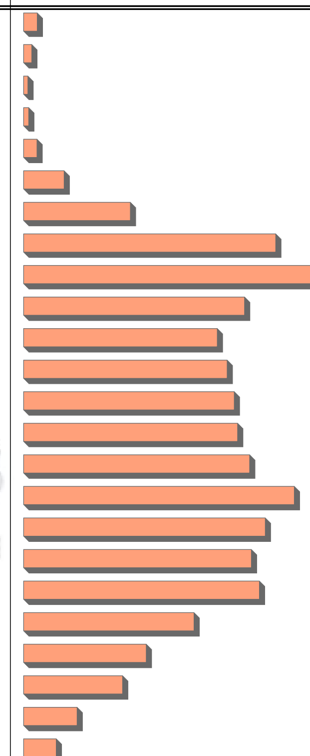


Comments: none

LOCATION: 40. Marsh Rd
SPECIFIC LOCATION: 100 ft from Bay Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899428
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		102				102			102	
1:00 AM		61				61			61	
2:00 AM		32				32			32	
3:00 AM		38				38			38	
4:00 AM		100				100			100	
5:00 AM		303				303			303	
6:00 AM		798				798			798	
7:00 AM		1885				1885			1885	
8:00 AM		**2150**				**2150**			**2150**	
9:00 AM		1652				1652			1652	
10:00 AM		1448				1448			1448	
11:00 AM		1522				1522			1522	
12:00 PM		1575				1575			1575	
1:00 PM		1600				1600			1600	
2:00 PM		1690				1690			1690	
3:00 PM		**2024**				**2024**			**2024**	
4:00 PM		1807				1807			1807	
5:00 PM		1703				1703			1703	
6:00 PM		1763				1763			1763	
7:00 PM		1274				1274			1274	
8:00 PM		917				917			917	
9:00 PM		740				740			740	
10:00 PM		400				400			400	
11:00 PM		244				244			244	
Day Total		25828				25828			25828	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2150				8:00 AM 2150			8:00 AM 2150	
PM Peak Volume		3:00 PM 2024				3:00 PM 2024			3:00 PM 2024	

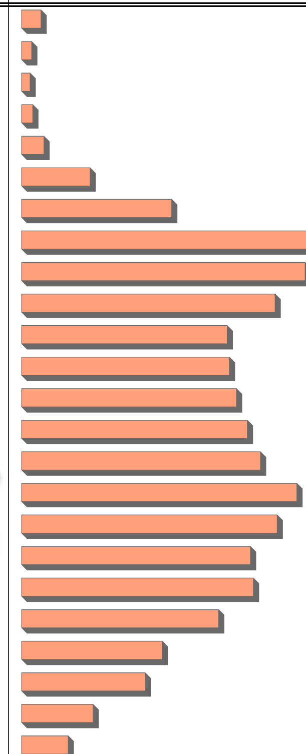


Comments: none

LOCATION: 41. Marsh Rd
SPECIFIC LOCATION: 100 ft from Bohannon Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899429
DIRECTION: NB/SB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		166				166			166	
1:00 AM		86				86			86	
2:00 AM		72				72			72	
3:00 AM		95				95			95	
4:00 AM		191				191			191	
5:00 AM		587				587			587	
6:00 AM		1287				1287			1287	
7:00 AM		**2475**				**2475**			**2475**	
8:00 AM		2432				2432			2432	
9:00 AM		2174				2174			2174	
10:00 AM		1763				1763			1763	
11:00 AM		1782				1782			1782	
12:00 PM		1843				1843			1843	
1:00 PM		1936				1936			1936	
2:00 PM		2049				2049			2049	
3:00 PM		**2361**				**2361**			**2361**	
4:00 PM		2192				2192			2192	
5:00 PM		1963				1963			1963	
6:00 PM		1988				1988			1988	
7:00 PM		1690				1690			1690	
8:00 PM		1206				1206			1206	
9:00 PM		1059				1059			1059	
10:00 PM		612				612			612	
11:00 PM		399				399			399	
Day Total		32408				32408			32408	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		7:00 AM 2475				7:00 AM 2475			7:00 AM 2475	
PM Peak Volume		3:00 PM 2361				3:00 PM 2361			3:00 PM 2361	

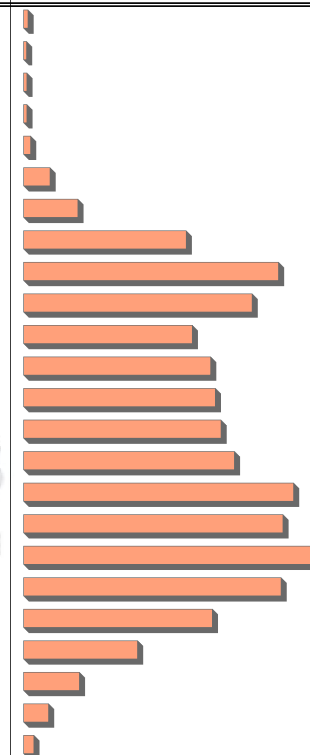


Comments: none

LOCATION: 44. Menlo Ave
SPECIFIC LOCATION: 100 ft from Crane St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899431
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		12				12			12	
1:00 AM		8				8			8	
2:00 AM		9				9			9	
3:00 AM		9				9			9	
4:00 AM		19				19			19	
5:00 AM		72				72			72	
6:00 AM		148				148			148	
7:00 AM		443				443			443	
8:00 AM		**695**				**695**			**695**	
9:00 AM		623				623			623	
10:00 AM		460				460			460	
11:00 AM		510				510			510	
12:00 PM		523				523			523	
1:00 PM		538				538			538	
2:00 PM		575				575			575	
3:00 PM		736				736			736	
4:00 PM		707				707			707	
5:00 PM		**784**				**784**			**784**	
6:00 PM		702				702			702	
7:00 PM		515				515			515	
8:00 PM		311				311			311	
9:00 PM		152				152			152	
10:00 PM		68				68			68	
11:00 PM		28				28			28	
Day Total		8647				8647			8647	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 695				8:00 AM 695			8:00 AM 695	
PM Peak Volume		5:00 PM 784				5:00 PM 784			5:00 PM 784	



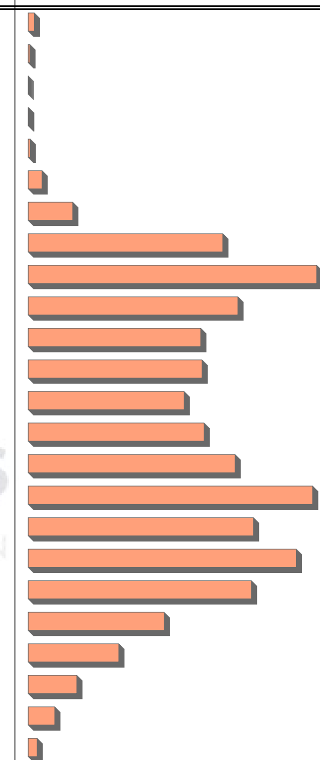
Comments: none

LOCATION: 45. Middle Ave
SPECIFIC LOCATION: 100 ft from Olive St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899432
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		15				15			15
1:00 AM		4				4			4
2:00 AM		0				0			0
3:00 AM		1				1			1
4:00 AM		5				5			5
5:00 AM		34				34			34
6:00 AM		109				109			109
7:00 AM		477				477			477
8:00 AM		**707**				**707**			**707**
9:00 AM		514				514			514
10:00 AM		423				423			423
11:00 AM		426				426			426
12:00 PM		382				382			382
1:00 PM		431				431			431
2:00 PM		507				507			507
3:00 PM		**697**				**697**			**697**
4:00 PM		552				552			552
5:00 PM		657				657			657
6:00 PM		547				547			547
7:00 PM		333				333			333
8:00 PM		222				222			222
9:00 PM		119				119			119
10:00 PM		65				65			65
11:00 PM		22				22			22
Day Total		7249				7249			7249
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 707				8:00 AM 707			8:00 AM 707
PM Peak Volume		3:00 PM 697				3:00 PM 697			3:00 PM 697

Average Week Profile

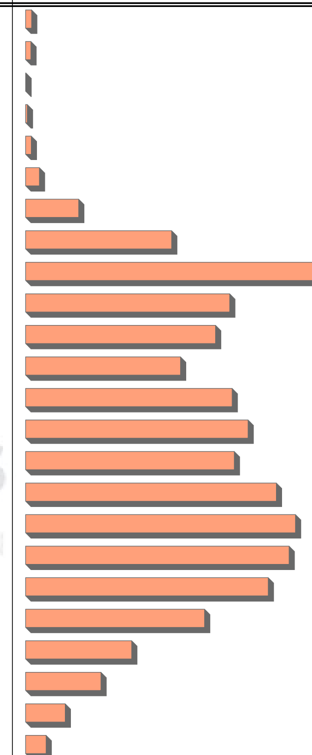


Comments: none

LOCATION: 46. Middle Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899433
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		17				17			17	
1:00 AM		15				15			15	
2:00 AM		1				1			1	
3:00 AM		5				5			5	
4:00 AM		16				16			16	
5:00 AM		39				39			39	
6:00 AM		150				150			150	
7:00 AM		413				413			413	
8:00 AM		**813**				**813**			**813**	
9:00 AM		577				577			577	
10:00 AM		537				537			537	
11:00 AM		438				438			438	
12:00 PM		584				584			584	
1:00 PM		629				629			629	
2:00 PM		590				590			590	
3:00 PM		709				709			709	
4:00 PM		**763**				**763**			**763**	
5:00 PM		745				745			745	
6:00 PM		686				686			686	
7:00 PM		506				506			506	
8:00 PM		300				300			300	
9:00 PM		213				213			213	
10:00 PM		112				112			112	
11:00 PM		58				58			58	
Day Total		8916				8916			8916	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 813				8:00 AM 813			8:00 AM 813	
PM Peak Volume		4:00 PM 763				4:00 PM 763			4:00 PM 763	

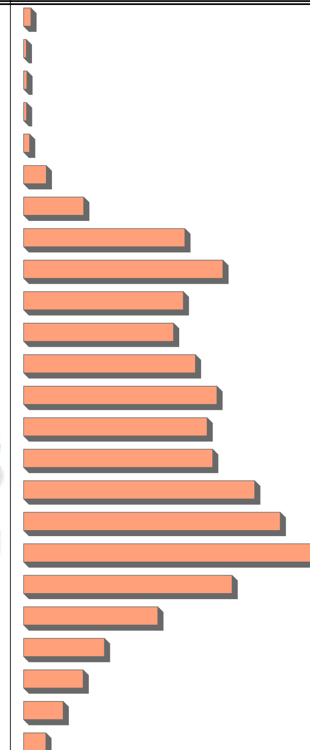


Comments: none

LOCATION: 47. Middlefield Rd
SPECIFIC LOCATION: 100 ft from Ravenswood Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899434
DIRECTION: NB/SB
DATE: Sep 30 2014 - Sep 30 2014

Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		38				38			38	
1:00 AM		14				14			14	
2:00 AM		17				17			17	
3:00 AM		15				15			15	
4:00 AM		31				31			31	
5:00 AM		118				118			118	
6:00 AM		313				313			313	
7:00 AM		840				840			840	
8:00 AM		**1038**				**1038**			**1038**	
9:00 AM		832				832			832	
10:00 AM		781				781			781	
11:00 AM		895				895			895	
12:00 PM		1007				1007			1007	
1:00 PM		956				956			956	
2:00 PM		985				985			985	
3:00 PM		1204				1204			1204	
4:00 PM		1337				1337			1337	
5:00 PM		**1498**				**1498**			**1498**	
6:00 PM		1086				1086			1086	
7:00 PM		699				699			699	
8:00 PM		421				421			421	
9:00 PM		310				310			310	
10:00 PM		206				206			206	
11:00 PM		116				116			116	
Day Total		14757				14757			14757	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1038				8:00 AM 1038			8:00 AM 1038	
PM Peak Volume		5:00 PM 1498				5:00 PM 1498			5:00 PM 1498	

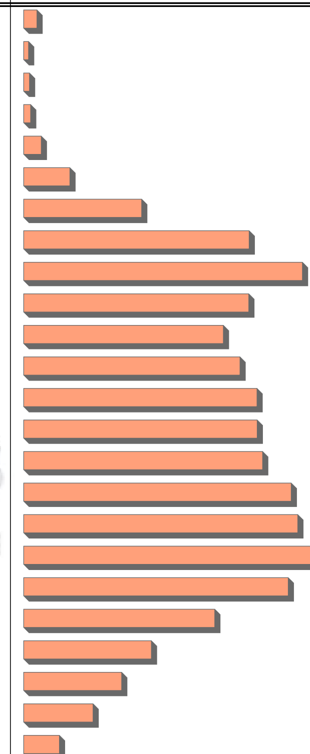


Comments: none

LOCATION: 48. Middlefield Rd
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899435
DIRECTION: NB/SB
DATE: Sep 30 2014 - Sep 30 2014

Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		71				71			71	
1:00 AM		26				26			26	
2:00 AM		31				31			31	
3:00 AM		37				37			37	
4:00 AM		94				94			94	
5:00 AM		247				247			247	
6:00 AM		631				631			631	
7:00 AM		1206				1206			1206	
8:00 AM		**1491**				**1491**			**1491**	
9:00 AM		1204				1204			1204	
10:00 AM		1068				1068			1068	
11:00 AM		1157				1157			1157	
12:00 PM		1248				1248			1248	
1:00 PM		1249				1249			1249	
2:00 PM		1278				1278			1278	
3:00 PM		1431				1431			1431	
4:00 PM		1466				1466			1466	
5:00 PM		**1543**				**1543**			**1543**	
6:00 PM		1415				1415			1415	
7:00 PM		1022				1022			1022	
8:00 PM		683				683			683	
9:00 PM		524				524			524	
10:00 PM		371				371			371	
11:00 PM		191				191			191	
Day Total		19684				19684			19684	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1491				8:00 AM 1491			8:00 AM 1491	
PM Peak Volume		5:00 PM 1543				5:00 PM 1543			5:00 PM 1543	

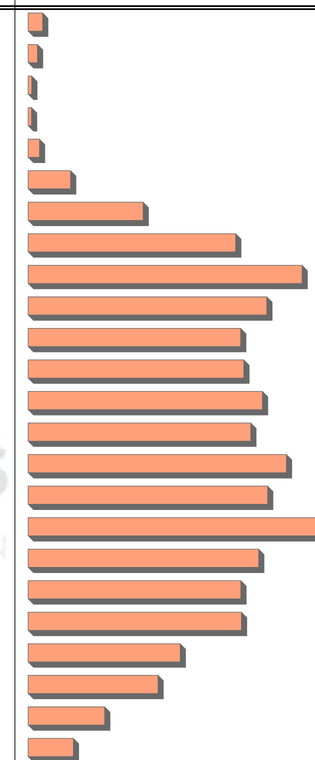


Comments: none

LOCATION: 49. Middlefield Rd
SPECIFIC LOCATION: 100 ft from City Limits
CITY/STATE: Menlo Park, CA

QC JOB #: 12899436
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		73				73			73	
1:00 AM		47				47			47	
2:00 AM		18				18			18	
3:00 AM		17				17			17	
4:00 AM		57				57			57	
5:00 AM		214				214			214	
6:00 AM		580				580			580	
7:00 AM		1047				1047			1047	
8:00 AM		**1382**				**1382**			**1382**	
9:00 AM		1204				1204			1204	
10:00 AM		1072				1072			1072	
11:00 AM		1088				1088			1088	
12:00 PM		1182				1182			1182	
1:00 PM		1123				1123			1123	
2:00 PM		1303				1303			1303	
3:00 PM		1208				1208			1208	
4:00 PM		**1453**				**1453**			**1453**	
5:00 PM		1163				1163			1163	
6:00 PM		1073				1073			1073	
7:00 PM		1076				1076			1076	
8:00 PM		767				767			767	
9:00 PM		655				655			655	
10:00 PM		386				386			386	
11:00 PM		228				228			228	
Day Total		18416				18416			18416	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1382				8:00 AM 1382			8:00 AM 1382	
PM Peak Volume		4:00 PM 1453				4:00 PM 1453			4:00 PM 1453	



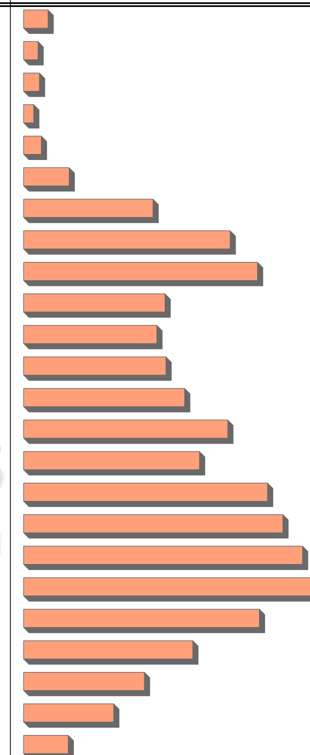
Comments: none

LOCATION: 50. Newbridge St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899437
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM			51			51			51
1:00 AM			30			30			30
2:00 AM			33			33			33
3:00 AM			21			21			21
4:00 AM			37			37			37
5:00 AM			95			95			95
6:00 AM			270			270			270
7:00 AM			431			431			431
8:00 AM			**488**			**488**			**488**
9:00 AM			295			295			295
10:00 AM			278			278			278
11:00 AM			297			297			297
12:00 PM			336			336			336
1:00 PM			426			426			426
2:00 PM			367			367			367
3:00 PM			509			509			509
4:00 PM			541			541			541
5:00 PM			582			582			582
6:00 PM			**600**			**600**			**600**
7:00 PM			492			492			492
8:00 PM			353			353			353
9:00 PM			252			252			252
10:00 PM			188			188			188
11:00 PM			93			93			93
Day Total			7065			7065			7065
% Weekday Average			100.0%						
% Week Average			100.0%			100.0%			
AM Peak Volume			8:00 AM 488			8:00 AM 488			8:00 AM 488
PM Peak Volume			6:00 PM 600			6:00 PM 600			6:00 PM 600

Average Week Profile

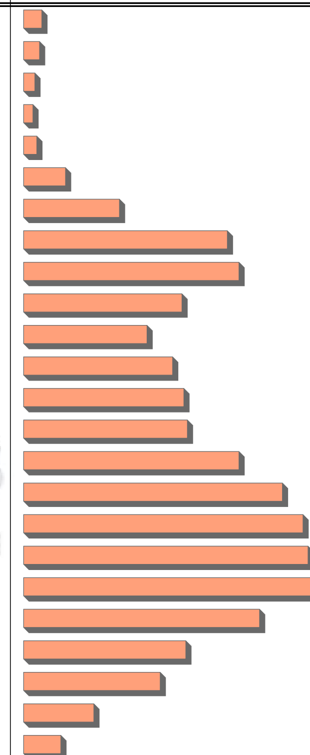


Comments: none

LOCATION: 51. Newbridge St
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899438
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		47				47			47	
1:00 AM		41				41			41	
2:00 AM		29				29			29	
3:00 AM		24				24			24	
4:00 AM		34				34			34	
5:00 AM		108				108			108	
6:00 AM		247				247			247	
7:00 AM		525				525			525	
8:00 AM		**555**				**555**			**555**	
9:00 AM		408				408			408	
10:00 AM		318				318			318	
11:00 AM		384				384			384	
12:00 PM		413				413			413	
1:00 PM		422				422			422	
2:00 PM		555				555			555	
3:00 PM		667				667			667	
4:00 PM		720				720			720	
5:00 PM		733				733			733	
6:00 PM		**741**				**741**			**741**	
7:00 PM		608				608			608	
8:00 PM		418				418			418	
9:00 PM		352				352			352	
10:00 PM		181				181			181	
11:00 PM		96				96			96	
Day Total		8626				8626			8626	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 555				8:00 AM 555			8:00 AM 555	
PM Peak Volume		6:00 PM 741				6:00 PM 741			6:00 PM 741	



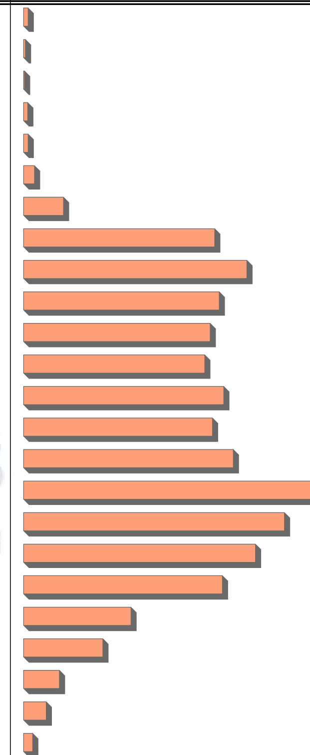
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 52. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899439
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		10				10			10	
1:00 AM		4				4			4	
2:00 AM		2				2			2	
3:00 AM		9				9			9	
4:00 AM		10				10			10	
5:00 AM		24				24			24	
6:00 AM		88				88			88	
7:00 AM		422				422			422	
8:00 AM		**493**				**493**			**493**	
9:00 AM		432				432			432	
10:00 AM		412				412			412	
11:00 AM		400				400			400	
12:00 PM		442				442			442	
1:00 PM		417				417			417	
2:00 PM		463				463			463	
3:00 PM		**635**				**635**			**635**	
4:00 PM		576				576			576	
5:00 PM		512				512			512	
6:00 PM		439				439			439	
7:00 PM		237				237			237	
8:00 PM		175				175			175	
9:00 PM		79				79			79	
10:00 PM		50				50			50	
11:00 PM		20				20			20	
Day Total		6351				6351			6351	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 493				8:00 AM 493			8:00 AM 493	
PM Peak Volume		3:00 PM 635				3:00 PM 635			3:00 PM 635	



Comments: none

Report generated on 10/24/2014 2:46 PM

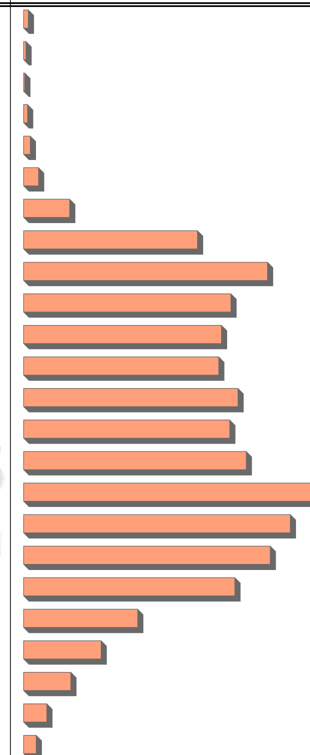
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

Type of report: Tube Count - Volume Data

LOCATION: 53. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from Crane St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899440
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		12				12			12	
1:00 AM		6				6			6	
2:00 AM		3				3			3	
3:00 AM		10				10			10	
4:00 AM		17				17			17	
5:00 AM		38				38			38	
6:00 AM		117				117			117	
7:00 AM		442				442			442	
8:00 AM		**620**				**620**			**620**	
9:00 AM		527				527			527	
10:00 AM		503				503			503	
11:00 AM		496				496			496	
12:00 PM		545				545			545	
1:00 PM		524				524			524	
2:00 PM		566				566			566	
3:00 PM		**731**				**731**			**731**	
4:00 PM		678				678			678	
5:00 PM		627				627			627	
6:00 PM		537				537			537	
7:00 PM		290				290			290	
8:00 PM		197				197			197	
9:00 PM		120				120			120	
10:00 PM		59				59			59	
11:00 PM		32				32			32	
Day Total		7697				7697			7697	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 620				8:00 AM 620			8:00 AM 620	
PM Peak Volume		3:00 PM 731				3:00 PM 731			3:00 PM 731	



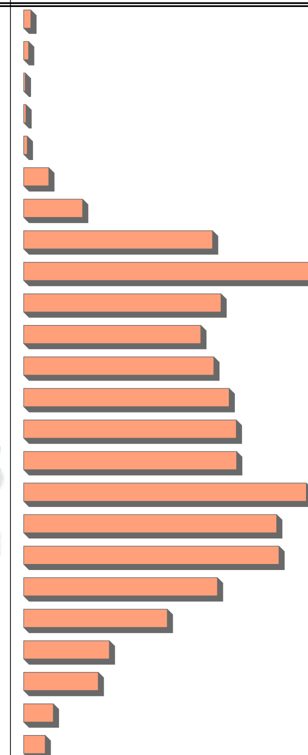
Comments: none

Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 54. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from El Camino Real
CITY/STATE: Menlo Park, CA

QC JOB #: 12899441
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		22				22			22	
1:00 AM		15				15			15	
2:00 AM		5				5			5	
3:00 AM		7				7			7	
4:00 AM		11				11			11	
5:00 AM		77				77			77	
6:00 AM		181				181			181	
7:00 AM		580				580			580	
8:00 AM		**886**				**886**			**886**	
9:00 AM		606				606			606	
10:00 AM		544				544			544	
11:00 AM		584				584			584	
12:00 PM		631				631			631	
1:00 PM		653				653			653	
2:00 PM		654				654			654	
3:00 PM		**868**				**868**			**868**	
4:00 PM		777				777			777	
5:00 PM		784				784			784	
6:00 PM		595				595			595	
7:00 PM		441				441			441	
8:00 PM		263				263			263	
9:00 PM		229				229			229	
10:00 PM		91				91			91	
11:00 PM		66				66			66	
Day Total		9570				9570			9570	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 886				8:00 AM 886			8:00 AM 886	
PM Peak Volume		3:00 PM 868				3:00 PM 868			3:00 PM 868	

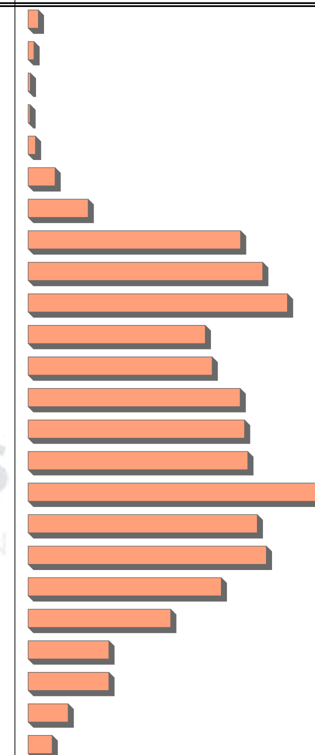
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 55. Oak Grove Ave
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899442
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				28		28			28	
1:00 AM				16		16			16	
2:00 AM				6		6			6	
3:00 AM				5		5			5	
4:00 AM				20		20			20	
5:00 AM				74		74			74	
6:00 AM				165		165			165	
7:00 AM				584		584			584	
8:00 AM				645		645			645	
9:00 AM				**713**		**713**			**713**	
10:00 AM				487		487			487	
11:00 AM				506		506			506	
12:00 PM				583		583			583	
1:00 PM				595		595			595	
2:00 PM				604		604			604	
3:00 PM				**792**		**792**			**792**	
4:00 PM				630		630			630	
5:00 PM				655		655			655	
6:00 PM				531		531			531	
7:00 PM				392		392			392	
8:00 PM				222		222			222	
9:00 PM				222		222			222	
10:00 PM				110		110			110	
11:00 PM				66		66			66	
Day Total				8651		8651			8651	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				9:00 AM 713		9:00 AM 713			9:00 AM 713	
PM Peak Volume				3:00 PM 792		3:00 PM 792			3:00 PM 792	



Comments: none

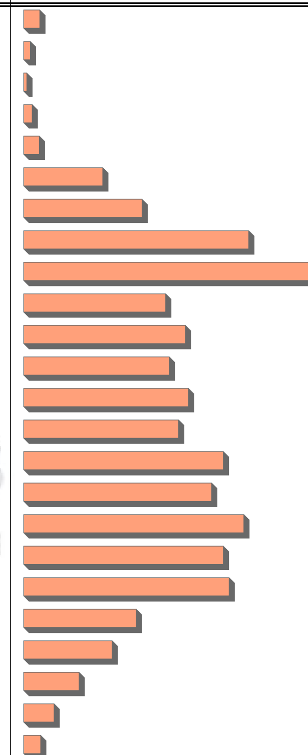
Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 56. O'Brien Dr
SPECIFIC LOCATION: 100 ft from Kavanaugh Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899443
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			36			36			36	
1:00 AM			15			15			15	
2:00 AM			7			7			7	
3:00 AM			19			19			19	
4:00 AM			35			35			35	
5:00 AM			177			177			177	
6:00 AM			265			265			265	
7:00 AM			504			504			504	
8:00 AM			**646**			**646**			**646**	
9:00 AM			318			318			318	
10:00 AM			362			362			362	
11:00 AM			326			326			326	
12:00 PM			369			369			369	
1:00 PM			347			347			347	
2:00 PM			447			447			447	
3:00 PM			421			421			421	
4:00 PM			**493**			**493**			**493**	
5:00 PM			447			447			447	
6:00 PM			460			460			460	
7:00 PM			252			252			252	
8:00 PM			198			198			198	
9:00 PM			124			124			124	
10:00 PM			68			68			68	
11:00 PM			38			38			38	
Day Total			6374			6374			6374	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 646			8:00 AM 646			8:00 AM 646	
PM Peak Volume			4:00 PM 493			4:00 PM 493			4:00 PM 493	

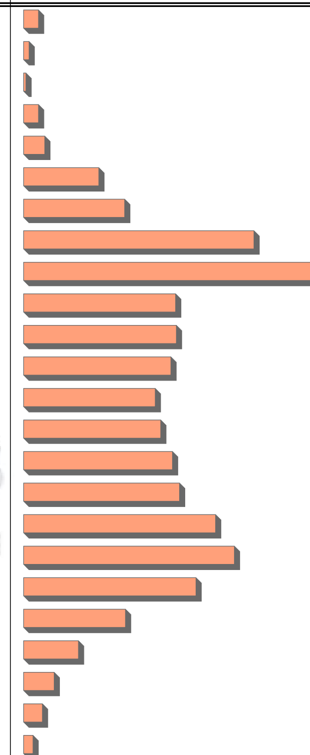


Comments: none

LOCATION: 57. O'Brien Dr
SPECIFIC LOCATION: 100 ft from University Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899444
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			19			19			19	
1:00 AM			7			7			7	
2:00 AM			3			3			3	
3:00 AM			19			19			19	
4:00 AM			27			27			27	
5:00 AM			96			96			96	
6:00 AM			129			129			129	
7:00 AM			294			294			294	
8:00 AM			**367**			**367**			**367**	
9:00 AM			194			194			194	
10:00 AM			195			195			195	
11:00 AM			188			188			188	
12:00 PM			168			168			168	
1:00 PM			175			175			175	
2:00 PM			190			190			190	
3:00 PM			199			199			199	
4:00 PM			245			245			245	
5:00 PM			**269**			**269**			**269**	
6:00 PM			220			220			220	
7:00 PM			130			130			130	
8:00 PM			70			70			70	
9:00 PM			39			39			39	
10:00 PM			24			24			24	
11:00 PM			12			12			12	
Day Total			3279			3279			3279	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 367			8:00 AM 367			8:00 AM 367	
PM Peak Volume			5:00 PM 269			5:00 PM 269			5:00 PM 269	



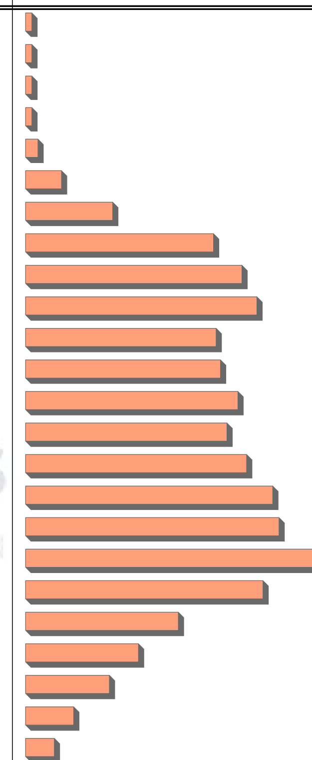
Comments: none

LOCATION: 60. Ravenswood Ave
SPECIFIC LOCATION: 100 ft from Alma St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899446
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM				36		36			36
1:00 AM				36		36			36
2:00 AM				36		36			36
3:00 AM				36		36			36
4:00 AM				71		71			71
5:00 AM				206		206			206
6:00 AM				500		500			500
7:00 AM				1079		1079			1079
8:00 AM				1242		1242			1242
9:00 AM				**1328**		**1328**			**1328**
10:00 AM				1094		1094			1094
11:00 AM				1119		1119			1119
12:00 PM				1219		1219			1219
1:00 PM				1156		1156			1156
2:00 PM				1269		1269			1269
3:00 PM				1419		1419			1419
4:00 PM				1455		1455			1455
5:00 PM				**1651**		**1651**			**1651**
6:00 PM				1363		1363			1363
7:00 PM				877		877			877
8:00 PM				648		648			648
9:00 PM				481		481			481
10:00 PM				276		276			276
11:00 PM				165		165			165
Day Total				18762		18762			18762
% Weekday Average				100.0%					
% Week Average				100.0%		100.0%			
AM Peak Volume				9:00 AM 1328		9:00 AM 1328			9:00 AM 1328
PM Peak Volume				5:00 PM 1651		5:00 PM 1651			5:00 PM 1651

Average Week Profile

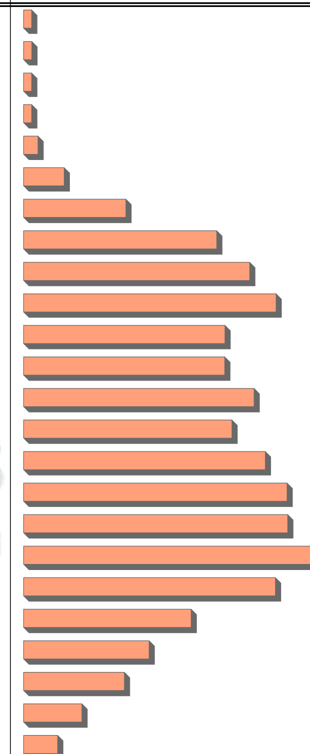


Comments: none

LOCATION: 61. Ravenswood Ave
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899447
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				38		38			38	
1:00 AM				39		39			39	
2:00 AM				38		38			38	
3:00 AM				38		38			38	
4:00 AM				68		68			68	
5:00 AM				192		192			192	
6:00 AM				484		484			484	
7:00 AM				914		914			914	
8:00 AM				1070		1070			1070	
9:00 AM				**1195**		**1195**			**1195**	
10:00 AM				953		953			953	
11:00 AM				952		952			952	
12:00 PM				1091		1091			1091	
1:00 PM				986		986			986	
2:00 PM				1144		1144			1144	
3:00 PM				1247		1247			1247	
4:00 PM				1250		1250			1250	
5:00 PM				**1361**		**1361**			**1361**	
6:00 PM				1192		1192			1192	
7:00 PM				793		793			793	
8:00 PM				594		594			594	
9:00 PM				477		477			477	
10:00 PM				276		276			276	
11:00 PM				161		161			161	
Day Total				16553		16553			16553	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				9:00 AM 1195		9:00 AM 1195			9:00 AM 1195	
PM Peak Volume				5:00 PM 1361		5:00 PM 1361			5:00 PM 1361	

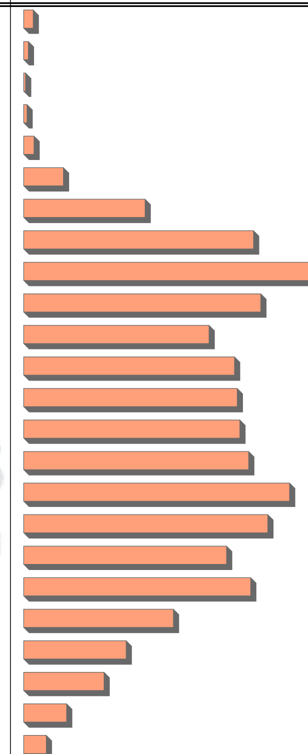


Comments: none

LOCATION: 63. Sand Hill Rd
SPECIFIC LOCATION: 100 ft from I-280
CITY/STATE: Menlo Park, CA

QC JOB #: 12899449
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		80				80			80	
1:00 AM		39				39			39	
2:00 AM		16				16			16	
3:00 AM		28				28			28	
4:00 AM		87				87			87	
5:00 AM		334				334			334	
6:00 AM		1021				1021			1021	
7:00 AM		1933				1933			1933	
8:00 AM		**2426**				**2426**			**2426**	
9:00 AM		1994				1994			1994	
10:00 AM		1559				1559			1559	
11:00 AM		1773				1773			1773	
12:00 PM		1796				1796			1796	
1:00 PM		1818				1818			1818	
2:00 PM		1892				1892			1892	
3:00 PM		**2236**				**2236**			**2236**	
4:00 PM		2053				2053			2053	
5:00 PM		1706				1706			1706	
6:00 PM		1909				1909			1909	
7:00 PM		1259				1259			1259	
8:00 PM		862				862			862	
9:00 PM		676				676			676	
10:00 PM		361				361			361	
11:00 PM		190				190			190	
Day Total		28048				28048			28048	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2426				8:00 AM 2426			8:00 AM 2426	
PM Peak Volume		3:00 PM 2236				3:00 PM 2236			3:00 PM 2236	



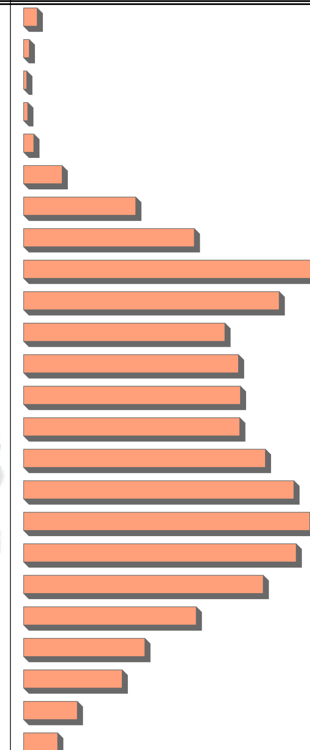
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 64. Sand Hill Rd
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899450
DIRECTION: EB/WB
DATE: Sep 25 2014 - Sep 25 2014

Start Time	Mon	Tue	Wed	Thu 25-Sep-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				118		118			118	
1:00 AM				49		49			49	
2:00 AM				27		27			27	
3:00 AM				36		36			36	
4:00 AM				89		89			89	
5:00 AM				335		335			335	
6:00 AM				975		975			975	
7:00 AM				1484		1484			1484	
8:00 AM				**2500**		**2500**			**2500**	
9:00 AM				2222		2222			2222	
10:00 AM				1750		1750			1750	
11:00 AM				1868		1868			1868	
12:00 PM				1885		1885			1885	
1:00 PM				1879		1879			1879	
2:00 PM				2102		2102			2102	
3:00 PM				2350		2350			2350	
4:00 PM				**2488**		**2488**			**2488**	
5:00 PM				2370		2370			2370	
6:00 PM				2083		2083			2083	
7:00 PM				1501		1501			1501	
8:00 PM				1054		1054			1054	
9:00 PM				857		857			857	
10:00 PM				467		467			467	
11:00 PM				296		296			296	
Day Total				30785		30785			30785	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 2500		8:00 AM 2500			8:00 AM 2500	
PM Peak Volume				4:00 PM 2488		4:00 PM 2488			4:00 PM 2488	



Comments: none

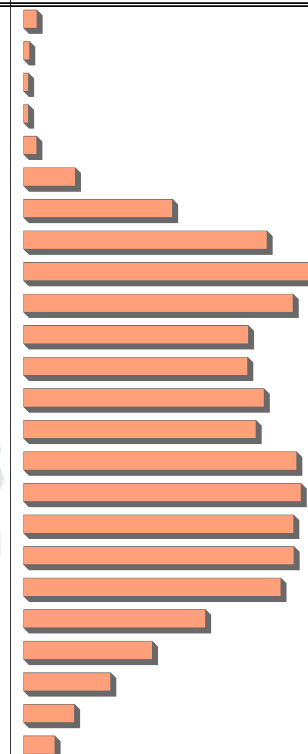
Report generated on 10/24/2014 2:46 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 65. Sand Hill Rd
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899451
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		114				114			114	
1:00 AM		51				51			51	
2:00 AM		41				41			41	
3:00 AM		41				41			41	
4:00 AM		112				112			112	
5:00 AM		446				446			446	
6:00 AM		1286				1286			1286	
7:00 AM		2101				2101			2101	
8:00 AM		**2491**				**2491**			**2491**	
9:00 AM		2326				2326			2326	
10:00 AM		1940				1940			1940	
11:00 AM		1934				1934			1934	
12:00 PM		2076				2076			2076	
1:00 PM		2006				2006			2006	
2:00 PM		2357				2357			2357	
3:00 PM		**2395**				**2395**			**2395**	
4:00 PM		2331				2331			2331	
5:00 PM		2334				2334			2334	
6:00 PM		2221				2221			2221	
7:00 PM		1570				1570			1570	
8:00 PM		1110				1110			1110	
9:00 PM		751				751			751	
10:00 PM		439				439			439	
11:00 PM		269				269			269	
Day Total		32742				32742			32742	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2491				8:00 AM 2491			8:00 AM 2491	
PM Peak Volume		3:00 PM 2395				3:00 PM 2395			3:00 PM 2395	

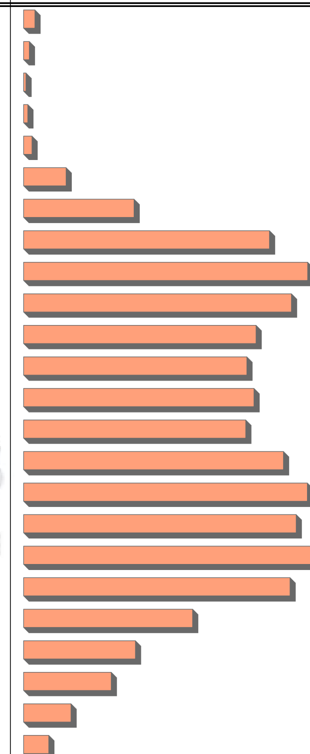


Comments: none

LOCATION: 66. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Junipero Serra Blvd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899452
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		81				81			81	
1:00 AM		41				41			41	
2:00 AM		17				17			17	
3:00 AM		30				30			30	
4:00 AM		60				60			60	
5:00 AM		304				304			304	
6:00 AM		790				790			790	
7:00 AM		1759				1759			1759	
8:00 AM		**2032**				**2032**			**2032**	
9:00 AM		1916				1916			1916	
10:00 AM		1663				1663			1663	
11:00 AM		1597				1597			1597	
12:00 PM		1648				1648			1648	
1:00 PM		1589				1589			1589	
2:00 PM		1859				1859			1859	
3:00 PM		2030				2030			2030	
4:00 PM		1950				1950			1950	
5:00 PM		**2057**				**2057**			**2057**	
6:00 PM		1906				1906			1906	
7:00 PM		1209				1209			1209	
8:00 PM		800				800			800	
9:00 PM		627				627			627	
10:00 PM		339				339			339	
11:00 PM		180				180			180	
Day Total		26484				26484			26484	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2032				8:00 AM 2032			8:00 AM 2032	
PM Peak Volume		5:00 PM 2057				5:00 PM 2057			5:00 PM 2057	



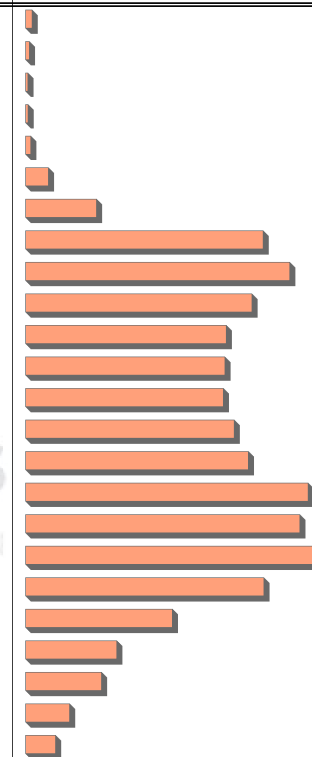
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 67. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Sand Hill Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899453
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				45		45			45	
1:00 AM				26		26			26	
2:00 AM				16		16			16	
3:00 AM				17		17			17	
4:00 AM				36		36			36	
5:00 AM				158		158			158	
6:00 AM				493		493			493	
7:00 AM				1651		1651			1651	
8:00 AM				**1836**		**1836**			**1836**	
9:00 AM				1573		1573			1573	
10:00 AM				1395		1395			1395	
11:00 AM				1385		1385			1385	
12:00 PM				1375		1375			1375	
1:00 PM				1450		1450			1450	
2:00 PM				1549		1549			1549	
3:00 PM				1964		1964			1964	
4:00 PM				1906		1906			1906	
5:00 PM				**1999**		**1999**			**1999**	
6:00 PM				1656		1656			1656	
7:00 PM				1021		1021			1021	
8:00 PM				634		634			634	
9:00 PM				528		528			528	
10:00 PM				306		306			306	
11:00 PM				208		208			208	
Day Total				23227		23227			23227	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1836		8:00 AM 1836			8:00 AM 1836	
PM Peak Volume				5:00 PM 1999		5:00 PM 1999			5:00 PM 1999	

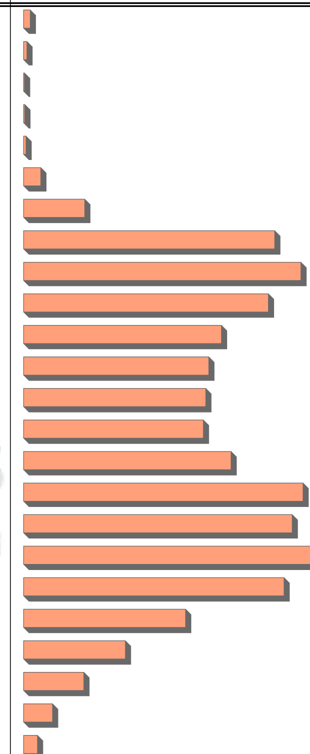


Comments: none

LOCATION: 68. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Alameda de las Pulgas
CITY/STATE: Menlo Park, CA

QC JOB #: 12899454
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		22				22			22	
1:00 AM		11				11			11	
2:00 AM		3				3			3	
3:00 AM		4				4			4	
4:00 AM		8				8			8	
5:00 AM		57				57			57	
6:00 AM		203				203			203	
7:00 AM		834				834			834	
8:00 AM		**921**				**921**			**921**	
9:00 AM		813				813			813	
10:00 AM		657				657			657	
11:00 AM		615				615			615	
12:00 PM		605				605			605	
1:00 PM		597				597			597	
2:00 PM		689				689			689	
3:00 PM		928				928			928	
4:00 PM		892				892			892	
5:00 PM		**955**				**955**			**955**	
6:00 PM		865				865			865	
7:00 PM		538				538			538	
8:00 PM		338				338			338	
9:00 PM		200				200			200	
10:00 PM		96				96			96	
11:00 PM		46				46			46	
Day Total		10897				10897			10897	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 921				8:00 AM 921			8:00 AM 921	
PM Peak Volume		5:00 PM 955				5:00 PM 955			5:00 PM 955	

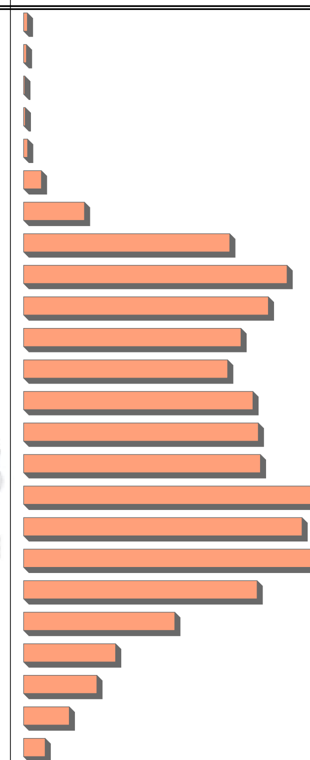


Comments: none

LOCATION: 69. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Avy/Orange Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899455
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				16		16			16	
1:00 AM				12		12			12	
2:00 AM				5		5			5	
3:00 AM				7		7			7	
4:00 AM				17		17			17	
5:00 AM				76		76			76	
6:00 AM				260		260			260	
7:00 AM				881		881			881	
8:00 AM				**1126**		**1126**			**1126**	
9:00 AM				1046		1046			1046	
10:00 AM				929		929			929	
11:00 AM				872		872			872	
12:00 PM				980		980			980	
1:00 PM				1003		1003			1003	
2:00 PM				1012		1012			1012	
3:00 PM				1226		1226			1226	
4:00 PM				1190		1190			1190	
5:00 PM				**1229**		**1229**			**1229**	
6:00 PM				998		998			998	
7:00 PM				646		646			646	
8:00 PM				393		393			393	
9:00 PM				313		313			313	
10:00 PM				195		195			195	
11:00 PM				92		92			92	
Day Total				14524		14524			14524	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1126		8:00 AM 1126			8:00 AM 1126	
PM Peak Volume				5:00 PM 1229		5:00 PM 1229			5:00 PM 1229	

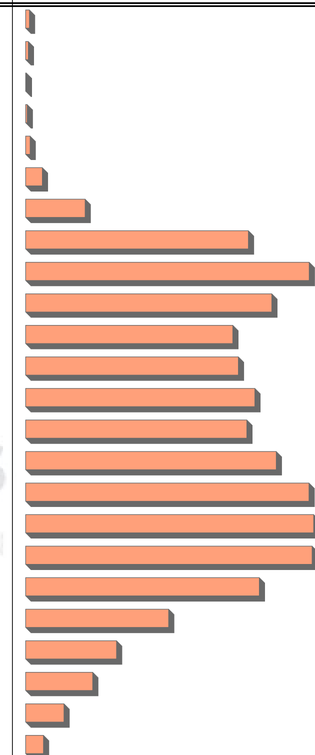


Comments: none

LOCATION: 70. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Olive St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899456
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				17		17			17	
1:00 AM				12		12			12	
2:00 AM				3		3			3	
3:00 AM				7		7			7	
4:00 AM				20		20			20	
5:00 AM				75		75			75	
6:00 AM				267		267			267	
7:00 AM				1000		1000			1000	
8:00 AM				**1273**		**1273**			**1273**	
9:00 AM				1105		1105			1105	
10:00 AM				930		930			930	
11:00 AM				955		955			955	
12:00 PM				1029		1029			1029	
1:00 PM				993		993			993	
2:00 PM				1125		1125			1125	
3:00 PM				1272		1272			1272	
4:00 PM				**1293**		**1293**			**1293**	
5:00 PM				1286		1286			1286	
6:00 PM				1049		1049			1049	
7:00 PM				642		642			642	
8:00 PM				408		408			408	
9:00 PM				301		301			301	
10:00 PM				172		172			172	
11:00 PM				80		80			80	
Day Total				15314		15314			15314	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1273		8:00 AM 1273			8:00 AM 1273	
PM Peak Volume				4:00 PM 1293		4:00 PM 1293			4:00 PM 1293	

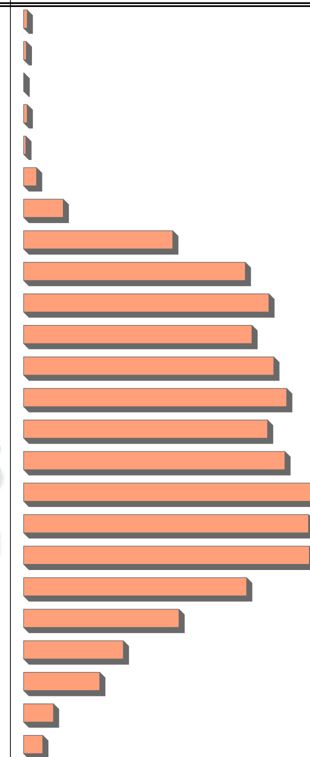


Comments: none

LOCATION: 71. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899457
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				8		8			8	
1:00 AM				6		6			6	
2:00 AM				1		1			1	
3:00 AM				8		8			8	
4:00 AM				5		5			5	
5:00 AM				29		29			29	
6:00 AM				89		89			89	
7:00 AM				335		335			335	
8:00 AM				498		498			498	
9:00 AM				551		551			551	
10:00 AM				513		513			513	
11:00 AM				**562**		**562**			**562**	
12:00 PM				591		591			591	
1:00 PM				548		548			548	
2:00 PM				587		587			587	
3:00 PM				**646**		**646**			**646**	
4:00 PM				640		640			640	
5:00 PM				642		642			642	
6:00 PM				501		501			501	
7:00 PM				349		349			349	
8:00 PM				224		224			224	
9:00 PM				171		171			171	
10:00 PM				67		67			67	
11:00 PM				43		43			43	
Day Total				7614		7614			7614	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				11:00 AM 562		11:00 AM 562			11:00 AM 562	
PM Peak Volume				3:00 PM 646		3:00 PM 646			3:00 PM 646	

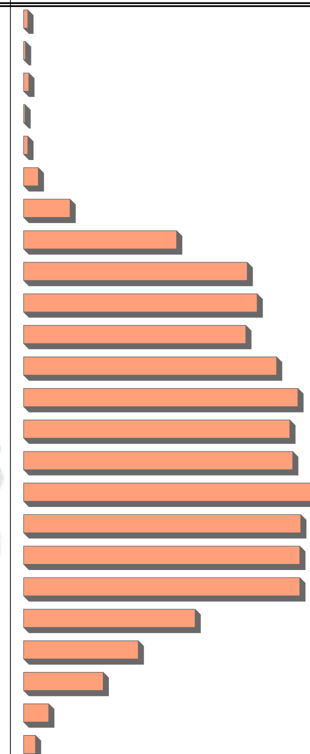


Comments: none

LOCATION: 72. Santa Cruz Ave
SPECIFIC LOCATION: 100 ft from Crane St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899458
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		9				9			9	
1:00 AM		4				4			4	
2:00 AM		11				11			11	
3:00 AM		3				3			3	
4:00 AM		9				9			9	
5:00 AM		31				31			31	
6:00 AM		98				98			98	
7:00 AM		323				323			323	
8:00 AM		472				472			472	
9:00 AM		493				493			493	
10:00 AM		469				469			469	
11:00 AM		**534**				**534**			**534**	
12:00 PM		579				579			579	
1:00 PM		562				562			562	
2:00 PM		568				568			568	
3:00 PM		**607**				**607**			**607**	
4:00 PM		585				585			585	
5:00 PM		583				583			583	
6:00 PM		583				583			583	
7:00 PM		362				362			362	
8:00 PM		242				242			242	
9:00 PM		168				168			168	
10:00 PM		53				53			53	
11:00 PM		25				25			25	
Day Total		7373				7373			7373	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		11:00 AM 534				11:00 AM 534			11:00 AM 534	
PM Peak Volume		3:00 PM 607				3:00 PM 607			3:00 PM 607	



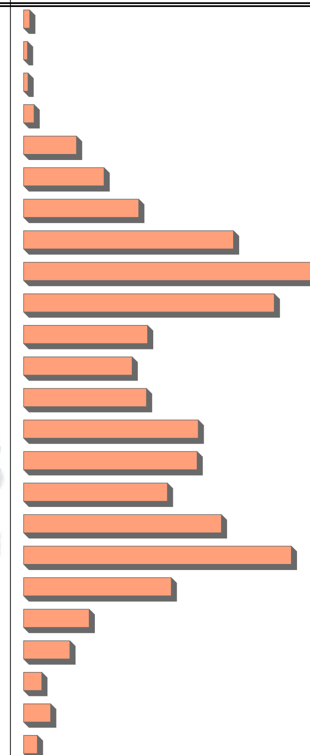
Comments: none

LOCATION: 73. Scott Dr
SPECIFIC LOCATION: 100 ft from Marsh Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899459
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		11				11			11
1:00 AM		7				7			7
2:00 AM		8				8			8
3:00 AM		19				19			19
4:00 AM		96				96			96
5:00 AM		146				146			146
6:00 AM		209				209			209
7:00 AM		381				381			381
8:00 AM		**522**				**522**			**522**
9:00 AM		455				455			455
10:00 AM		225				225			225
11:00 AM		197				197			197
12:00 PM		223				223			223
1:00 PM		317				317			317
2:00 PM		315				315			315
3:00 PM		261				261			261
4:00 PM		359				359			359
5:00 PM		**486**				**486**			**486**
6:00 PM		268				268			268
7:00 PM		119				119			119
8:00 PM		84				84			84
9:00 PM		33				33			33
10:00 PM		49				49			49
11:00 PM		25				25			25
Day Total		4815				4815			4815
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 522				8:00 AM 522			8:00 AM 522
PM Peak Volume		5:00 PM 486				5:00 PM 486			5:00 PM 486

Average Week Profile

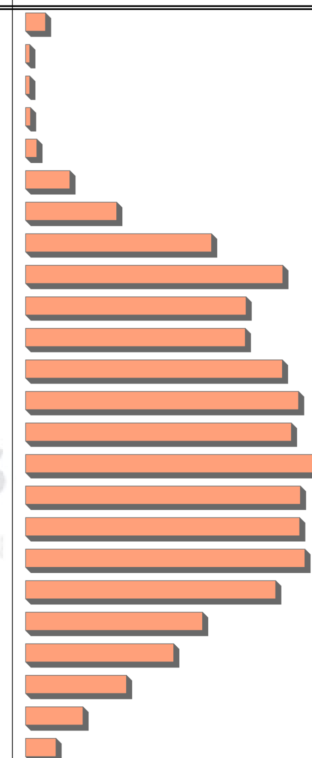


Comments: none

LOCATION: 74. Sharon Park Dr
SPECIFIC LOCATION: 100 ft from Sand Hill Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899460
DIRECTION: NB/SB
DATE: Sep 24 2014 - Sep 24 2014

Start Time	Mon	Tue	Wed 24-Sep-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			53			53			53	
1:00 AM			11			11			11	
2:00 AM			11			11			11	
3:00 AM			13			13			13	
4:00 AM			30			30			30	
5:00 AM			118			118			118	
6:00 AM			243			243			243	
7:00 AM			496			496			496	
8:00 AM			**686**			**686**			**686**	
9:00 AM			588			588			588	
10:00 AM			586			586			586	
11:00 AM			685			685			685	
12:00 PM			728			728			728	
1:00 PM			709			709			709	
2:00 PM			**767**			**767**			**767**	
3:00 PM			733			733			733	
4:00 PM			731			731			731	
5:00 PM			745			745			745	
6:00 PM			667			667			667	
7:00 PM			472			472			472	
8:00 PM			395			395			395	
9:00 PM			269			269			269	
10:00 PM			153			153			153	
11:00 PM			81			81			81	
Day Total			9970			9970			9970	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 686			8:00 AM 686			8:00 AM 686	
PM Peak Volume			2:00 PM 767			2:00 PM 767			2:00 PM 767	

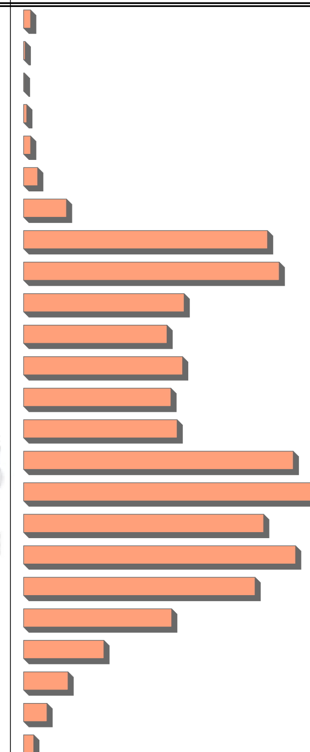


Comments: none

LOCATION: 75. Sharon Rd
SPECIFIC LOCATION: 100 ft from Sharon Park Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899461
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		9				9			9	
1:00 AM		2				2			2	
2:00 AM		1				1			1	
3:00 AM		4				4			4	
4:00 AM		9				9			9	
5:00 AM		18				18			18	
6:00 AM		55				55			55	
7:00 AM		313				313			313	
8:00 AM		**328**				**328**			**328**	
9:00 AM		206				206			206	
10:00 AM		184				184			184	
11:00 AM		204				204			204	
12:00 PM		189				189			189	
1:00 PM		197				197			197	
2:00 PM		346				346			346	
3:00 PM		**369**				**369**			**369**	
4:00 PM		308				308			308	
5:00 PM		349				349			349	
6:00 PM		297				297			297	
7:00 PM		190				190			190	
8:00 PM		103				103			103	
9:00 PM		57				57			57	
10:00 PM		30				30			30	
11:00 PM		13				13			13	
Day Total		3781				3781			3781	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 328				8:00 AM 328			8:00 AM 328	
PM Peak Volume		3:00 PM 369				3:00 PM 369			3:00 PM 369	



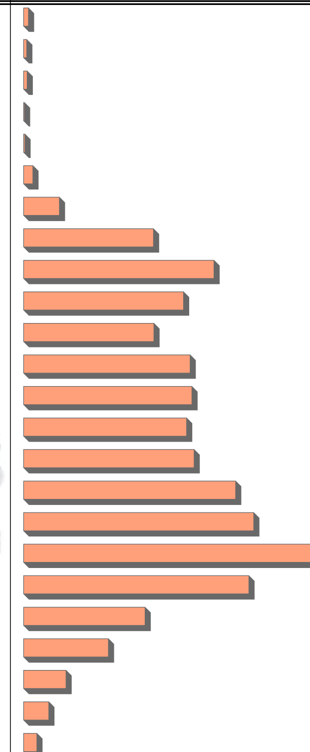
Comments: none

LOCATION: 76. University Dr
SPECIFIC LOCATION: 100 ft from Middle Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899462
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		11				11			11
1:00 AM		7				7			7
2:00 AM		8				8			8
3:00 AM		2				2			2
4:00 AM		3				3			3
5:00 AM		21				21			21
6:00 AM		81				81			81
7:00 AM		294				294			294
8:00 AM		**431**				**431**			**431**
9:00 AM		362				362			362
10:00 AM		295				295			295
11:00 AM		377				377			377
12:00 PM		381				381			381
1:00 PM		369				369			369
2:00 PM		386				386			386
3:00 PM		480				480			480
4:00 PM		521				521			521
5:00 PM		**651**				**651**			**651**
6:00 PM		510				510			510
7:00 PM		275				275			275
8:00 PM		192				192			192
9:00 PM		96				96			96
10:00 PM		57				57			57
11:00 PM		30				30			30
Day Total		5840				5840			5840
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 431				8:00 AM 431			8:00 AM 431
PM Peak Volume		5:00 PM 651				5:00 PM 651			5:00 PM 651

Average Week Profile



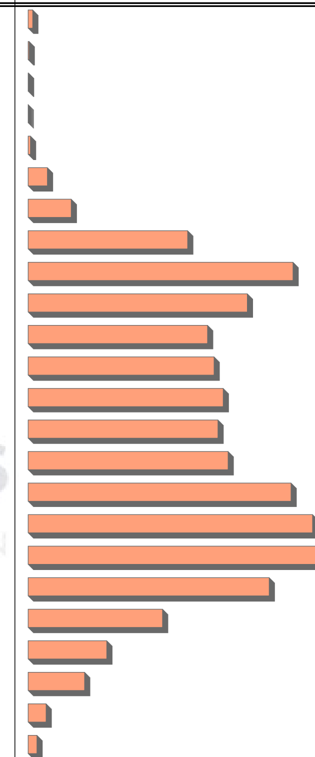
Comments: none

LOCATION: 77. University Dr
SPECIFIC LOCATION: 100 ft from Menlo Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899463
DIRECTION: NB/SB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		14				14			14
1:00 AM		3				3			3
2:00 AM		1				1			1
3:00 AM		0				0			0
4:00 AM		7				7			7
5:00 AM		59				59			59
6:00 AM		132				132			132
7:00 AM		489				489			489
8:00 AM		**812**				**812**			**812**
9:00 AM		672				672			672
10:00 AM		550				550			550
11:00 AM		570				570			570
12:00 PM		598				598			598
1:00 PM		582				582			582
2:00 PM		613				613			613
3:00 PM		806				806			806
4:00 PM		872				872			872
5:00 PM		**883**				**883**			**883**
6:00 PM		739				739			739
7:00 PM		412				412			412
8:00 PM		241				241			241
9:00 PM		173				173			173
10:00 PM		55				55			55
11:00 PM		27				27			27
Day Total		9310				9310			9310
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 812				8:00 AM 812			8:00 AM 812
PM Peak Volume		5:00 PM 883				5:00 PM 883			5:00 PM 883

Average Week Profile



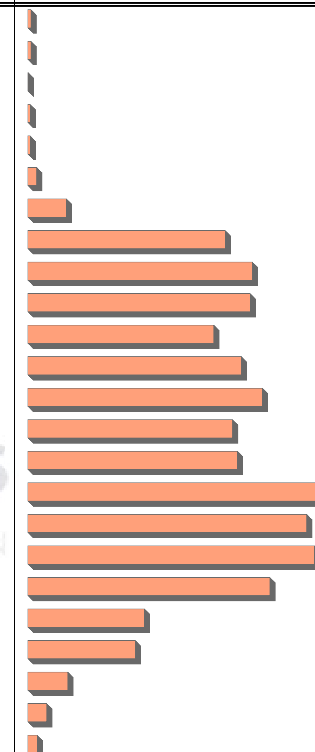
Comments: none

LOCATION: 78. University Dr
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899464
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		7				7			7
1:00 AM		7				7			7
2:00 AM		1				1			1
3:00 AM		5				5			5
4:00 AM		5				5			5
5:00 AM		20				20			20
6:00 AM		88				88			88
7:00 AM		450				450			450
8:00 AM		**512**				**512**			**512**
9:00 AM		507				507			507
10:00 AM		424				424			424
11:00 AM		487				487			487
12:00 PM		535				535			535
1:00 PM		467				467			467
2:00 PM		478				478			478
3:00 PM		**657**				**657**			**657**
4:00 PM		636				636			636
5:00 PM		654				654			654
6:00 PM		552				552			552
7:00 PM		266				266			266
8:00 PM		245				245			245
9:00 PM		91				91			91
10:00 PM		43				43			43
11:00 PM		21				21			21
Day Total		7158				7158			7158
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 512				8:00 AM 512			8:00 AM 512
PM Peak Volume		3:00 PM 657				3:00 PM 657			3:00 PM 657

Average Week Profile

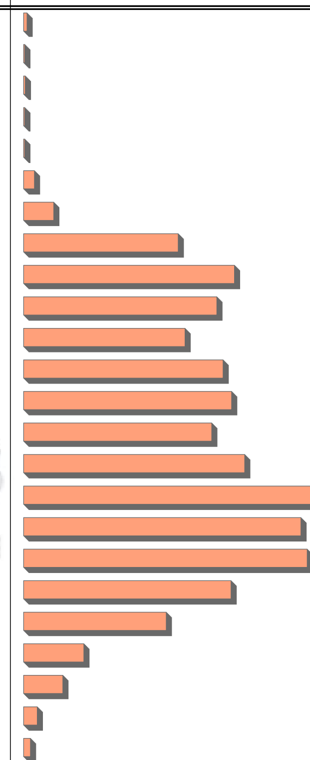


Comments: none

LOCATION: 79. University Dr
SPECIFIC LOCATION: 100 ft from Oak Grove Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899465
DIRECTION: NB/SB
DATE: Oct 23 2014 - Oct 23 2014

Start Time	Mon	Tue	Wed	Thu 23-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				6		6			6	
1:00 AM				2		2			2	
2:00 AM				3		3			3	
3:00 AM				2		2			2	
4:00 AM				2		2			2	
5:00 AM				19		19			19	
6:00 AM				53		53			53	
7:00 AM				272		272			272	
8:00 AM				**371**		**371**			**371**	
9:00 AM				340		340			340	
10:00 AM				284		284			284	
11:00 AM				351		351			351	
12:00 PM				366		366			366	
1:00 PM				331		331			331	
2:00 PM				389		389			389	
3:00 PM				**506**		**506**			**506**	
4:00 PM				488		488			488	
5:00 PM				499		499			499	
6:00 PM				365		365			365	
7:00 PM				251		251			251	
8:00 PM				106		106			106	
9:00 PM				69		69			69	
10:00 PM				24		24			24	
11:00 PM				12		12			12	
Day Total				5111		5111			5111	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 371		8:00 AM 371			8:00 AM 371	
PM Peak Volume				3:00 PM 506		3:00 PM 506			3:00 PM 506	

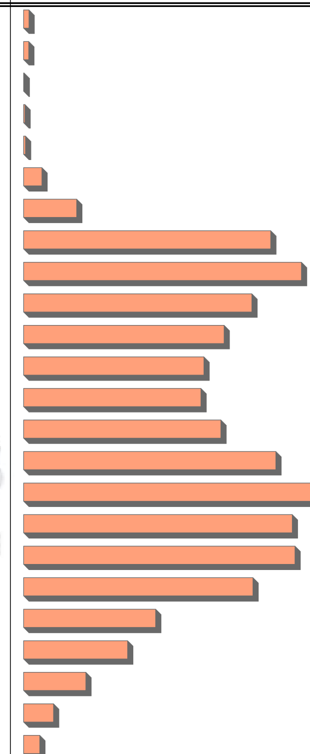


Comments: none

LOCATION: 84. Valparaiso Ave
SPECIFIC LOCATION: 100 ft from Alameda de las Pulgas
CITY/STATE: Menlo Park, CA

QC JOB #: 12899466
DIRECTION: EB/WB
DATE: Oct 15 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed 15-Oct-14	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				20		20			20	
1:00 AM				19		19			19	
2:00 AM				2		2			2	
3:00 AM				5		5			5	
4:00 AM				7		7			7	
5:00 AM				68		68			68	
6:00 AM				197		197			197	
7:00 AM				917		917			917	
8:00 AM				**1031**		**1031**			**1031**	
9:00 AM				847		847			847	
10:00 AM				744		744			744	
11:00 AM				669		669			669	
12:00 PM				658		658			658	
1:00 PM				732		732			732	
2:00 PM				936		936			936	
3:00 PM				**1067**		**1067**			**1067**	
4:00 PM				997		997			997	
5:00 PM				1007		1007			1007	
6:00 PM				851		851			851	
7:00 PM				490		490			490	
8:00 PM			**386**			386			386	
9:00 PM			231			231			231	
10:00 PM			111			111			111	
11:00 PM			60			60			60	
Day Total			788	11264		12052			12052	
% Weekday Average			6.5%	93.5%						
% Week Average			6.5%	93.5%		100.0%				
AM Peak Volume				8:00 AM 1031		8:00 AM 1031			8:00 AM 1031	
PM Peak Volume			8:00 PM 386	3:00 PM 1067		3:00 PM 1067			3:00 PM 1067	

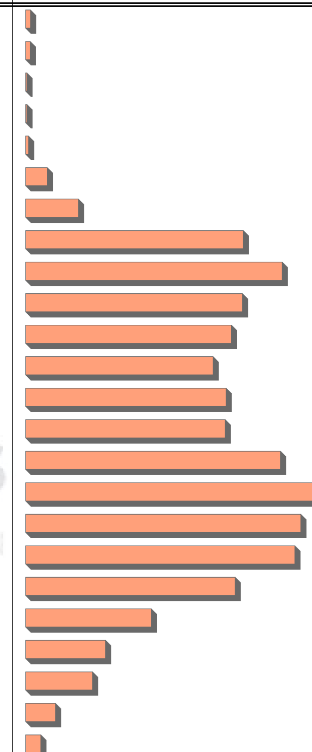


Comments: none

LOCATION: 85. Valparaiso Ave
SPECIFIC LOCATION: 100 ft from Cotton St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899467
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				22		22			22	
1:00 AM				21		21			21	
2:00 AM				6		6			6	
3:00 AM				6		6			6	
4:00 AM				13		13			13	
5:00 AM				98		98			98	
6:00 AM				239		239			239	
7:00 AM				986		986			986	
8:00 AM				**1162**		**1162**			**1162**	
9:00 AM				982		982			982	
10:00 AM				932		932			932	
11:00 AM				849		849			849	
12:00 PM				908		908			908	
1:00 PM				904		904			904	
2:00 PM				1154		1154			1154	
3:00 PM				**1302**		**1302**			**1302**	
4:00 PM				1246		1246			1246	
5:00 PM				1219		1219			1219	
6:00 PM				949		949			949	
7:00 PM				569		569			569	
8:00 PM				362		362			362	
9:00 PM				303		303			303	
10:00 PM				135		135			135	
11:00 PM				69		69			69	
Day Total				14436		14436			14436	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 1162		8:00 AM 1162			8:00 AM 1162	
PM Peak Volume				3:00 PM 1302		3:00 PM 1302			3:00 PM 1302	



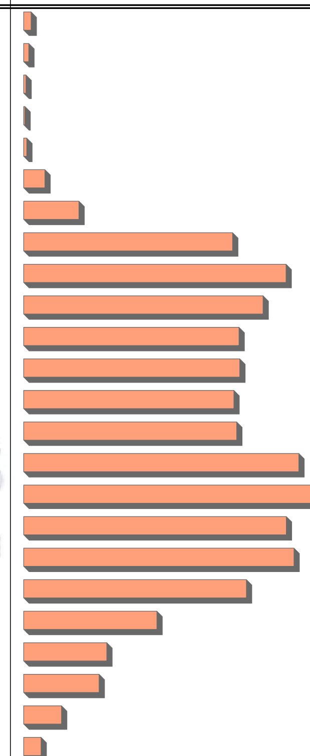
Comments: none

LOCATION: 86. Valparaiso Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899468
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM				29		29			29
1:00 AM				20		20			20
2:00 AM				9		9			9
3:00 AM				5		5			5
4:00 AM				12		12			12
5:00 AM				83		83			83
6:00 AM				216		216			216
7:00 AM				817		817			817
8:00 AM				**1026**		**1026**			**1026**
9:00 AM				936		936			936
10:00 AM				842		842			842
11:00 AM				845		845			845
12:00 PM				822		822			822
1:00 PM				833		833			833
2:00 PM				1076		1076			1076
3:00 PM				**1128**		**1128**			**1128**
4:00 PM				1027		1027			1027
5:00 PM				1057		1057			1057
6:00 PM				871		871			871
7:00 PM				521		521			521
8:00 PM				325		325			325
9:00 PM				295		295			295
10:00 PM				148		148			148
11:00 PM				68		68			68
Day Total				13011		13011			13011
% Weekday Average				100.0%					
% Week Average				100.0%		100.0%			
AM Peak Volume				8:00 AM 1026		8:00 AM 1026			8:00 AM 1026
PM Peak Volume				3:00 PM 1128		3:00 PM 1128			3:00 PM 1128

Average Week Profile

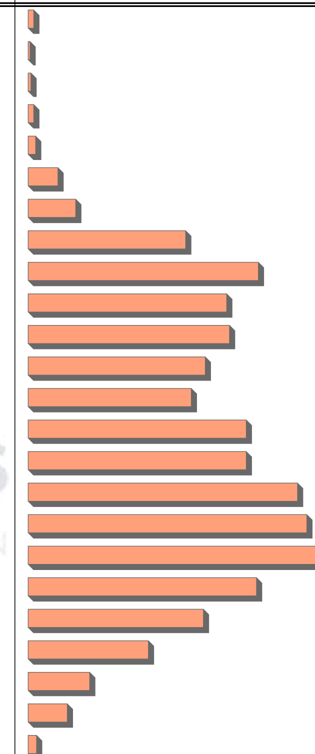


Comments: none

LOCATION: 87. Willow Rd
SPECIFIC LOCATION: 100 ft from Alma St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899469
DIRECTION: EB/WB
DATE: Sep 30 2014 - Sep 30 2014

Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		6				6			6	
1:00 AM		2				2			2	
2:00 AM		3				3			3	
3:00 AM		6				6			6	
4:00 AM		8				8			8	
5:00 AM		32				32			32	
6:00 AM		51				51			51	
7:00 AM		169				169			169	
8:00 AM		**247**				**247**			**247**	
9:00 AM		213				213			213	
10:00 AM		216				216			216	
11:00 AM		190				190			190	
12:00 PM		175				175			175	
1:00 PM		234				234			234	
2:00 PM		234				234			234	
3:00 PM		289				289			289	
4:00 PM		299				299			299	
5:00 PM		**309**				**309**			**309**	
6:00 PM		245				245			245	
7:00 PM		188				188			188	
8:00 PM		129				129			129	
9:00 PM		66				66			66	
10:00 PM		42				42			42	
11:00 PM		9				9			9	
Day Total		3362				3362			3362	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 247				8:00 AM 247			8:00 AM 247	
PM Peak Volume		5:00 PM 309				5:00 PM 309			5:00 PM 309	

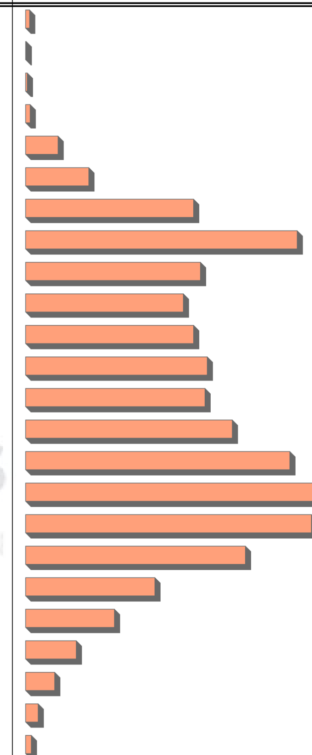


Comments: none

LOCATION: 88. Willow Rd
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899470
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		7				7			7	
1:00 AM		1				1			1	
2:00 AM		3				3			3	
3:00 AM		8				8			8	
4:00 AM		57				57			57	
5:00 AM		111				111			111	
6:00 AM		295				295			295	
7:00 AM		**477**				**477**			**477**	
8:00 AM		307				307			307	
9:00 AM		277				277			277	
10:00 AM		295				295			295	
11:00 AM		319				319			319	
12:00 PM		315				315			315	
1:00 PM		363				363			363	
2:00 PM		464				464			464	
3:00 PM		**505**				**505**			**505**	
4:00 PM		502				502			502	
5:00 PM		386				386			386	
6:00 PM		227				227			227	
7:00 PM		156				156			156	
8:00 PM		89				89			89	
9:00 PM		51				51			51	
10:00 PM		22				22			22	
11:00 PM		10				10			10	
Day Total		5247				5247			5247	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		7:00 AM 477				7:00 AM 477			7:00 AM 477	
PM Peak Volume		3:00 PM 505				3:00 PM 505			3:00 PM 505	

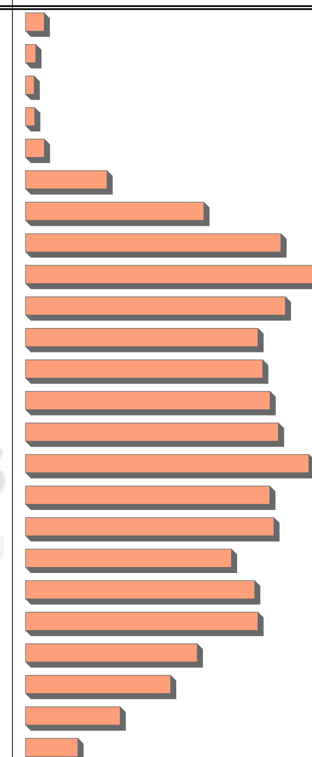


Comments: none

LOCATION: 89. Willow Rd
SPECIFIC LOCATION: 100 ft from Middlefield Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899471
DIRECTION: EB/WB
DATE: Oct 21 2014 - Oct 21 2014

Start Time	Mon	Tue 21-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		113				113			113	
1:00 AM		62				62			62	
2:00 AM		52				52			52	
3:00 AM		55				55			55	
4:00 AM		114				114			114	
5:00 AM		495				495			495	
6:00 AM		1084				1084			1084	
7:00 AM		1553				1553			1553	
8:00 AM		**1749**				**1749**			**1749**	
9:00 AM		1580				1580			1580	
10:00 AM		1413				1413			1413	
11:00 AM		1442				1442			1442	
12:00 PM		1487				1487			1487	
1:00 PM		1538				1538			1538	
2:00 PM		**1723**				**1723**			**1723**	
3:00 PM		1485				1485			1485	
4:00 PM		1510				1510			1510	
5:00 PM		1252				1252			1252	
6:00 PM		1393				1393			1393	
7:00 PM		1413				1413			1413	
8:00 PM		1044				1044			1044	
9:00 PM		882				882			882	
10:00 PM		575				575			575	
11:00 PM		318				318			318	
Day Total		24332				24332			24332	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 1749				8:00 AM 1749			8:00 AM 1749	
PM Peak Volume		2:00 PM 1723				2:00 PM 1723			2:00 PM 1723	

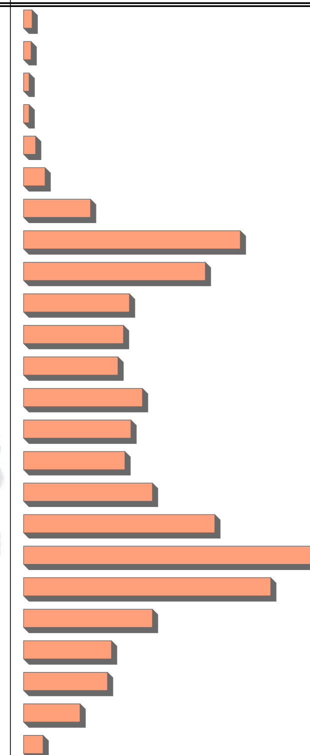


Comments: none

LOCATION: 112. Chilco St
SPECIFIC LOCATION: 100 ft from Hamilton Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899483
DIRECTION: EB/WB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			17			17			17	
1:00 AM			15			15			15	
2:00 AM			11			11			11	
3:00 AM			11			11			11	
4:00 AM			24			24			24	
5:00 AM			43			43			43	
6:00 AM			134			134			134	
7:00 AM			**434**			**434**			**434**	
8:00 AM			364			364			364	
9:00 AM			212			212			212	
10:00 AM			200			200			200	
11:00 AM			189			189			189	
12:00 PM			238			238			238	
1:00 PM			215			215			215	
2:00 PM			203			203			203	
3:00 PM			258			258			258	
4:00 PM			383			383			383	
5:00 PM			**576**			**576**			**576**	
6:00 PM			495			495			495	
7:00 PM			258			258			258	
8:00 PM			176			176			176	
9:00 PM			168			168			168	
10:00 PM			113			113			113	
11:00 PM			39			39			39	
Day Total			4776			4776			4776	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			7:00 AM 434			7:00 AM 434			7:00 AM 434	
PM Peak Volume			5:00 PM 576			5:00 PM 576			5:00 PM 576	

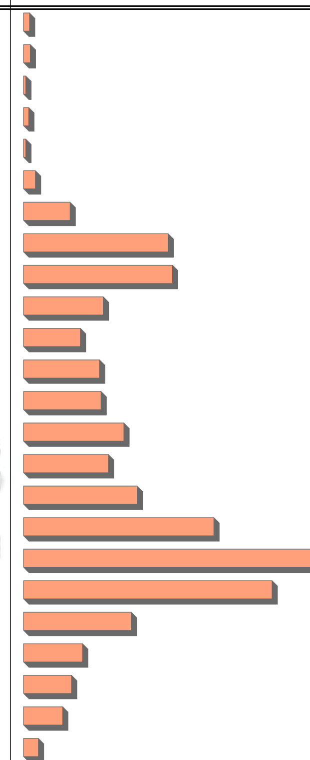


Comments: none

LOCATION: 113. Chilco St
SPECIFIC LOCATION: 100 ft from Ivy Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899484
DIRECTION: EB/WB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			8			8			8	
1:00 AM			9			9			9	
2:00 AM			3			3			3	
3:00 AM			7			7			7	
4:00 AM			3			3			3	
5:00 AM			16			16			16	
6:00 AM			63			63			63	
7:00 AM			196			196			196	
8:00 AM			**202**			**202**			**202**	
9:00 AM			108			108			108	
10:00 AM			77			77			77	
11:00 AM			103			103			103	
12:00 PM			105			105			105	
1:00 PM			136			136			136	
2:00 PM			115			115			115	
3:00 PM			154			154			154	
4:00 PM			258			258			258	
5:00 PM			**390**			**390**			**390**	
6:00 PM			337			337			337	
7:00 PM			146			146			146	
8:00 PM			80			80			80	
9:00 PM			65			65			65	
10:00 PM			53			53			53	
11:00 PM			20			20			20	
Day Total			2654			2654			2654	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 202			8:00 AM 202			8:00 AM 202	
PM Peak Volume			5:00 PM 390			5:00 PM 390			5:00 PM 390	



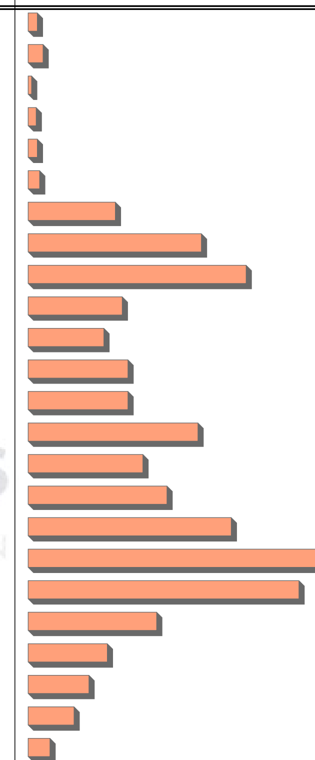
Comments: none

LOCATION: 114. Chilco St
SPECIFIC LOCATION: 100 ft from Newbridge St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899485
DIRECTION: EB/WB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM			8			8			8
1:00 AM			13			13			13
2:00 AM			3			3			3
3:00 AM			7			7			7
4:00 AM			8			8			8
5:00 AM			10			10			10
6:00 AM			76			76			76
7:00 AM			151			151			151
8:00 AM			**190**			**190**			**190**
9:00 AM			82			82			82
10:00 AM			66			66			66
11:00 AM			87			87			87
12:00 PM			87			87			87
1:00 PM			148			148			148
2:00 PM			100			100			100
3:00 PM			121			121			121
4:00 PM			177			177			177
5:00 PM			**251**			**251**			**251**
6:00 PM			236			236			236
7:00 PM			112			112			112
8:00 PM			69			69			69
9:00 PM			53			53			53
10:00 PM			40			40			40
11:00 PM			19			19			19
Day Total			2114			2114			2114
% Weekday Average			100.0%						
% Week Average			100.0%			100.0%			
AM Peak Volume			8:00 AM 190			8:00 AM 190			8:00 AM 190
PM Peak Volume			5:00 PM 251			5:00 PM 251			5:00 PM 251

Average Week Profile

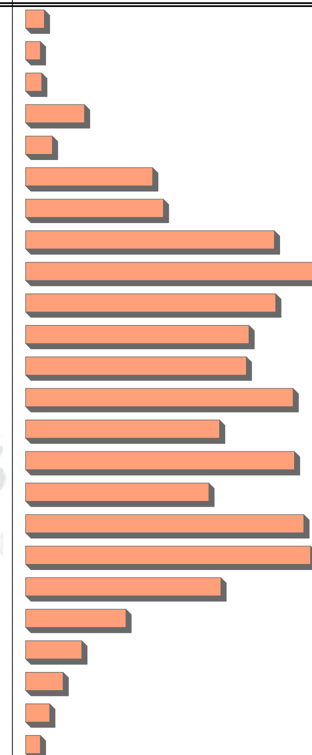


Comments: none

LOCATION: 119. Hamilton Ave
SPECIFIC LOCATION: 100 ft from Willow Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899486
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			14			14			14	
1:00 AM			11			11			11	
2:00 AM			12			12			12	
3:00 AM			44			44			44	
4:00 AM			20			20			20	
5:00 AM			95			95			95	
6:00 AM			103			103			103	
7:00 AM			186			186			186	
8:00 AM			**215**			**215**			**215**	
9:00 AM			187			187			187	
10:00 AM			167			167			167	
11:00 AM			165			165			165	
12:00 PM			200			200			200	
1:00 PM			145			145			145	
2:00 PM			201			201			201	
3:00 PM			137			137			137	
4:00 PM			208			208			208	
5:00 PM			**213**			**213**			**213**	
6:00 PM			146			146			146	
7:00 PM			75			75			75	
8:00 PM			42			42			42	
9:00 PM			28			28			28	
10:00 PM			18			18			18	
11:00 PM			11			11			11	
Day Total			2643			2643			2643	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 215			8:00 AM 215			8:00 AM 215	
PM Peak Volume			5:00 PM 213			5:00 PM 213			5:00 PM 213	



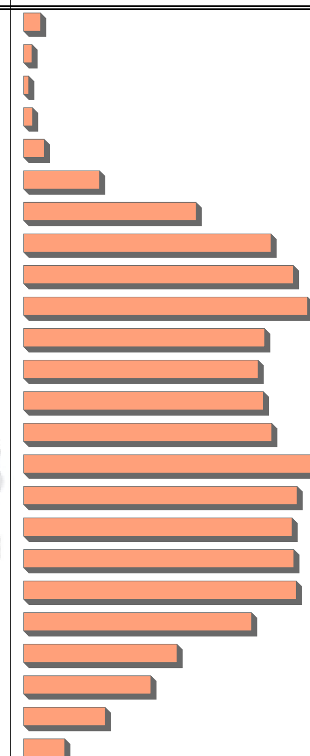
Comments: none

LOCATION: 120. Willow Rd
SPECIFIC LOCATION: 100 ft from Gilbert Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899487
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		101				101			101
1:00 AM		50				50			50
2:00 AM		30				30			30
3:00 AM		53				53			53
4:00 AM		123				123			123
5:00 AM		454				454			454
6:00 AM		1030				1030			1030
7:00 AM		1478				1478			1478
8:00 AM		1612				1612			1612
9:00 AM		**1696**				**1696**			**1696**
10:00 AM		1440				1440			1440
11:00 AM		1401				1401			1401
12:00 PM		1433				1433			1433
1:00 PM		1482				1482			1482
2:00 PM		**1718**				**1718**			**1718**
3:00 PM		1634				1634			1634
4:00 PM		1604				1604			1604
5:00 PM		1614				1614			1614
6:00 PM		1629				1629			1629
7:00 PM		1362				1362			1362
8:00 PM		916				916			916
9:00 PM		760				760			760
10:00 PM		487				487			487
11:00 PM		246				246			246
Day Total		24353				24353			24353
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		9:00 AM 1696				9:00 AM 1696			9:00 AM 1696
PM Peak Volume		2:00 PM 1718				2:00 PM 1718			2:00 PM 1718

Average Week Profile

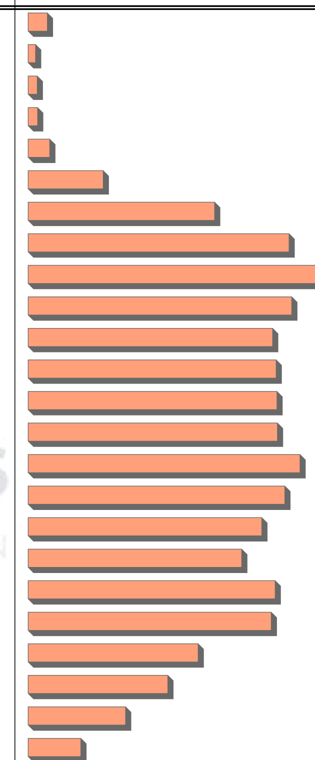


Comments: none

LOCATION: 121. Willow Rd
SPECIFIC LOCATION: 100 ft from Coleman Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899488
DIRECTION: EB/WB
DATE: Sep 30 2014 - Sep 30 2014

Start Time	Mon	Tue 30-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		195				195			195	
1:00 AM		75				75			75	
2:00 AM		92				92			92	
3:00 AM		96				96			96	
4:00 AM		219				219			219	
5:00 AM		762				762			762	
6:00 AM		1893				1893			1893	
7:00 AM		2649				2649			2649	
8:00 AM		**2924**				**2924**			**2924**	
9:00 AM		2676				2676			2676	
10:00 AM		2482				2482			2482	
11:00 AM		2518				2518			2518	
12:00 PM		2526				2526			2526	
1:00 PM		2531				2531			2531	
2:00 PM		**2760**				**2760**			**2760**	
3:00 PM		2606				2606			2606	
4:00 PM		2372				2372			2372	
5:00 PM		2168				2168			2168	
6:00 PM		2508				2508			2508	
7:00 PM		2468				2468			2468	
8:00 PM		1726				1726			1726	
9:00 PM		1418				1418			1418	
10:00 PM		989				989			989	
11:00 PM		535				535			535	
Day Total		41188				41188			41188	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 2924				8:00 AM 2924			8:00 AM 2924	
PM Peak Volume		2:00 PM 2760				2:00 PM 2760			2:00 PM 2760	



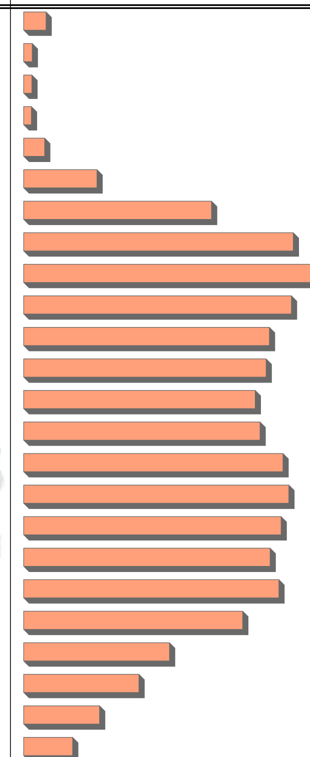
Comments: none

LOCATION: 122. Willow Rd
SPECIFIC LOCATION: 100 ft from Durham St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899489
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		191				191			191
1:00 AM		73				73			73
2:00 AM		70				70			70
3:00 AM		66				66			66
4:00 AM		179				179			179
5:00 AM		626				626			626
6:00 AM		1604				1604			1604
7:00 AM		2302				2302			2302
8:00 AM		**2463**				**2463**			**2463**
9:00 AM		2286				2286			2286
10:00 AM		2098				2098			2098
11:00 AM		2070				2070			2070
12:00 PM		1977				1977			1977
1:00 PM		2018				2018			2018
2:00 PM		2214				2214			2214
3:00 PM		**2264**				**2264**			**2264**
4:00 PM		2198				2198			2198
5:00 PM		2104				2104			2104
6:00 PM		2179				2179			2179
7:00 PM		1870				1870			1870
8:00 PM		1245				1245			1245
9:00 PM		984				984			984
10:00 PM		648				648			648
11:00 PM		418				418			418
Day Total		34147				34147			34147
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 2463				8:00 AM 2463			8:00 AM 2463
PM Peak Volume		3:00 PM 2264				3:00 PM 2264			3:00 PM 2264

Average Week Profile

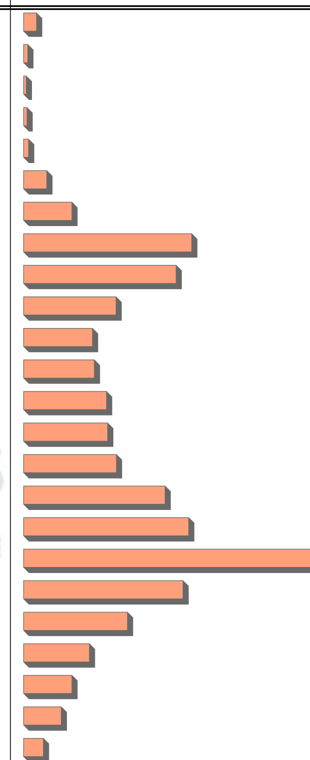


Comments: none

LOCATION: 123. Chilco St
SPECIFIC LOCATION: 100 ft from Terminal Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899490
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		34				34			34	
1:00 AM		11				11			11	
2:00 AM		7				7			7	
3:00 AM		9				9			9	
4:00 AM		13				13			13	
5:00 AM		61				61			61	
6:00 AM		127				127			127	
7:00 AM		**442**				**442**			**442**	
8:00 AM		401				401			401	
9:00 AM		243				243			243	
10:00 AM		181				181			181	
11:00 AM		186				186			186	
12:00 PM		218				218			218	
1:00 PM		221				221			221	
2:00 PM		244				244			244	
3:00 PM		372				372			372	
4:00 PM		434				434			434	
5:00 PM		**756**				**756**			**756**	
6:00 PM		419				419			419	
7:00 PM		273				273			273	
8:00 PM		173				173			173	
9:00 PM		127				127			127	
10:00 PM		99				99			99	
11:00 PM		52				52			52	
Day Total		5103				5103			5103	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		7:00 AM 442				7:00 AM 442			7:00 AM 442	
PM Peak Volume		5:00 PM 756				5:00 PM 756			5:00 PM 756	



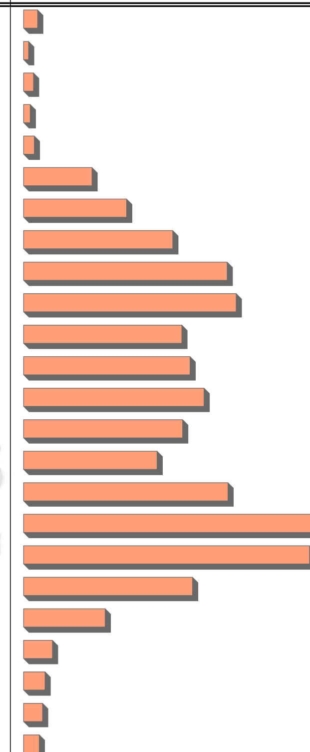
Comments: none

LOCATION: 124. Chrysler Dr
SPECIFIC LOCATION: 100 ft from Constitution Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899491
DIRECTION: EB/WB
DATE: Oct 15 2014 - Oct 15 2014

Start Time	Mon	Tue	Wed 15-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM			17			17			17
1:00 AM			6			6			6
2:00 AM			12			12			12
3:00 AM			8			8			8
4:00 AM			13			13			13
5:00 AM			83			83			83
6:00 AM			125			125			125
7:00 AM			181			181			181
8:00 AM			247			247			247
9:00 AM			**258**			**258**			**258**
10:00 AM			192			192			192
11:00 AM			202			202			202
12:00 PM			219			219			219
1:00 PM			193			193			193
2:00 PM			162			162			162
3:00 PM			248			248			248
4:00 PM			**349**			**349**			**349**
5:00 PM			347			347			347
6:00 PM			205			205			205
7:00 PM			99			99			99
8:00 PM			35			35			35
9:00 PM			26			26			26
10:00 PM			23			23			23
11:00 PM			19			19			19
Day Total			3269			3269			3269
% Weekday Average			100.0%						
% Week Average			100.0%			100.0%			
AM Peak Volume			9:00 AM 258			9:00 AM 258			9:00 AM 258
PM Peak Volume			4:00 PM 349			4:00 PM 349			4:00 PM 349

Average Week Profile

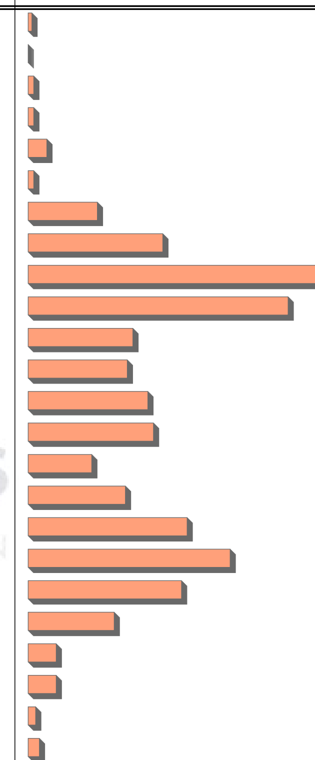


Comments: none

LOCATION: 125. Chrysler Dr
SPECIFIC LOCATION: 100 ft from Independence Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899492
DIRECTION: EB/WB
DATE: Oct 14 2014 - Oct 14 2014

Start Time	Mon	Tue 14-Oct-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		2				2			2	
1:00 AM		0				0			0	
2:00 AM		3				3			3	
3:00 AM		3				3			3	
4:00 AM		10				10			10	
5:00 AM		3				3			3	
6:00 AM		37				37			37	
7:00 AM		72				72			72	
8:00 AM		**154**				**154**			**154**	
9:00 AM		139				139			139	
10:00 AM		56				56			56	
11:00 AM		53				53			53	
12:00 PM		64				64			64	
1:00 PM		67				67			67	
2:00 PM		34				34			34	
3:00 PM		52				52			52	
4:00 PM		85				85			85	
5:00 PM		**108**				**108**			**108**	
6:00 PM		82				82			82	
7:00 PM		46				46			46	
8:00 PM		15				15			15	
9:00 PM		15				15			15	
10:00 PM		4				4			4	
11:00 PM		6				6			6	
Day Total		1110				1110			1110	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 154				8:00 AM 154			8:00 AM 154	
PM Peak Volume		5:00 PM 108				5:00 PM 108			5:00 PM 108	

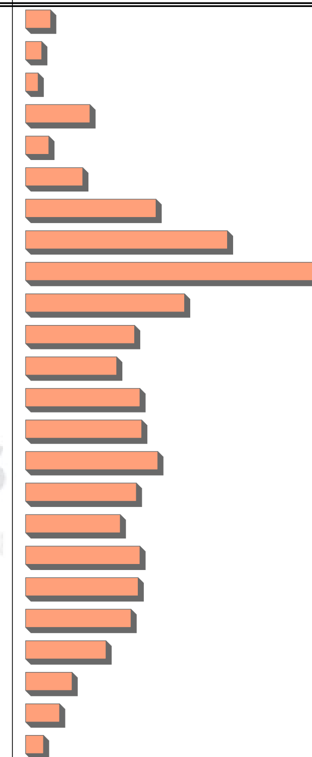


Comments: none

LOCATION: 126. Adams Dr
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899493
DIRECTION: NB/SB
DATE: Oct 08 2014 - Oct 08 2014

Start Time	Mon	Tue	Wed 08-Oct-14	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM			14			14			14	
1:00 AM			9			9			9	
2:00 AM			7			7			7	
3:00 AM			36			36			36	
4:00 AM			13			13			13	
5:00 AM			32			32			32	
6:00 AM			73			73			73	
7:00 AM			113			113			113	
8:00 AM			**161**			**161**			**161**	
9:00 AM			89			89			89	
10:00 AM			61			61			61	
11:00 AM			51			51			51	
12:00 PM			64			64			64	
1:00 PM			65			65			65	
2:00 PM			**74**			**74**			**74**	
3:00 PM			62			62			62	
4:00 PM			53			53			53	
5:00 PM			64			64			64	
6:00 PM			63			63			63	
7:00 PM			59			59			59	
8:00 PM			45			45			45	
9:00 PM			26			26			26	
10:00 PM			19			19			19	
11:00 PM			10			10			10	
Day Total			1263			1263			1263	
% Weekday Average			100.0%							
% Week Average			100.0%			100.0%				
AM Peak Volume			8:00 AM 161			8:00 AM 161			8:00 AM 161	
PM Peak Volume			2:00 PM 74			2:00 PM 74			2:00 PM 74	



Comments: none

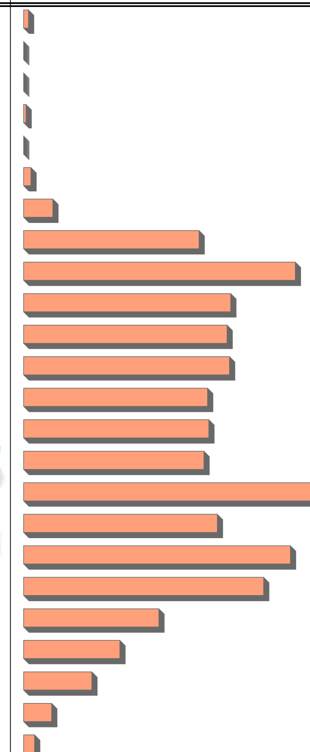
Type of report: Tube Count - Volume Data

LOCATION: 133. Olive St
SPECIFIC LOCATION: 100 ft from Santa Cruz Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899494
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic
12:00 AM		4				4			4
1:00 AM		0				0			0
2:00 AM		0				0			0
3:00 AM		2				2			2
4:00 AM		0				0			0
5:00 AM		6				6			6
6:00 AM		24				24			24
7:00 AM		144				144			144
8:00 AM		**223**				**223**			**223**
9:00 AM		170				170			170
10:00 AM		167				167			167
11:00 AM		169				169			169
12:00 PM		151				151			151
1:00 PM		152				152			152
2:00 PM		148				148			148
3:00 PM		**236**				**236**			**236**
4:00 PM		159				159			159
5:00 PM		219				219			219
6:00 PM		197				197			197
7:00 PM		111				111			111
8:00 PM		79				79			79
9:00 PM		56				56			56
10:00 PM		23				23			23
11:00 PM		9				9			9
Day Total		2449				2449			2449
% Weekday Average		100.0%							
% Week Average		100.0%				100.0%			
AM Peak Volume		8:00 AM 223				8:00 AM 223			8:00 AM 223
PM Peak Volume		3:00 PM 236				3:00 PM 236			3:00 PM 236

Average Week Profile



Comments: none

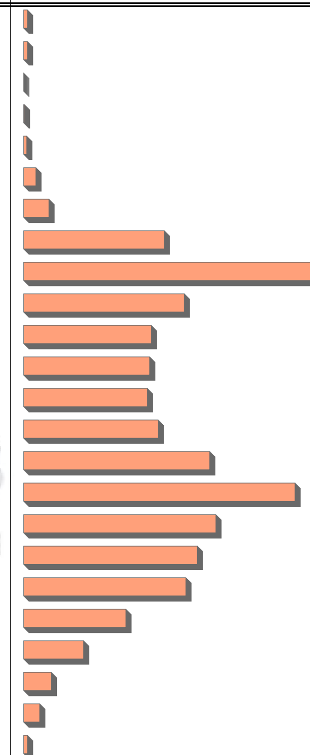
Report generated on 10/24/2014 2:47 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

LOCATION: 134. Olive St
SPECIFIC LOCATION: 100 ft from Middle Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899495
DIRECTION: NB/SB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		5				5			5	
1:00 AM		5				5			5	
2:00 AM		0				0			0	
3:00 AM		1				1			1	
4:00 AM		4				4			4	
5:00 AM		16				16			16	
6:00 AM		33				33			33	
7:00 AM		183				183			183	
8:00 AM		**374**				**374**			**374**	
9:00 AM		209				209			209	
10:00 AM		166				166			166	
11:00 AM		164				164			164	
12:00 PM		161				161			161	
1:00 PM		175				175			175	
2:00 PM		242				242			242	
3:00 PM		**353**				**353**			**353**	
4:00 PM		250				250			250	
5:00 PM		226				226			226	
6:00 PM		211				211			211	
7:00 PM		133				133			133	
8:00 PM		78				78			78	
9:00 PM		36				36			36	
10:00 PM		21				21			21	
11:00 PM		5				5			5	
Day Total		3051				3051			3051	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 374				8:00 AM 374			8:00 AM 374	
PM Peak Volume		3:00 PM 353				3:00 PM 353			3:00 PM 353	



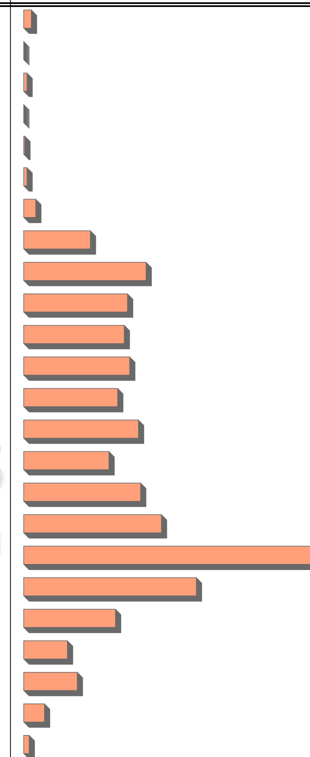
Comments: none

Type of report: Tube Count - Volume Data

LOCATION: 135. Cambridge Ave
SPECIFIC LOCATION: 100 ft from University Dr
CITY/STATE: Menlo Park, CA

QC JOB #: 12899496
DIRECTION: EB/WB
DATE: Sep 23 2014 - Sep 23 2014

Start Time	Mon	Tue 23-Sep-14	Wed	Thu	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM		7				7			7	
1:00 AM		0				0			0	
2:00 AM		3				3			3	
3:00 AM		0				0			0	
4:00 AM		1				1			1	
5:00 AM		3				3			3	
6:00 AM		11				11			11	
7:00 AM		61				61			61	
8:00 AM		**112**				**112**			**112**	
9:00 AM		95				95			95	
10:00 AM		92				92			92	
11:00 AM		97				97			97	
12:00 PM		86				86			86	
1:00 PM		105				105			105	
2:00 PM		78				78			78	
3:00 PM		107				107			107	
4:00 PM		126				126			126	
5:00 PM		**264**				**264**			**264**	
6:00 PM		158				158			158	
7:00 PM		84				84			84	
8:00 PM		40				40			40	
9:00 PM		49				49			49	
10:00 PM		19				19			19	
11:00 PM		5				5			5	
Day Total		1603				1603			1603	
% Weekday Average		100.0%								
% Week Average		100.0%				100.0%				
AM Peak Volume		8:00 AM 112				8:00 AM 112			8:00 AM 112	
PM Peak Volume		5:00 PM 264				5:00 PM 264			5:00 PM 264	

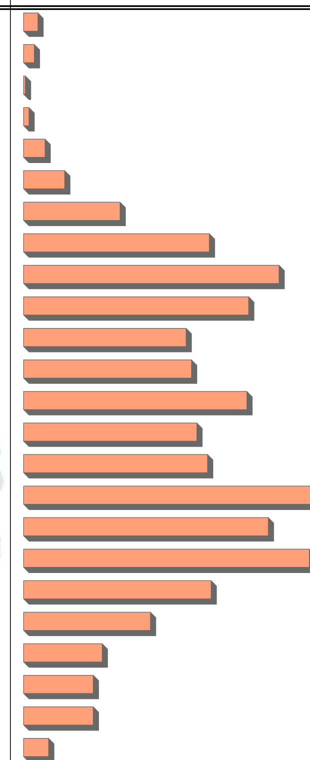


Comments: none

LOCATION: 136. Linfield Dr
SPECIFIC LOCATION: 100 ft from Middlefield Rd
CITY/STATE: Menlo Park, CA

QC JOB #: 12899497
DIRECTION: EB/WB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				8		8			8	
1:00 AM				6		6			6	
2:00 AM				1		1			1	
3:00 AM				3		3			3	
4:00 AM				12		12			12	
5:00 AM				23		23			23	
6:00 AM				54		54			54	
7:00 AM				104		104			104	
8:00 AM				**143**		**143**			**143**	
9:00 AM				126		126			126	
10:00 AM				91		91			91	
11:00 AM				94		94			94	
12:00 PM				125		125			125	
1:00 PM				97		97			97	
2:00 PM				103		103			103	
3:00 PM				**161**		**161**			**161**	
4:00 PM				137		137			137	
5:00 PM				160		160			160	
6:00 PM				105		105			105	
7:00 PM				71		71			71	
8:00 PM				44		44			44	
9:00 PM				39		39			39	
10:00 PM				39		39			39	
11:00 PM				14		14			14	
Day Total				1760		1760			1760	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 143		8:00 AM 143			8:00 AM 143	
PM Peak Volume				3:00 PM 161		3:00 PM 161			3:00 PM 161	

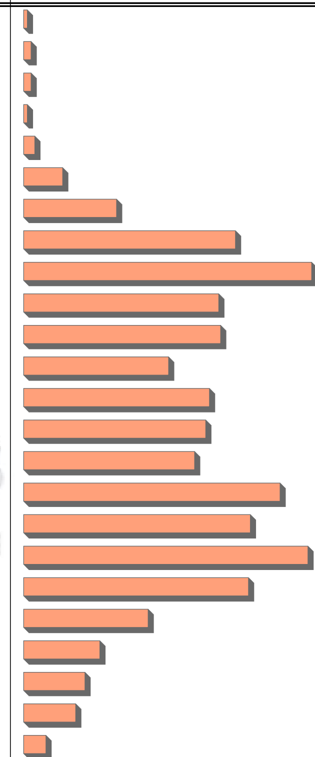


Comments: none

LOCATION: 137. Waverly St
SPECIFIC LOCATION: 100 ft from Laurel St
CITY/STATE: Menlo Park, CA

QC JOB #: 12899498
DIRECTION: NB/SB
DATE: Oct 16 2014 - Oct 16 2014

Start Time	Mon	Tue	Wed	Thu 16-Oct-14	Fri	Average Weekday Hourly Traffic	Sat	Sun	Average Week Hourly Traffic	Average Week Profile
12:00 AM				2		2			2	
1:00 AM				4		4			4	
2:00 AM				4		4			4	
3:00 AM				2		2			2	
4:00 AM				6		6			6	
5:00 AM				21		21			21	
6:00 AM				50		50			50	
7:00 AM				114		114			114	
8:00 AM				**155**		**155**			**155**	
9:00 AM				105		105			105	
10:00 AM				106		106			106	
11:00 AM				78		78			78	
12:00 PM				100		100			100	
1:00 PM				98		98			98	
2:00 PM				92		92			92	
3:00 PM				138		138			138	
4:00 PM				122		122			122	
5:00 PM				**153**		**153**			**153**	
6:00 PM				121		121			121	
7:00 PM				67		67			67	
8:00 PM				41		41			41	
9:00 PM				33		33			33	
10:00 PM				28		28			28	
11:00 PM				12		12			12	
Day Total				1652		1652			1652	
% Weekday Average				100.0%						
% Week Average				100.0%		100.0%				
AM Peak Volume				8:00 AM 155		8:00 AM 155			8:00 AM 155	
PM Peak Volume				5:00 PM 153		5:00 PM 153			5:00 PM 153	



Comments: none

PEAK HOUR INTERSECTION COUNT SHEETS

Traffic Data Service

Campbell, CA
(408) 377-2988
tdsbay@cs.com

File Name : 1AM FINAL
Site Code : 00000001
Start Date : 5/5/2015
Page No : 1

Groups Printed- Vehicles

	MIDDLEFIELD RD Southbound					MARSH RD Westbound					MIDDLEFIELD RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	49	72	0	121	82	0	100	1	183	45	12	0	0	57	0	0	0	0	0	361
07:15 AM	0	53	83	0	136	86	0	135	0	221	78	31	0	0	109	0	0	0	0	0	466
07:30 AM	0	105	68	0	173	104	0	147	0	251	79	32	0	0	111	0	0	0	0	0	535
07:45 AM	0	120	72	0	192	57	0	124	2	183	109	59	0	0	168	0	0	0	0	0	543
Total	0	327	295	0	622	329	0	506	3	838	311	134	0	0	445	0	0	0	0	0	1905
08:00 AM	0	79	90	0	169	87	0	118	1	206	121	45	0	0	166	0	0	0	0	0	541
08:15 AM	0	102	104	0	206	81	0	118	5	204	106	60	0	0	166	0	0	0	0	0	576
08:30 AM	0	90	108	0	198	70	0	125	1	196	119	61	0	0	180	0	0	0	0	0	574
08:45 AM	0	69	99	0	168	86	0	122	2	210	92	67	0	0	159	0	0	0	0	0	537
Total	0	340	401	0	741	324	0	483	9	816	438	233	0	0	671	0	0	0	0	0	2228
Grand Total	0	667	696	0	1363	653	0	989	12	1654	749	367	0	0	1116	0	0	0	0	0	4133
Apprch %	0	48.9	51.1	0		39.5	0	59.8	0.7		67.1	32.9	0	0		0	0	0	0		
Total %	0	16.1	16.8	0	33	15.8	0	23.9	0.3	40	18.1	8.9	0	0	27	0	0	0	0	0	

	MIDDLEFIELD RD Southbound				MARSH RD Westbound				MIDDLEFIELD RD Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	**120**	72	192	57	0	124	181	109	59	0	168	0	0	0	0	541
08:00 AM	0	79	90	169	**87**	0	118	**205**	**121**	45	0	166	0	0	0	0	540
08:15 AM	0	102	104	**206**	81	0	118	199	106	60	0	166	0	0	0	0	571
08:30 AM	0	90	**108**	198	70	0	**125**	195	119	**61**	0	**180**	0	0	0	0	**573**
Total Volume	0	391	374	765	295	0	485	780	455	225	0	680	0	0	0	0	2225
% App. Total	0	51.1	48.9		37.8	0	62.2		66.9	33.1	0		0	0	0		
PHF	.000	.815	.866	.928	.848	.000	.970	.951	.940	.922	.000	.944	.000	.000	.000	.000	.971

Traffic Data Service

Campbell, CA

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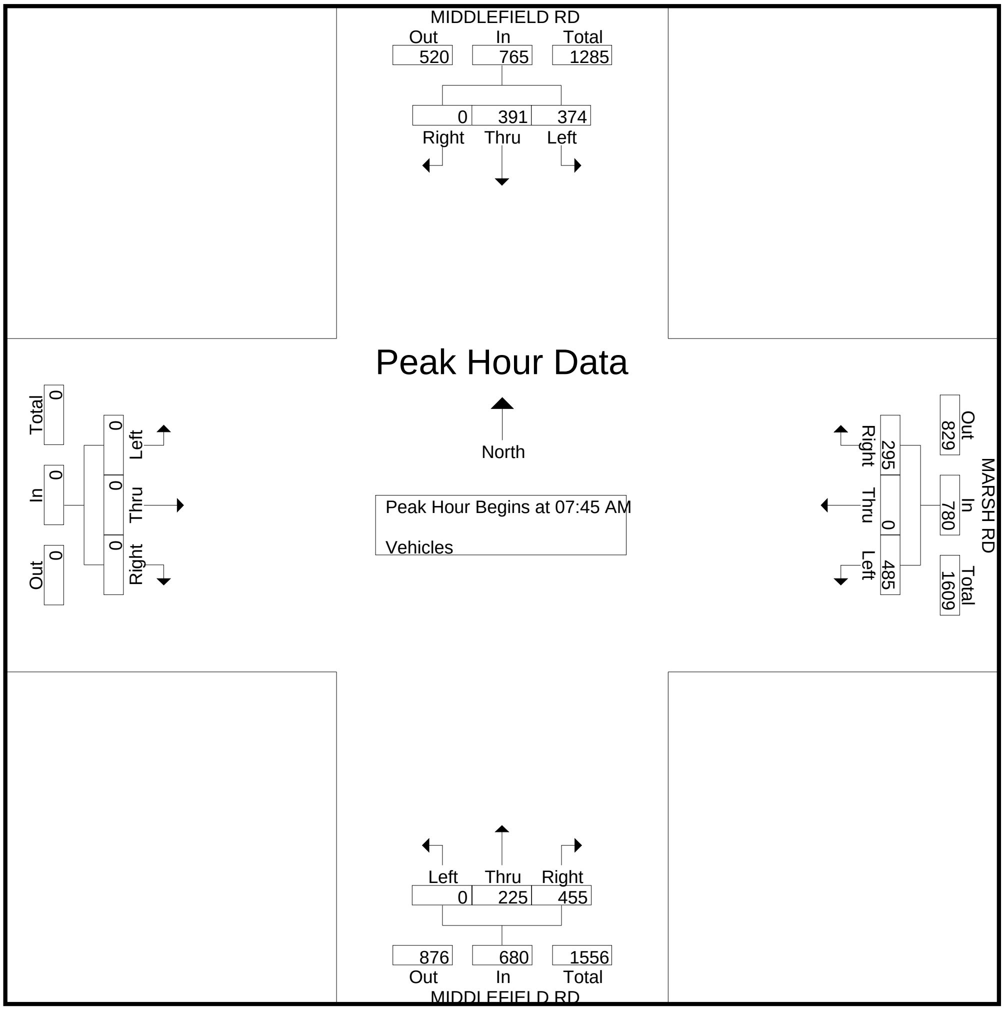
Site Code : 00000001
Start Date : 5/5/2015
Page No : 2



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File Name : 1AM FINAL
Site Code : 00000001
Start Date : 5/5/2015
Page No : 1

Groups Printed- Bikes

	MIDDLEFIELD RD Southbound					MARSH RD Westbound					MIDDLEFIELD RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	5	0	0	5	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	8
07:15 AM	0	3	0	0	3	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	5
07:30 AM	0	5	1	0	6	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	10
07:45 AM	0	7	0	0	7	0	0	0	0	0	1	7	0	0	8	0	0	0	0	0	15
Total	0	20	1	0	21	0	0	3	0	3	1	13	0	0	14	0	0	0	0	0	38
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
08:15 AM	0	10	1	0	11	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	16
08:30 AM	0	8	1	0	9	0	0	1	0	1	0	4	0	0	4	0	0	0	0	0	14
08:45 AM	0	7	0	0	7	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	9
Total	0	26	2	0	28	0	0	1	0	1	1	12	0	0	13	0	0	0	0	0	42
Grand Total	0	46	3	0	49	0	0	4	0	4	2	25	0	0	27	0	0	0	0	0	80
Apprch %	0	93.9	6.1	0		0	0	100	0		7.4	92.6	0	0		0	0	0	0		
Total %	0	57.5	3.8	0	61.2	0	0	5	0	5	2.5	31.2	0	0	33.8	0	0	0	0	0	

	MIDDLEFIELD RD Southbound				MARSH RD Westbound				MIDDLEFIELD RD Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	7	0	7	0	0	0	0	**1**	**7**	0	**8**	0	0	0	0	15
08:00 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
08:15 AM	0	**10**	**1**	**11**	0	0	0	0	0	5	0	5	0	0	0	0	**16**
08:30 AM	0	8	1	9	0	0	**1**	**1**	0	4	0	4	0	0	0	0	14
Total Volume	0	26	2	28	0	0	1	1	1	18	0	19	0	0	0	0	48
% App. Total	0	92.9	7.1		0	0	100		5.3	94.7	0		0	0	0		
PHF	.000	.650	.500	.636	.000	.000	.250	.250	.250	.643	.000	.594	.000	.000	.000	.000	.750

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File Name : 1AM FINAL
Site Code : 00000001
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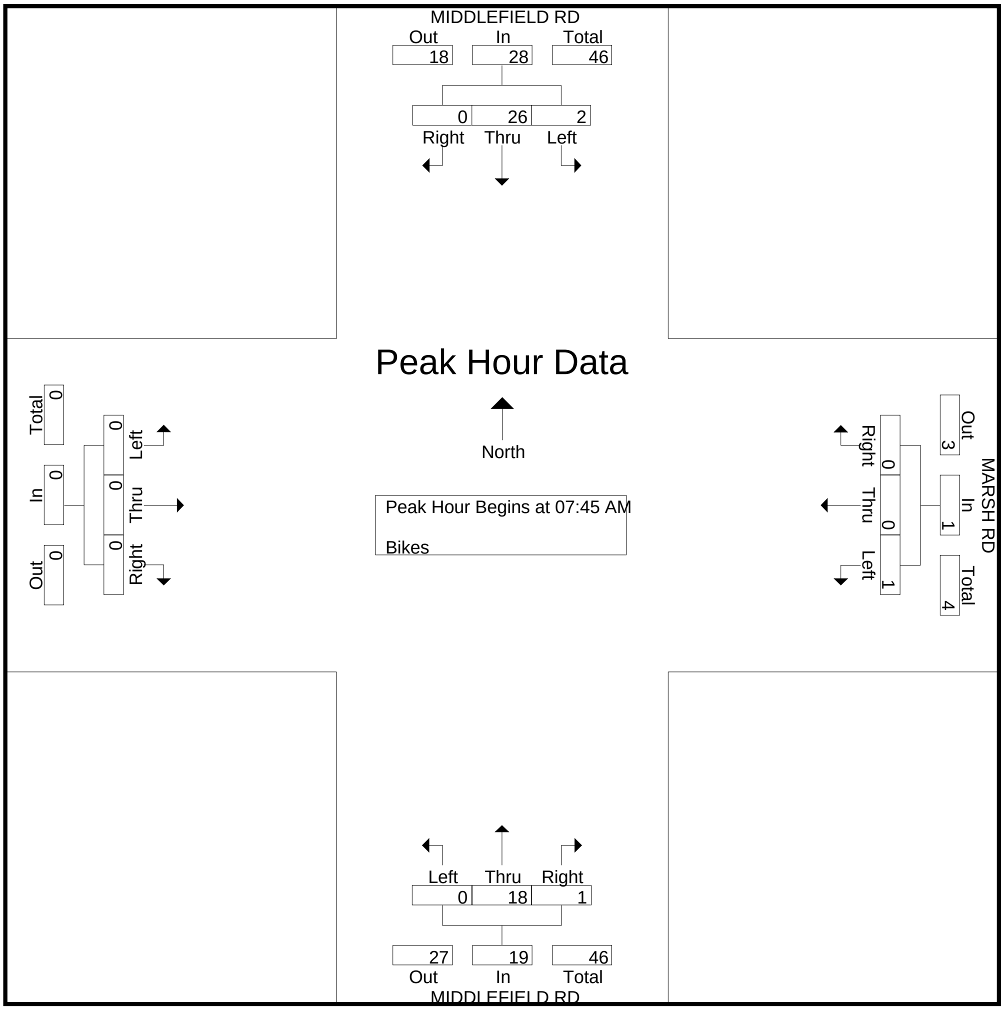

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File Name : 1PM FINAL
Site Code : 00000001
Start Date : 5/5/2015
Page No : 1

Groups Printed- Vehicles

	MIDDLEFIELD RD Southbound					MARSH RD Westbound					MIDDLEFIELD RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	57	93	0	150	68	0	107	3	178	148	78	0	0	226	0	0	0	0	0	554
04:15 PM	0	53	95	0	148	79	0	89	1	169	113	103	0	0	216	0	0	0	0	0	533
04:30 PM	0	57	92	0	149	66	0	102	0	168	118	112	0	0	230	0	0	0	0	0	547
04:45 PM	0	67	82	0	149	91	0	107	2	200	104	121	0	0	225	0	0	0	0	0	574
Total	0	234	362	0	596	304	0	405	6	715	483	414	0	0	897	0	0	0	0	0	2208
05:00 PM	0	68	75	0	143	112	0	121	1	234	99	114	0	0	213	0	0	0	0	0	590
05:15 PM	0	88	89	0	177	92	0	97	1	190	96	136	0	0	232	0	0	0	0	0	599
05:30 PM	0	65	78	0	143	104	0	101	3	208	94	131	0	0	225	0	0	0	0	0	576
05:45 PM	0	67	69	0	136	99	0	107	0	206	80	128	0	0	208	0	0	0	0	0	550
Total	0	288	311	0	599	407	0	426	5	838	369	509	0	0	878	0	0	0	0	0	2315
Grand Total	0	522	673	0	1195	711	0	831	11	1553	852	923	0	0	1775	0	0	0	0	0	4523
Apprch %	0	43.7	56.3	0		45.8	0	53.5	0.7		48	52	0	0		0	0	0	0		
Total %	0	11.5	14.9	0	26.4	15.7	0	18.4	0.2	34.3	18.8	20.4	0	0	39.2	0	0	0	0	0	

	MIDDLEFIELD RD Southbound				MARSH RD Westbound				MIDDLEFIELD RD Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	67	82	149	91	0	107	198	**104**	121	0	225	0	0	0	0	572
05:00 PM	0	68	75	143	**112**	0	**121**	**233**	99	114	0	213	0	0	0	0	589
05:15 PM	0	**88**	**89**	**177**	92	0	97	189	96	**136**	0	**232**	0	0	0	0	**598**
05:30 PM	0	65	78	143	104	0	101	205	94	131	0	225	0	0	0	0	573
Total Volume	0	288	324	612	399	0	426	825	393	502	0	895	0	0	0	0	2332
% App. Total	0	47.1	52.9		48.4	0	51.6		43.9	56.1	0		0	0	0		
PHF	.000	.818	.910	.864	.891	.000	.880	.885	.945	.923	.000	.964	.000	.000	.000	.000	.975

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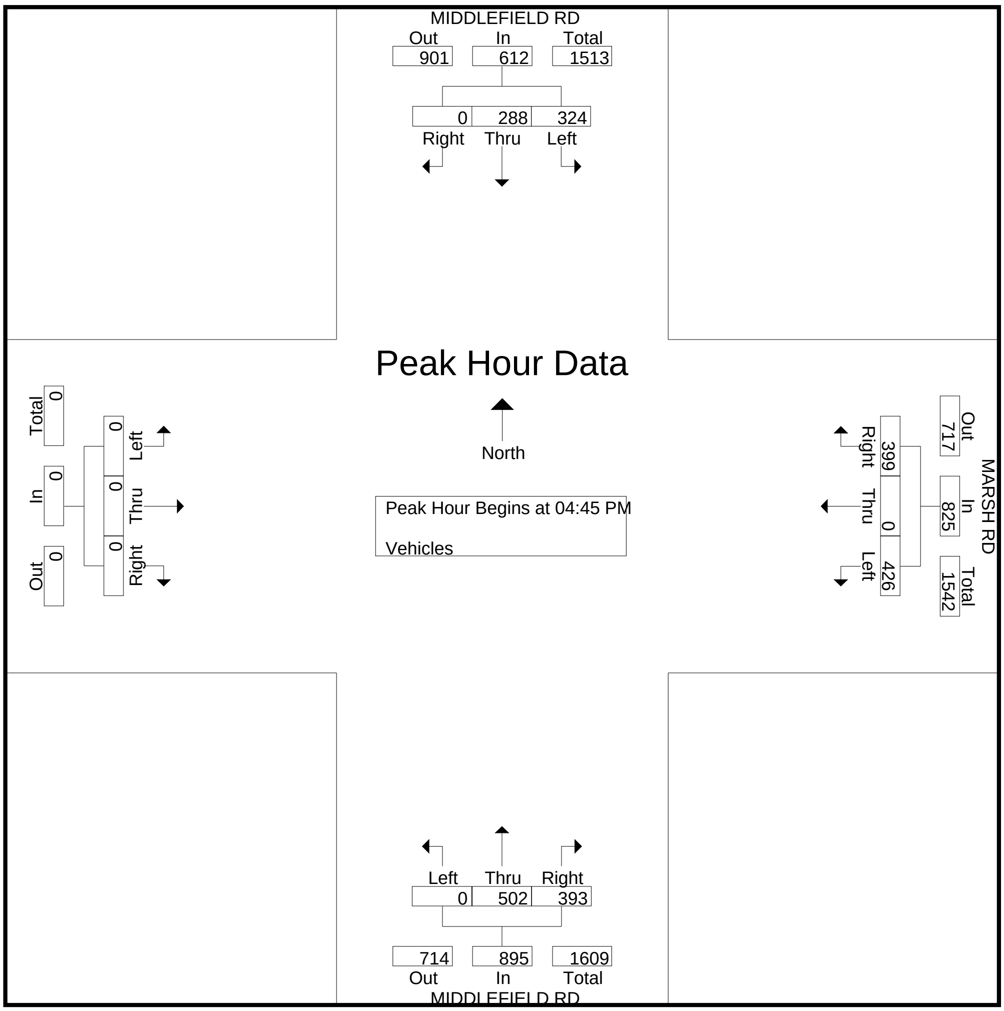
File Name : 1PM FINAL
Site Code : 00000001
Start Date : 5/5/2015
Page No : 2



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File Name : 1PM FINAL
Site Code : 00000001
Start Date : 5/5/2015
Page No : 1

Groups Printed- Bikes

	MIDDLEFIELD RD Southbound					MARSH RD Westbound					MIDDLEFIELD RD Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	3
04:15 PM	0	1	0	0	1	0	0	1	0	1	0	6	0	0	6	0	0	0	0	0	8
04:30 PM	0	5	0	0	5	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	10
04:45 PM	0	5	0	0	5	0	0	1	0	1	0	4	0	0	4	0	0	0	0	0	10
Total	0	11	0	0	11	0	0	3	0	3	1	16	0	0	17	0	0	0	0	0	31
05:00 PM	0	5	0	0	5	0	0	3	0	3	1	2	0	0	3	0	0	0	0	0	11
05:15 PM	0	1	0	0	1	0	0	3	0	3	1	5	0	0	6	0	0	0	0	0	10
05:30 PM	0	2	0	0	2	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	10
05:45 PM	0	2	0	0	2	0	0	0	0	0	2	9	0	0	11	0	0	0	0	0	13
Total	0	10	0	0	10	0	0	6	0	6	4	24	0	0	28	0	0	0	0	0	44
Grand Total	0	21	0	0	21	0	0	9	0	9	5	40	0	0	45	0	0	0	0	0	75
Apprch %	0	100	0	0		0	0	100	0		11.1	88.9	0	0		0	0	0	0		
Total %	0	28	0	0	28	0	0	12	0	12	6.7	53.3	0	0	60	0	0	0	0	0	

	MIDDLEFIELD RD Southbound				MARSH RD Westbound				MIDDLEFIELD RD Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**5**	0	**5**	0	0	**3**	**3**	1	2	0	3	0	0	0	0	11
05:15 PM	0	1	0	1	0	0	3	3	1	5	0	6	0	0	0	0	10
05:30 PM	0	2	0	2	0	0	0	0	0	8	0	8	0	0	0	0	10
05:45 PM	0	2	0	2	0	0	0	0	**2**	**9**	0	**11**	0	0	0	0	**13**
Total Volume	0	10	0	10	0	0	6	6	4	24	0	28	0	0	0	0	44
% App. Total	0	100	0		0	0	100		14.3	85.7	0		0	0	0		
PHF	.000	.500	.000	.500	.000	.000	.500	.500	.500	.667	.000	.636	.000	.000	.000	.000	.846

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File Name : 1PM FINAL
Site Code : 00000001
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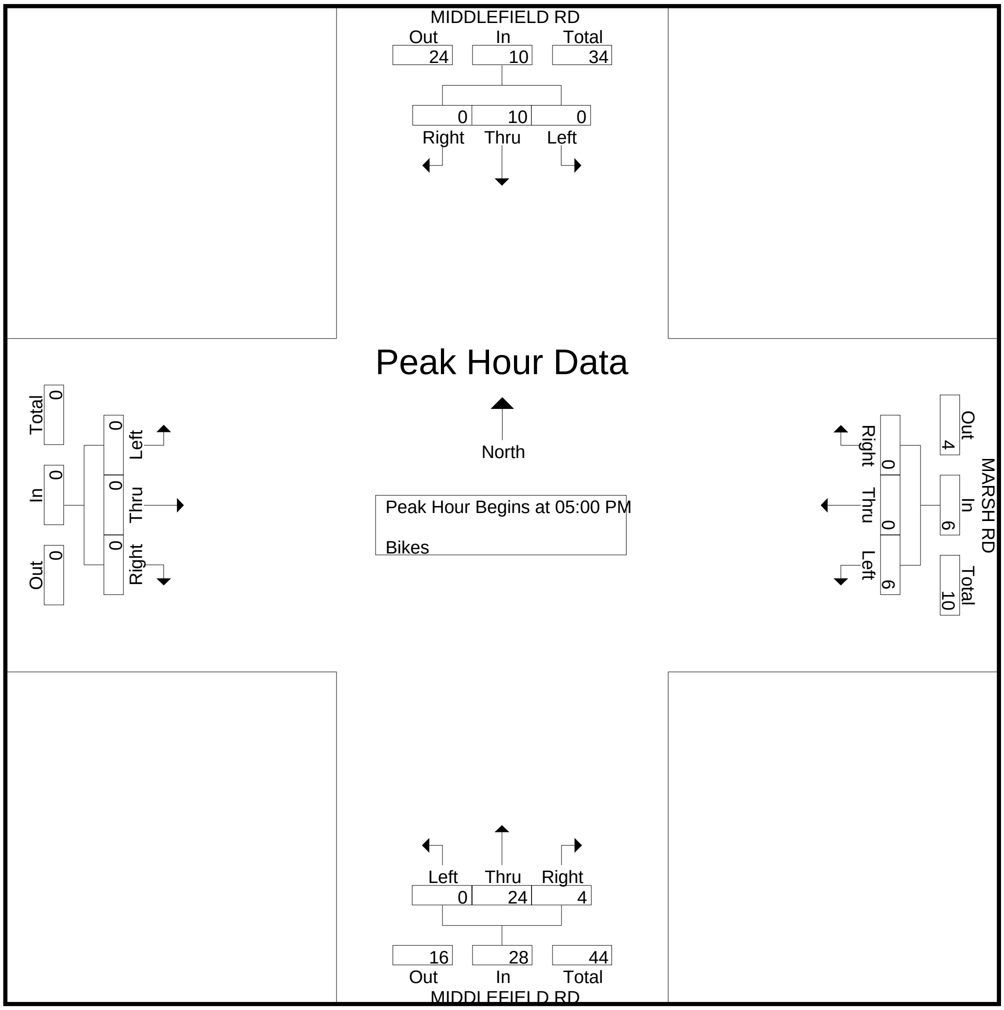

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File Name : 2AM FINAL
Site Code : 00000002
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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					BAY RD Westbound					UNIVERSITY AVE Northbound					BAY RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	7	283	20	1	311	20	30	37	2	89	18	95	15	10	138	16	24	11	4	55	593
07:15 AM	1	265	25	8	299	18	44	37	3	102	21	96	21	10	148	21	36	11	8	76	625
07:30 AM	13	239	17	2	271	42	46	21	0	109	20	111	26	8	165	13	38	16	2	69	614
07:45 AM	12	205	31	7	255	26	62	16	2	106	27	126	25	10	188	12	70	11	1	94	643
Total	33	992	93	18	1136	106	182	111	7	406	86	428	87	38	639	62	168	49	15	294	2475
08:00 AM	6	196	24	5	231	19	61	28	3	111	24	128	30	31	213	11	48	22	3	84	639
08:15 AM	12	255	22	5	294	32	47	23	3	105	21	141	31	18	211	20	37	15	7	79	689
08:30 AM	6	251	26	5	288	26	49	24	1	100	14	142	25	13	194	19	52	10	4	85	667
08:45 AM	10	268	27	4	309	19	35	20	1	75	20	174	13	16	223	26	38	9	12	85	692
Total	34	970	99	19	1122	96	192	95	8	391	79	585	99	78	841	76	175	56	26	333	2687
Grand Total	67	1962	192	37	2258	202	374	206	15	797	165	1013	186	116	1480	138	343	105	41	627	5162
Apprch %	3	86.9	8.5	1.6		25.3	46.9	25.8	1.9		11.1	68.4	12.6	7.8		22	54.7	16.7	6.5		
Total %	1.3	38	3.7	0.7	43.7	3.9	7.2	4	0.3	15.4	3.2	19.6	3.6	2.2	28.7	2.7	6.6	2	0.8	12.1	

	UNIVERSITY AVE Southbound				BAY RD Westbound				UNIVERSITY AVE Northbound				BAY RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	6	196	24	226	19	**61**	**28**	**108**	**24**	128	30	182	11	48	**22**	**81**	597
08:15 AM	**12**	255	22	289	**32**	47	23	102	21	141	**31**	193	20	37	15	72	656
08:30 AM	6	251	26	283	26	49	24	99	14	142	25	181	19	**52**	10	81	644
08:45 AM	10	**268**	**27**	**305**	19	35	20	74	20	**174**	13	**207**	**26**	38	9	73	**659**
Total Volume	34	970	99	1103	96	192	95	383	79	585	99	763	76	175	56	307	2556
% App. Total	3.1	87.9	9		25.1	50.1	24.8		10.4	76.7	13		24.8	57	18.2		
PHF	.708	.905	.917	.904	.750	.787	.848	.887	.823	.841	.798	.921	.731	.841	.636	.948	.970

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File Name : 2AM FINAL
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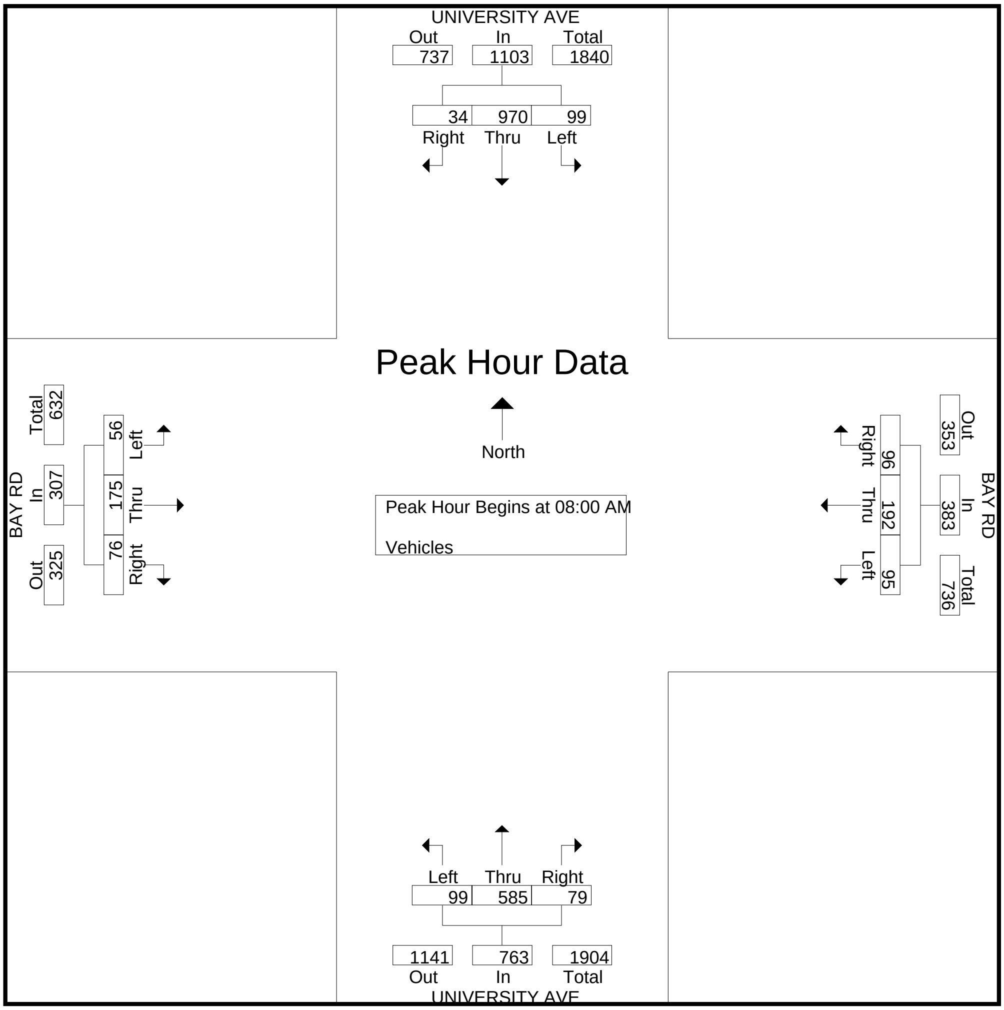

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File Name : 2AM FINAL
Site Code : 00000002
Start Date : 5/5/2015

Groups Printed- Bikes

	UNIVERSITY AVE Southbound					BAY RD Westbound					UNIVERSITY AVE Northbound					BAY RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	1
07:15 AM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	1	1	0	0	2	0	0	0	0	0	1	0	0	0	1	0	2	0	0	2	5
08:00 AM	0	2	1	0	3	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	5
08:15 AM	0	2	1	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	4
08:30 AM	0	1	0	0	1	0	1	0	0	1	0	4	0	0	4	0	0	0	0	0	6
08:45 AM	0	1	0	0	1	2	0	0	0	2	1	1	0	0	2	0	0	0	0	0	5
Total	0	6	2	0	8	2	1	0	0	3	1	8	0	0	9	0	0	0	0	0	20
Grand Total	1	7	2	0	10	2	1	0	0	3	2	8	0	0	10	0	2	0	0	2	25
Apprch %	10	70	20	0		66.7	33.3	0	0		20	80	0	0		0	100	0	0		
Total %	4	28	8	0	40	8	4	0	0	12	8	32	0	0	40	0	8	0	0	8	

	UNIVERSITY AVE Southbound				BAY RD Westbound				UNIVERSITY AVE Northbound				BAY RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	**2**	**1**	**3**	0	0	0	0	0	2	0	2	0	0	0	0	5
08:15 AM	0	2	1	3	0	0	0	0	0	1	0	1	0	0	0	0	4
08:30 AM	0	1	0	1	0	**1**	0	1	0	**4**	0	**4**	0	0	0	0	**6**
08:45 AM	0	1	0	1	**2**	0	0	**2**	**1**	1	0	2	0	0	0	0	5
Total Volume	0	6	2	8	2	1	0	3	1	8	0	9	0	0	0	0	20
% App. Total	0	75	25		66.7	33.3	0		11.1	88.9	0		0	0	0		
PHF	.000	.750	.500	.667	.250	.250	.000	.375	.250	.500	.000	.563	.000	.000	.000	.000	.833

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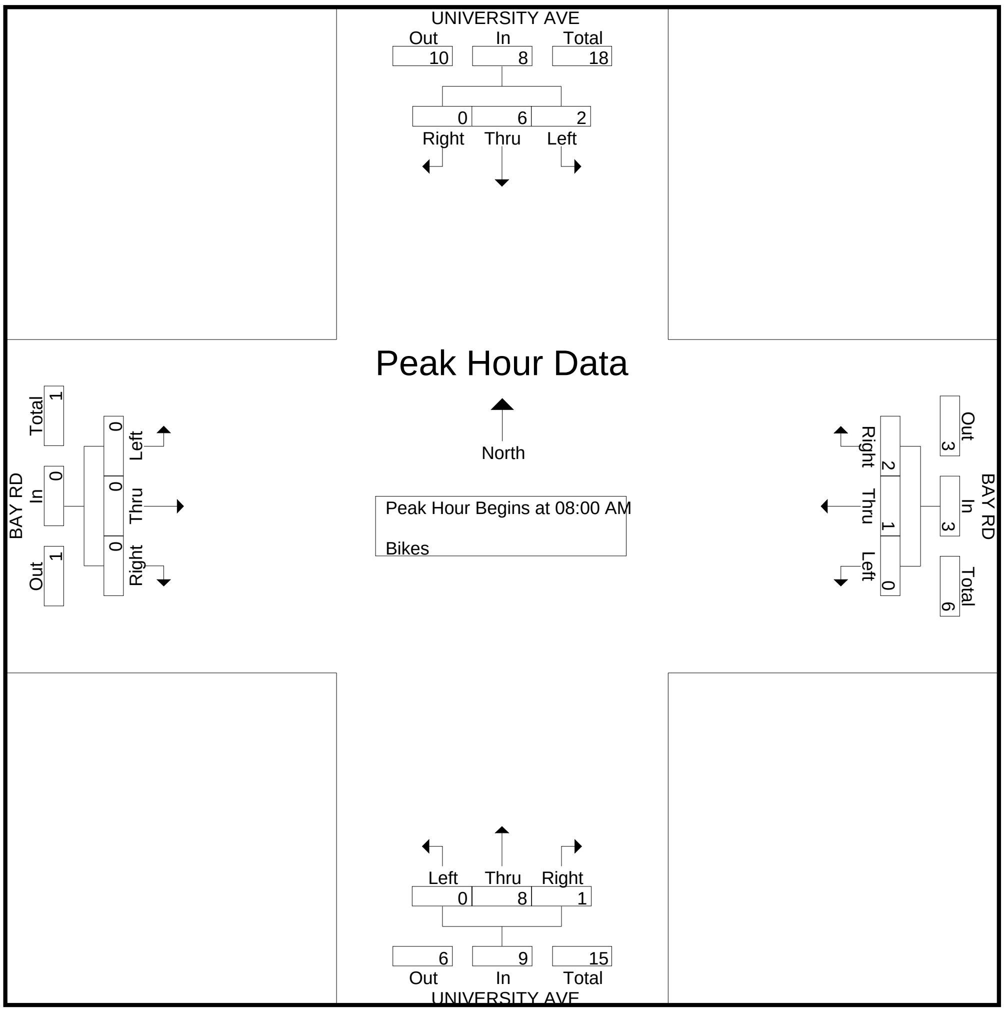

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File Name : 2PM FINAL
Site Code : 00000002
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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					BAY RD Westbound					UNIVERSITY AVE Northbound					BAY RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	9	102	22	4	137	94	58	29	1	182	10	281	8	21	320	33	55	34	22	144	783
04:15 PM	11	95	25	14	145	102	50	34	8	194	13	267	8	14	302	37	60	37	11	145	786
04:30 PM	8	99	15	8	130	115	59	35	1	210	7	299	6	21	333	25	67	43	8	143	816
04:45 PM	9	100	18	5	132	131	36	37	3	207	9	308	10	10	337	30	51	30	10	121	797
Total	37	396	80	31	544	442	203	135	13	793	39	1155	32	66	1292	125	233	144	51	553	3182
05:00 PM	6	108	32	0	146	126	60	34	0	220	13	240	9	15	277	21	66	38	6	131	774
05:15 PM	8	117	28	5	158	104	62	24	0	190	11	223	6	15	255	31	60	30	11	132	735
05:30 PM	7	110	11	2	130	91	63	26	0	180	6	149	4	13	172	29	61	16	2	108	590
05:45 PM	8	116	25	7	156	101	67	31	1	200	9	197	6	13	225	30	63	24	14	131	712
Total	29	451	96	14	590	422	252	115	1	790	39	809	25	56	929	111	250	108	33	502	2811
Grand Total	66	847	176	45	1134	864	455	250	14	1583	78	1964	57	122	2221	236	483	252	84	1055	5993
Apprch %	5.8	74.7	15.5	4		54.6	28.7	15.8	0.9		3.5	88.4	2.6	5.5		22.4	45.8	23.9	8		
Total %	1.1	14.1	2.9	0.8	18.9	14.4	7.6	4.2	0.2	26.4	1.3	32.8	1	2	37.1	3.9	8.1	4.2	1.4	17.6	

	UNIVERSITY AVE Southbound				BAY RD Westbound				UNIVERSITY AVE Northbound				BAY RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**11**	95	25	131	102	50	34	186	**13**	267	8	288	**37**	60	37	134	739
04:30 PM	8	99	15	122	115	59	35	209	7	299	6	312	25	**67**	**43**	**135**	**778**
04:45 PM	9	100	18	127	**131**	36	**37**	204	9	**308**	**10**	**327**	30	51	30	111	769
05:00 PM	6	**108**	**32**	**146**	126	**60**	34	**220**	13	240	9	262	21	66	38	125	753
Total Volume	34	402	90	526	474	205	140	819	42	1114	33	1189	113	244	148	505	3039
% App. Total	6.5	76.4	17.1		57.9	25	17.1		3.5	93.7	2.8		22.4	48.3	29.3		
PHF	.773	.931	.703	.901	.905	.854	.946	.931	.808	.904	.825	.909	.764	.910	.860	.935	.977

Traffic Data Service

Campbell, CA

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File Name : 2PM FINAL
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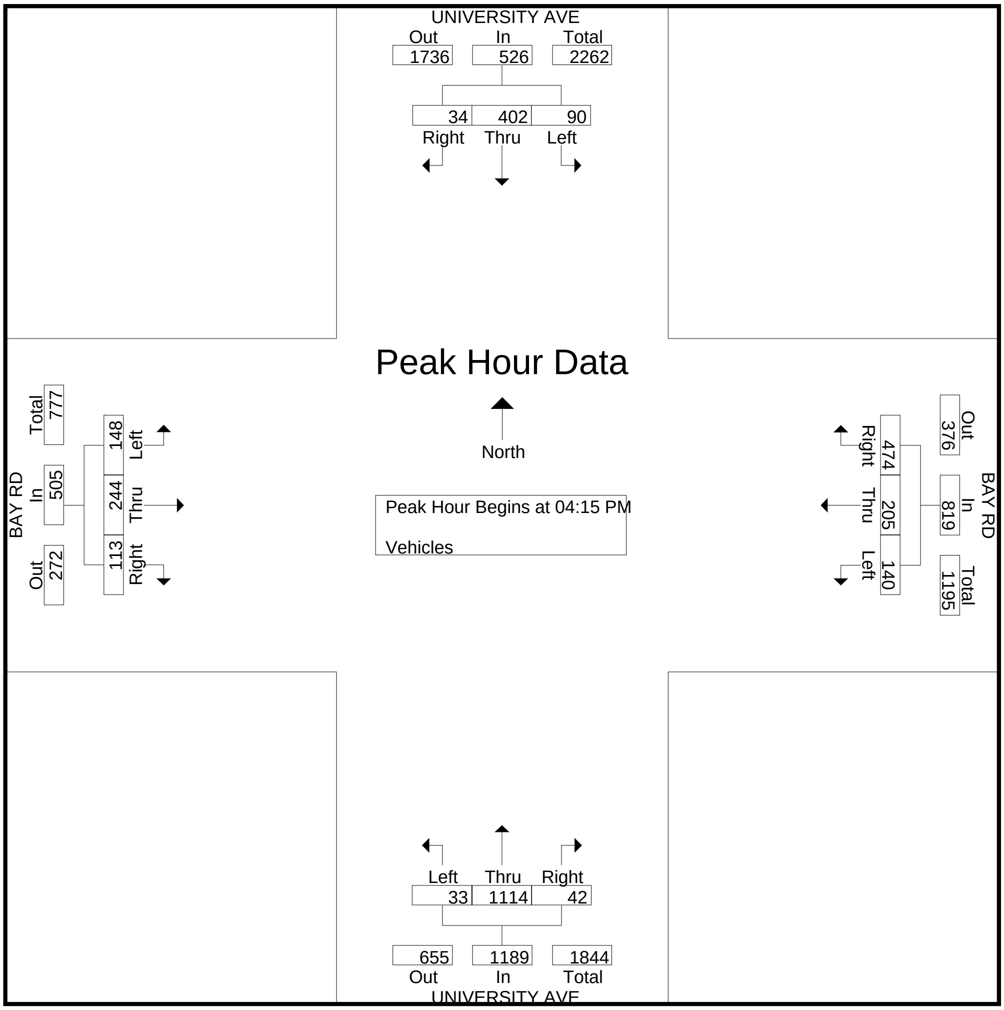

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File Name : 2PM FINAL
Site Code : 00000002
Start Date : 5/5/2015
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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					BAY RD Westbound					UNIVERSITY AVE Northbound					BAY RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	0	1	0	0	1	3
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	0	0	1	0	0	0	0	0	1	1	0	0	2	0	1	0	0	1	4
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2	0	0	3	4
05:15 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	3
05:30 PM	0	1	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	2
05:45 PM	0	1	0	0	1	0	1	0	0	1	0	1	0	0	1	0	3	0	0	3	6
Total	0	5	0	0	5	0	1	1	0	2	0	1	0	0	1	1	6	0	0	7	15
Grand Total	0	6	0	0	6	0	1	1	0	2	1	2	0	0	3	1	7	0	0	8	19
Apprch %	0	100	0	0		0	50	50	0		33.3	66.7	0	0		12.5	87.5	0	0		
Total %	0	31.6	0	0	31.6	0	5.3	5.3	0	10.5	5.3	10.5	0	0	15.8	5.3	36.8	0	0	42.1	

	UNIVERSITY AVE Southbound				BAY RD Westbound				UNIVERSITY AVE Northbound				BAY RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	**1**	2	0	**3**	4
05:15 PM	0	**2**	0	**2**	0	0	0	0	0	0	0	0	0	1	0	1	3
05:30 PM	0	1	0	1	0	0	**1**	**1**	0	0	0	0	0	0	0	0	2
05:45 PM	0	1	0	1	0	**1**	0	1	0	**1**	0	**1**	0	**3**	0	3	**6**
Total Volume	0	5	0	5	0	1	1	2	0	1	0	1	1	6	0	7	15
% App. Total	0	100	0		0	50	50		0	100	0		14.3	85.7	0		
PHF	.000	.625	.000	.625	.000	.250	.250	.500	.000	.250	.000	.250	.250	.500	.000	.583	.625

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File Name : 2PM FINAL
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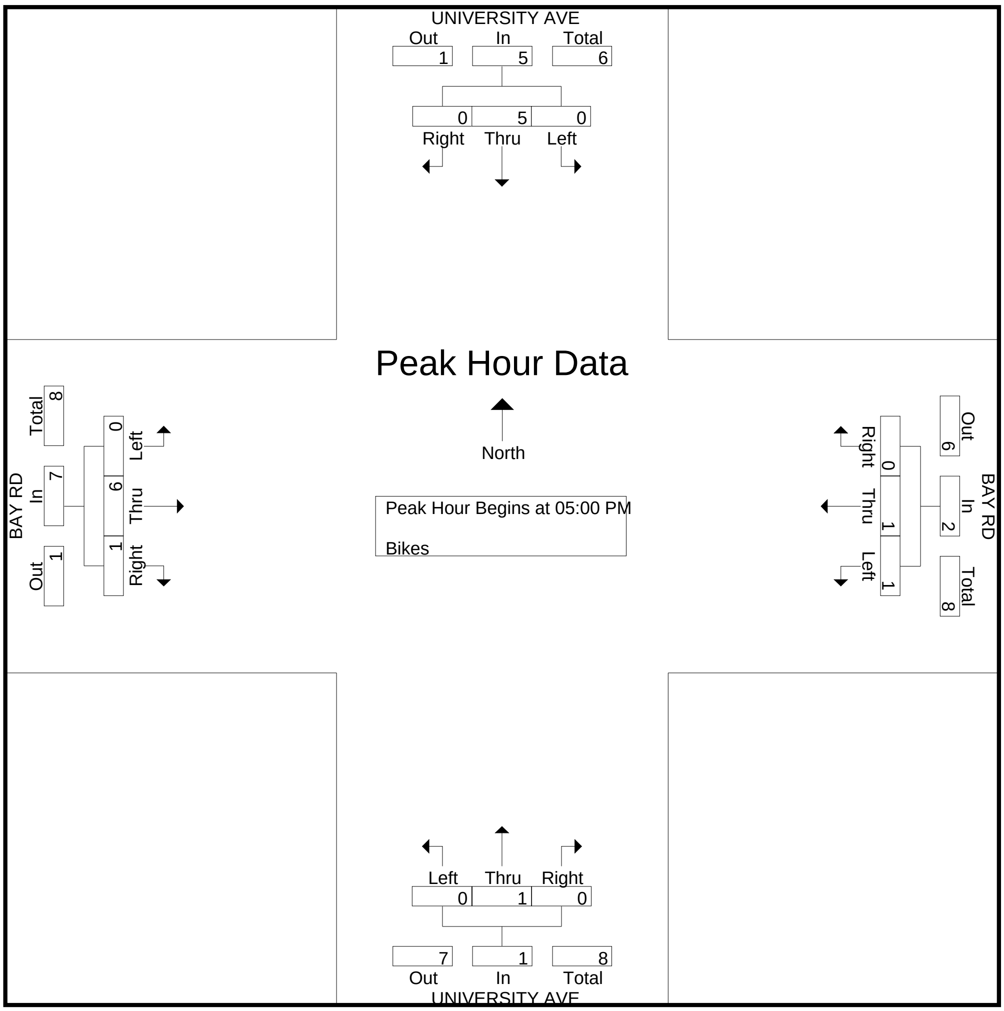

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File Name : 3AM FINAL
Site Code : 00000003
Start Date : 5/5/2015
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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					RUNNYMEDE ST Westbound					UNIVERSITY AVE Northbound					RUNNYMEDE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	10	319	21	0	350	2	19	14	0	35	11	124	1	1	137	3	9	5	1	18	540
07:15 AM	20	284	21	1	326	5	21	2	1	29	12	122	3	1	138	3	15	3	1	22	515
07:30 AM	25	225	34	0	284	1	35	4	3	43	15	129	5	0	149	0	24	3	1	28	504
07:45 AM	31	200	30	0	261	9	51	6	1	67	16	177	4	3	200	0	47	5	2	54	582
Total	86	1028	106	1	1221	17	126	26	5	174	54	552	13	5	624	6	95	16	5	122	2141
08:00 AM	16	197	32	2	247	4	65	8	6	83	12	163	3	5	183	1	13	4	2	20	533
08:15 AM	27	219	54	3	303	2	38	6	1	47	11	168	2	3	184	0	17	4	0	21	555
08:30 AM	15	232	51	0	298	7	18	7	0	32	8	163	0	3	174	0	8	6	2	16	520
08:45 AM	10	265	41	0	316	2	11	5	2	20	7	186	5	1	199	9	10	2	0	21	556
Total	68	913	178	5	1164	15	132	26	9	182	38	680	10	12	740	10	48	16	4	78	2164
Grand Total	154	1941	284	6	2385	32	258	52	14	356	92	1232	23	17	1364	16	143	32	9	200	4305
Apprch %	6.5	81.4	11.9	0.3		9	72.5	14.6	3.9		6.7	90.3	1.7	1.2		8	71.5	16	4.5		
Total %	3.6	45.1	6.6	0.1	55.4	0.7	6	1.2	0.3	8.3	2.1	28.6	0.5	0.4	31.7	0.4	3.3	0.7	0.2	4.6	

	UNIVERSITY AVE Southbound				RUNNYMEDE ST Westbound				UNIVERSITY AVE Northbound				RUNNYMEDE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	**31**	200	30	261	**9**	51	6	66	**16**	**177**	**4**	**197**	0	**47**	5	**52**	**576**
08:00 AM	16	197	32	245	4	**65**	**8**	**77**	12	163	3	178	**1**	13	4	18	518
08:15 AM	27	219	**54**	**300**	2	38	6	46	11	168	2	181	0	17	4	21	548
08:30 AM	15	**232**	51	298	7	18	7	32	8	163	0	171	0	8	**6**	14	515
Total Volume	89	848	167	1104	22	172	27	221	47	671	9	727	1	85	19	105	2157
% App. Total	8.1	76.8	15.1		10	77.8	12.2		6.5	92.3	1.2		1	81	18.1		
PHF	.718	.914	.773	.920	.611	.662	.844	.718	.734	.948	.563	.923	.250	.452	.792	.505	.936

Traffic Data Service

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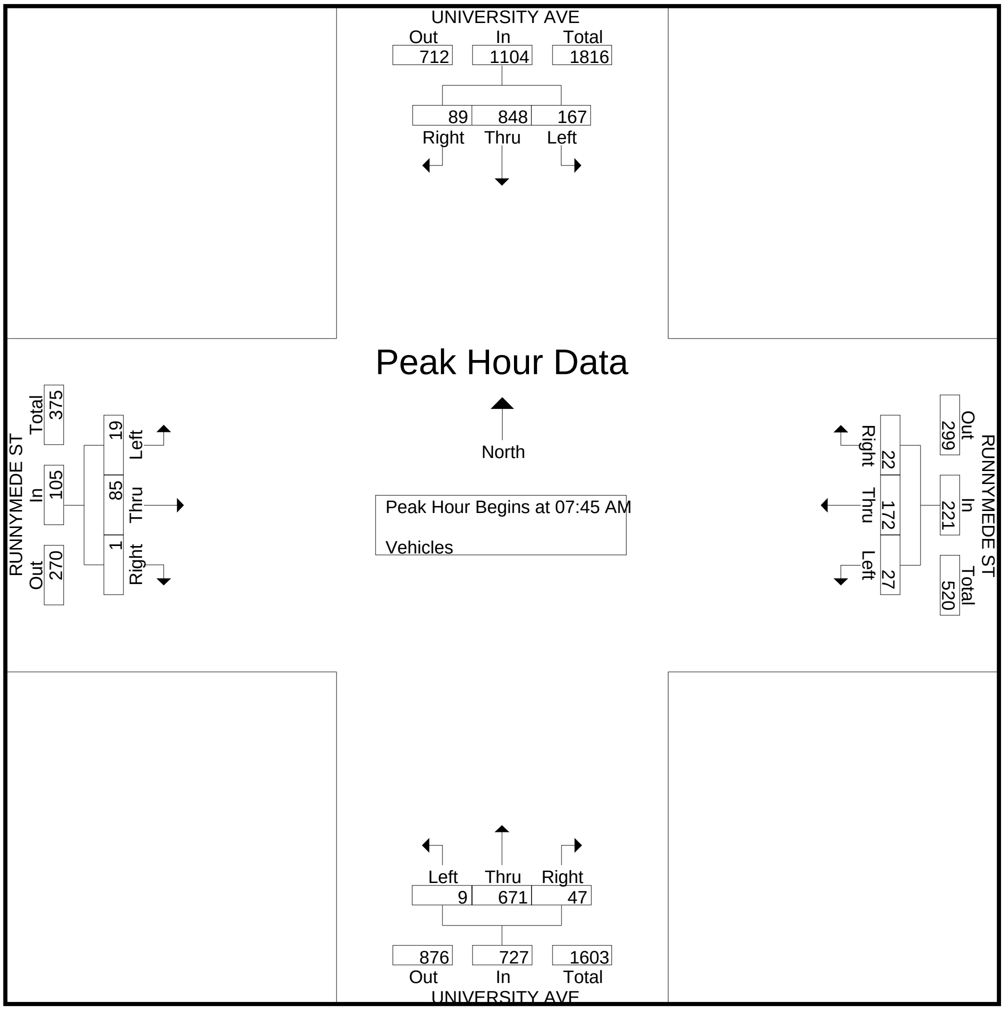

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File Name : 3AM FINAL
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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					RUNNYMEDE ST Westbound					UNIVERSITY AVE Northbound					RUNNYMEDE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
07:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	4
Total	0	7	0	0	7	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	9
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	4
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	1	0	0	1	6
Grand Total	0	7	0	0	7	0	1	0	0	1	0	6	0	0	6	0	1	0	0	1	15
Apprch %	0	100	0	0		0	100	0	0		0	100	0	0		0	100	0	0		
Total %	0	46.7	0	0	46.7	0	6.7	0	0	6.7	0	40	0	0	40	0	6.7	0	0	6.7	

	UNIVERSITY AVE Southbound				RUNNYMEDE ST Westbound				UNIVERSITY AVE Northbound				RUNNYMEDE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	2	0	2	0	**1**	0	**1**	0	0	0	0	0	0	0	0	3
07:30 AM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
07:45 AM	0	**3**	0	**3**	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**4**
Total Volume	0	7	0	7	0	1	0	1	0	1	0	1	0	0	0	0	9
% App. Total	0	100	0		0	100	0		0	100	0		0	0	0		
PHF	.000	.583	.000	.583	.000	.250	.000	.250	.000	.250	.000	.250	.000	.000	.000	.000	.563

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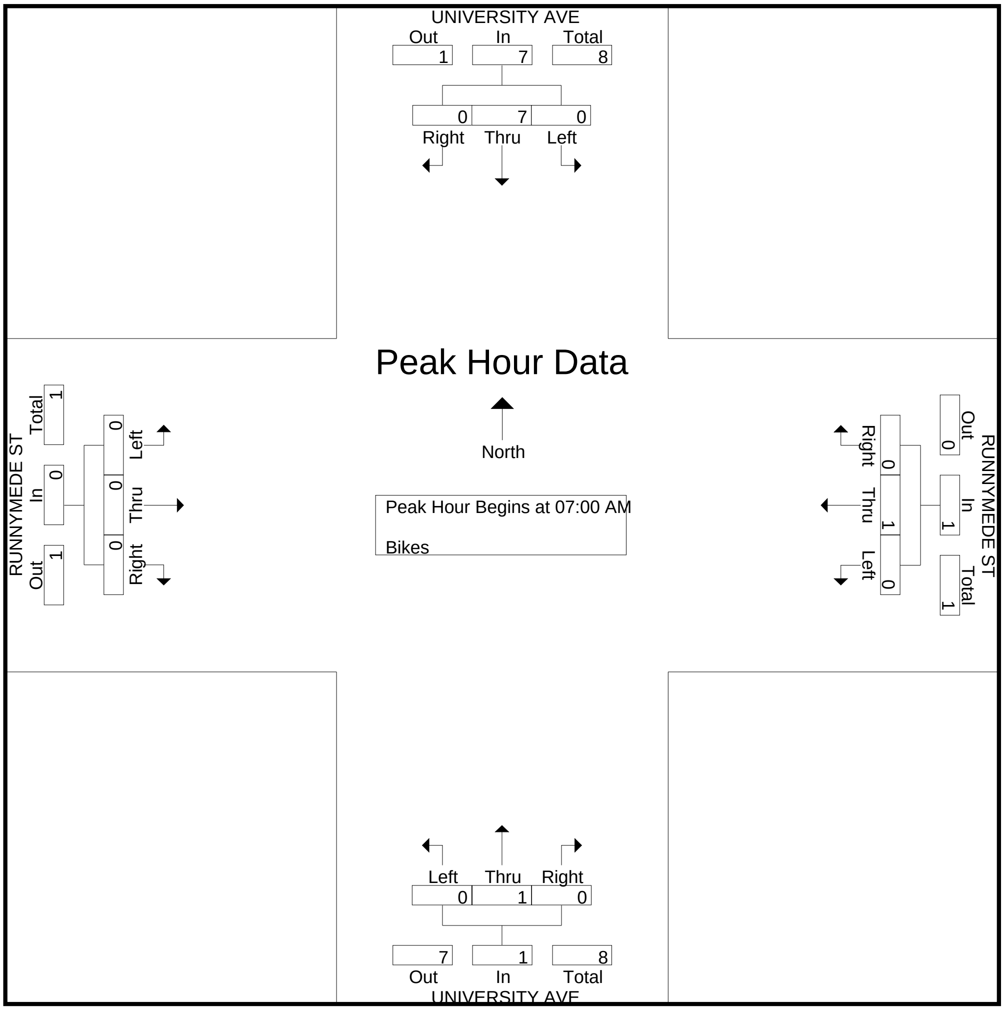

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File Name : 3PM FINAL
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Start Date : 5/5/2015

Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					RUNNYMEDE ST Westbound					UNIVERSITY AVE Northbound					RUNNYMEDE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	8	130	8	0	146	20	30	20	0	70	8	236	1	3	248	9	20	5	3	37	501
04:15 PM	6	168	9	2	185	32	24	20	2	78	12	243	4	2	261	6	21	8	8	43	567
04:30 PM	5	147	5	3	160	33	17	18	3	71	11	239	10	0	260	4	25	2	7	38	529
04:45 PM	6	166	6	2	180	21	15	31	0	67	8	253	9	1	271	4	23	2	1	30	548
Total	25	611	28	7	671	106	86	89	5	286	39	971	24	6	1040	23	89	17	19	148	2145
05:00 PM	5	151	6	1	163	20	28	20	3	71	12	235	1	2	250	2	17	2	0	21	505
05:15 PM	6	148	14	1	169	28	39	17	3	87	4	189	0	4	197	1	11	1	3	16	469
05:30 PM	6	174	8	1	189	19	28	12	1	60	7	100	4	3	114	1	27	5	1	34	397
05:45 PM	7	160	5	0	172	24	30	18	2	74	8	159	2	1	170	2	20	1	2	25	441
Total	24	633	33	3	693	91	125	67	9	292	31	683	7	10	731	6	75	9	6	96	1812
Grand Total	49	1244	61	10	1364	197	211	156	14	578	70	1654	31	16	1771	29	164	26	25	244	3957
Apprch %	3.6	91.2	4.5	0.7		34.1	36.5	27	2.4		4	93.4	1.8	0.9		11.9	67.2	10.7	10.2		
Total %	1.2	31.4	1.5	0.3	34.5	5	5.3	3.9	0.4	14.6	1.8	41.8	0.8	0.4	44.8	0.7	4.1	0.7	0.6	6.2	

	UNIVERSITY AVE Southbound				RUNNYMEDE ST Westbound				UNIVERSITY AVE Northbound				RUNNYMEDE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**6**	**168**	**9**	**183**	32	24	20	**76**	**12**	243	4	259	**6**	21	**8**	**35**	**553**
04:30 PM	5	147	5	157	**33**	17	18	68	11	239	**10**	260	4	**25**	2	31	516
04:45 PM	6	166	6	178	21	15	**31**	67	8	**253**	9	**270**	4	23	2	29	544
05:00 PM	5	151	6	162	20	**28**	20	68	12	235	1	248	2	17	2	21	499
Total Volume	22	632	26	680	106	84	89	279	43	970	24	1037	16	86	14	116	2112
% App. Total	3.2	92.9	3.8		38	30.1	31.9		4.1	93.5	2.3		13.8	74.1	12.1		
PHF	.917	.940	.722	.929	.803	.750	.718	.918	.896	.958	.600	.960	.667	.860	.438	.829	.955

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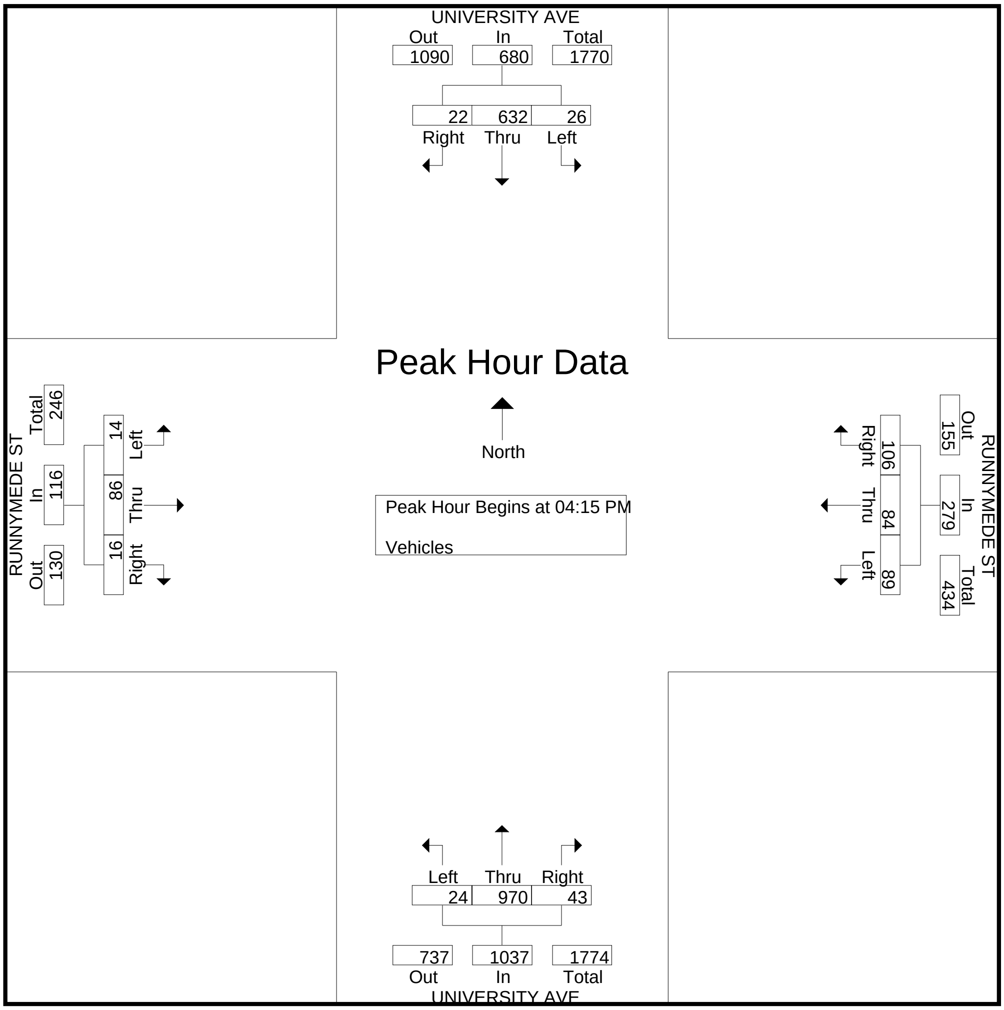

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File Name : 3PM FINAL
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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					RUNNYMEDE ST Westbound					UNIVERSITY AVE Northbound					RUNNYMEDE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	1	0	2	0	0	2	1	2	0	0	3	0	0	0	0	0	6
04:30 PM	0	1	0	0	1	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	3
04:45 PM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	3	1	0	4	0	2	0	0	2	2	3	0	0	5	0	0	0	0	0	11
05:00 PM	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	4
05:15 PM	0	1	1	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
05:30 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	4
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
Total	0	7	1	0	8	0	0	0	0	0	0	5	0	0	5	0	1	0	0	1	14
Grand Total	0	10	2	0	12	0	2	0	0	2	2	8	0	0	10	0	1	0	0	1	25
Apprch %	0	83.3	16.7	0		0	100	0	0		20	80	0	0		0	100	0	0		
Total %	0	40	8	0	48	0	8	0	0	8	8	32	0	0	40	0	4	0	0	4	

	UNIVERSITY AVE Southbound				RUNNYMEDE ST Westbound				UNIVERSITY AVE Northbound				RUNNYMEDE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	1	0	1	0	**2**	0	**2**	**1**	**2**	0	**3**	0	0	0	0	**6**
04:30 PM	0	1	0	1	0	0	0	0	1	1	0	2	0	0	0	0	3
04:45 PM	0	1	**1**	2	0	0	0	0	0	0	0	0	0	0	0	0	2
05:00 PM	0	**3**	0	**3**	0	0	0	0	0	1	0	1	0	0	0	0	4
Total Volume	0	6	1	7	0	2	0	2	2	4	0	6	0	0	0	0	15
% App. Total	0	85.7	14.3		0	100	0		33.3	66.7	0		0	0	0		
PHF	.000	.500	.250	.583	.000	.250	.000	.250	.500	.500	.000	.500	.000	.000	.000	.000	.625

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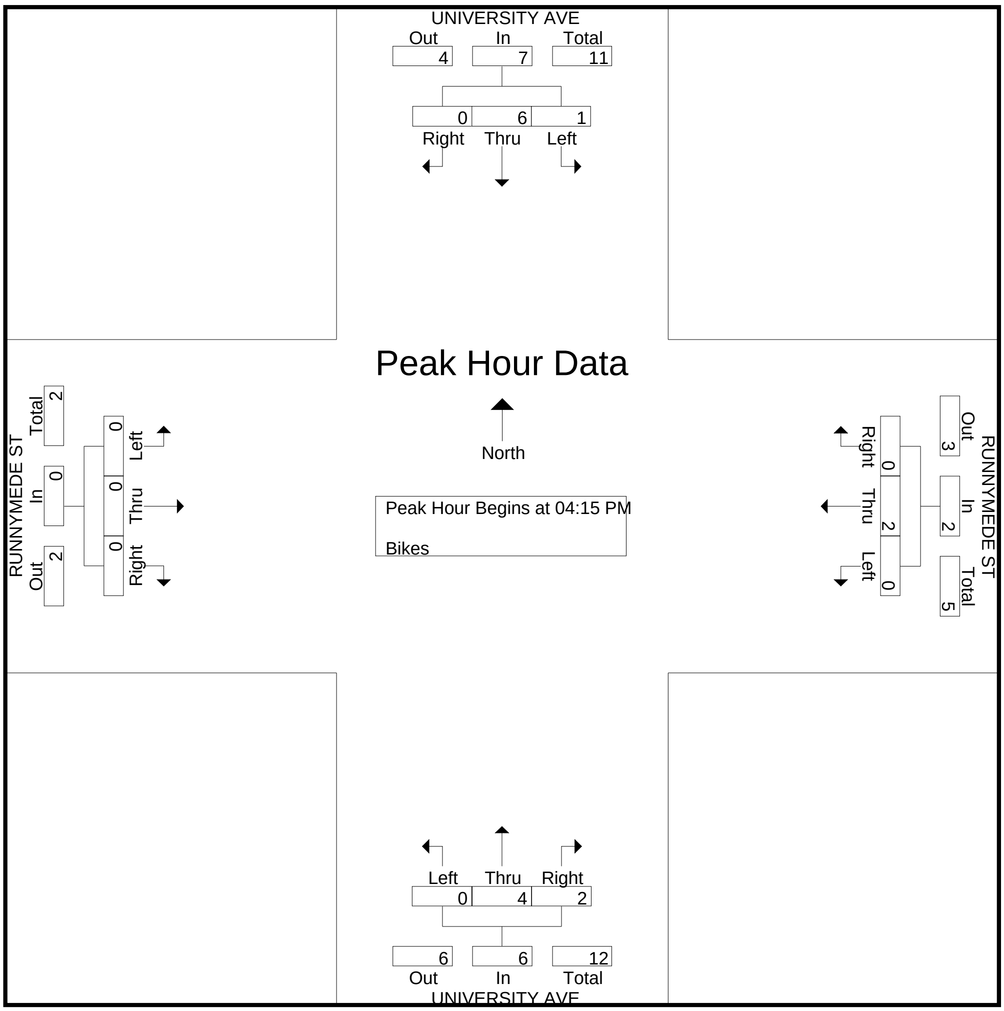

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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					BELL ST Westbound					UNIVERSITY AVE Northbound					BELL ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	6	330	3	7	346	8	10	19	2	39	4	113	4	4	125	5	12	4	3	24	534
07:15 AM	6	242	4	1	253	4	21	18	0	43	3	121	3	6	133	7	20	3	3	33	462
07:30 AM	3	213	3	6	225	2	28	35	2	67	4	150	4	6	164	7	15	2	3	27	483
07:45 AM	1	217	2	3	223	4	25	33	0	62	14	186	6	5	211	16	28	1	2	47	543
Total	16	1002	12	17	1047	18	84	105	4	211	25	570	17	21	633	35	75	10	11	131	2022
08:00 AM	7	196	6	0	209	2	38	25	0	65	13	169	11	2	195	10	19	5	0	34	503
08:15 AM	4	211	4	2	221	3	22	20	0	45	4	174	6	3	187	5	14	2	4	25	478
08:30 AM	4	264	4	0	272	3	30	12	1	46	12	149	6	1	168	4	15	4	1	24	510
08:45 AM	10	253	8	4	275	4	10	17	2	33	3	196	8	1	208	5	12	2	2	21	537
Total	25	924	22	6	977	12	100	74	3	189	32	688	31	7	758	24	60	13	7	104	2028
Grand Total	41	1926	34	23	2024	30	184	179	7	400	57	1258	48	28	1391	59	135	23	18	235	4050
Apprch %	2	95.2	1.7	1.1		7.5	46	44.8	1.8		4.1	90.4	3.5	2		25.1	57.4	9.8	7.7		
Total %	1	47.6	0.8	0.6	50	0.7	4.5	4.4	0.2	9.9	1.4	31.1	1.2	0.7	34.3	1.5	3.3	0.6	0.4	5.8	

	UNIVERSITY AVE Southbound				BELL ST Westbound				UNIVERSITY AVE Northbound				BELL ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	1	217	2	220	**4**	25	**33**	62	**14**	**186**	6	**206**	**16**	**28**	1	**45**	**533**
08:00 AM	**7**	196	**6**	209	2	**38**	25	**65**	13	169	**11**	193	10	19	**5**	34	501
08:15 AM	4	211	4	219	3	22	20	45	4	174	6	184	5	14	2	21	469
08:30 AM	4	**264**	4	**272**	3	30	12	45	12	149	6	167	4	15	4	23	507
Total Volume	16	888	16	920	12	115	90	217	43	678	29	750	35	76	12	123	2010
% App. Total	1.7	96.5	1.7		5.5	53	41.5		5.7	90.4	3.9		28.5	61.8	9.8		
PHF	.571	.841	.667	.846	.750	.757	.682	.835	.768	.911	.659	.910	.547	.679	.600	.683	.943

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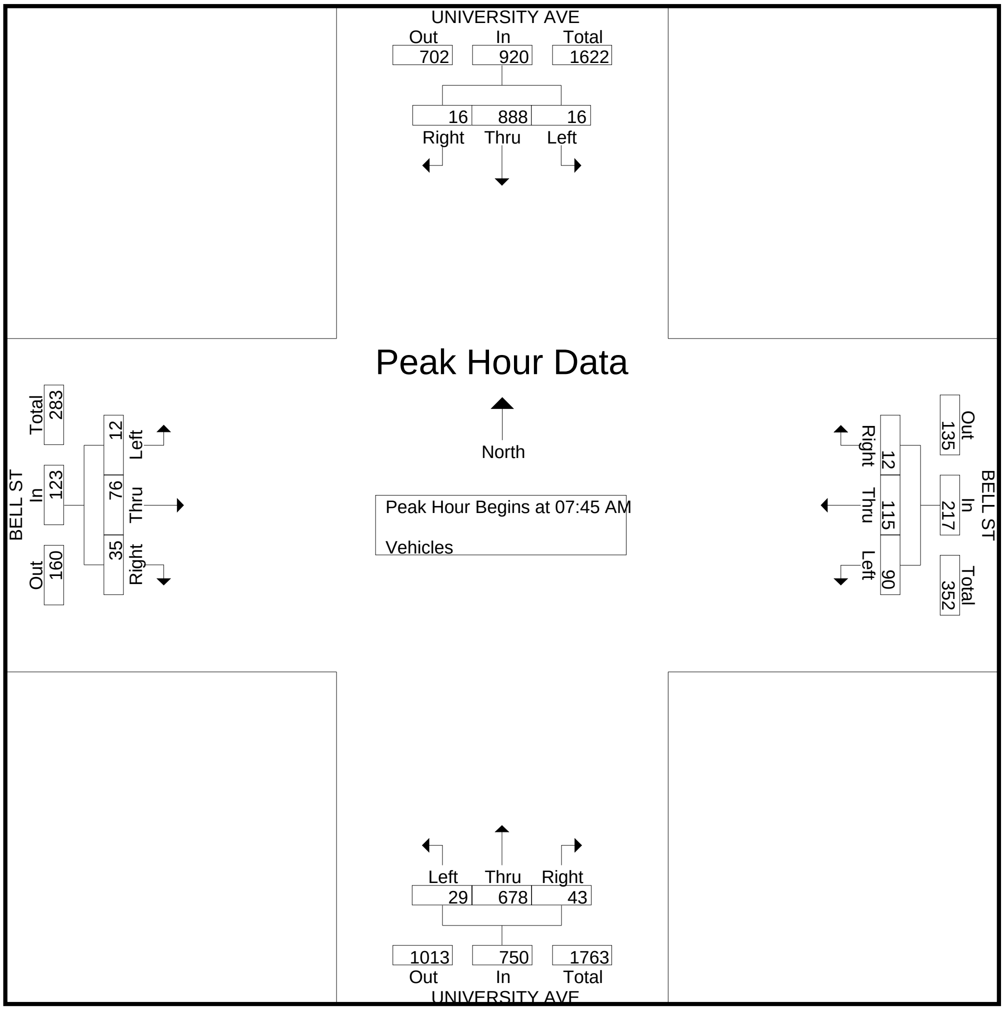

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File Name : 4AM FINAL
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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					BELL ST Westbound					UNIVERSITY AVE Northbound					BELL ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
Total	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
08:00 AM	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
08:15 AM	0	3	0	0	3	0	0	1	0	1	0	1	0	0	1	1	0	0	0	1	6
08:30 AM	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
08:45 AM	0	2	0	0	2	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	4
Total	0	11	0	0	11	0	0	2	0	2	0	4	0	0	4	1	1	0	0	2	19
Grand Total	0	13	0	0	13	0	0	2	0	2	0	5	0	0	5	1	1	0	0	2	22
Apprch %	0	100	0	0		0	0	100	0		0	100	0	0		50	50	0	0		
Total %	0	59.1	0	0	59.1	0	0	9.1	0	9.1	0	22.7	0	0	22.7	4.5	4.5	0	0	9.1	

	UNIVERSITY AVE Southbound				BELL ST Westbound				UNIVERSITY AVE Northbound				BELL ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	**4**	0	**4**	0	0	0	0	0	0	0	0	0	0	0	0	4
08:15 AM	0	3	0	3	0	0	**1**	**1**	0	1	0	1	**1**	0	0	**1**	**6**
08:30 AM	0	2	0	2	0	0	0	0	0	**3**	0	**3**	0	0	0	0	5
08:45 AM	0	2	0	2	0	0	1	1	0	0	0	0	0	**1**	0	1	4
Total Volume	0	11	0	11	0	0	2	2	0	4	0	4	1	1	0	2	19
% App. Total	0	100	0		0	0	100		0	100	0		50	50	0		
PHF	.000	.688	.000	.688	.000	.000	.500	.500	.000	.333	.000	.333	.250	.250	.000	.500	.792

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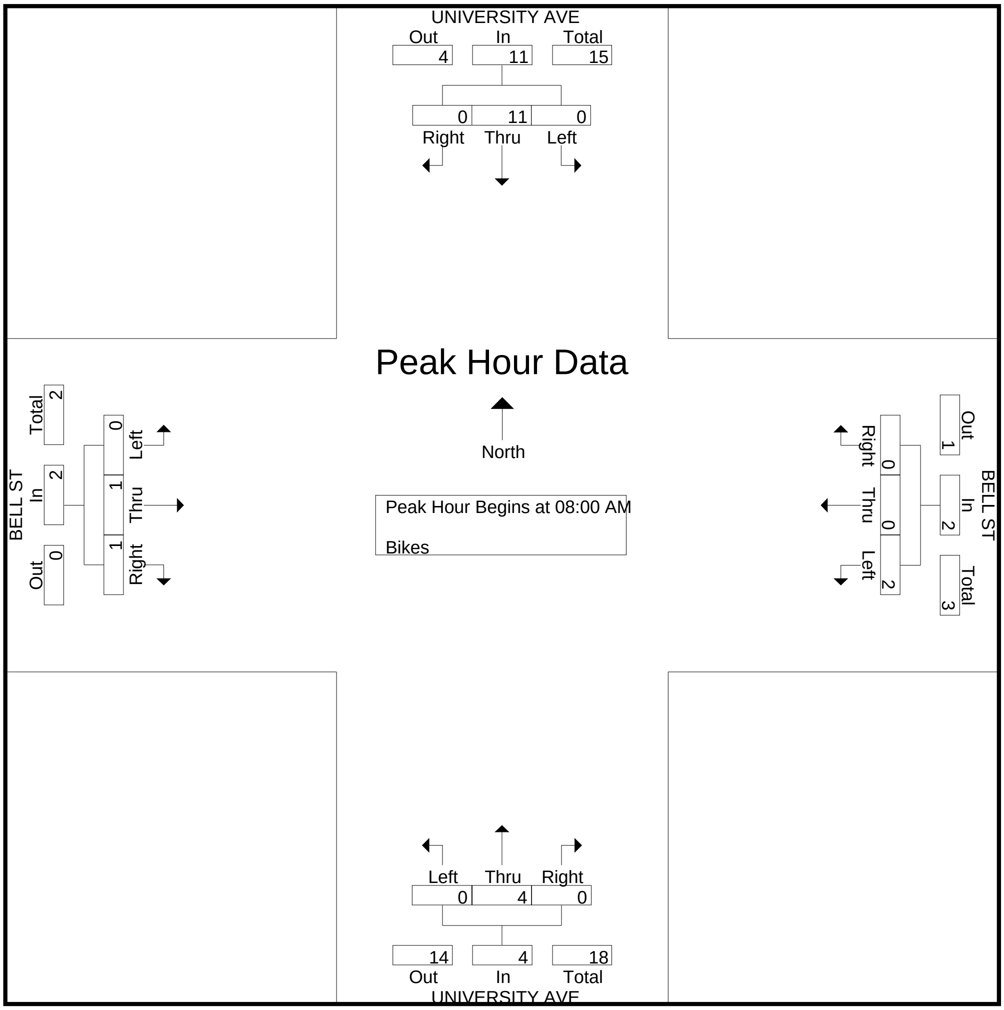

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File Name : 4PM FINAL
Site Code : 00000004
Start Date : 5/5/2015

Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					BELL ST Westbound					UNIVERSITY AVE Northbound					BELL ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	6	150	10	5	171	6	25	27	0	58	19	217	9	16	261	12	16	4	6	38	528
04:15 PM	6	170	16	5	197	7	21	26	0	54	22	251	11	5	289	10	17	5	4	36	576
04:30 PM	5	157	12	3	177	5	22	20	4	51	23	239	11	8	281	16	16	5	8	45	554
04:45 PM	6	183	9	3	201	5	22	22	2	51	26	258	10	1	295	7	23	2	3	35	582
Total	23	660	47	16	746	23	90	95	6	214	90	965	41	30	1126	45	72	16	21	154	2240
05:00 PM	6	149	11	6	172	5	31	25	1	62	31	251	16	1	299	7	26	3	4	40	573
05:15 PM	5	133	10	4	152	5	39	15	1	60	43	205	13	1	262	7	12	1	0	20	494
05:30 PM	3	175	8	7	193	5	29	24	2	60	8	105	10	4	127	14	19	2	8	43	423
05:45 PM	9	167	5	6	187	7	28	14	2	51	10	160	9	4	183	10	17	0	4	31	452
Total	23	624	34	23	704	22	127	78	6	233	92	721	48	10	871	38	74	6	16	134	1942
Grand Total	46	1284	81	39	1450	45	217	173	12	447	182	1686	89	40	1997	83	146	22	37	288	4182
Apprch %	3.2	88.6	5.6	2.7		10.1	48.5	38.7	2.7		9.1	84.4	4.5	2		28.8	50.7	7.6	12.8		
Total %	1.1	30.7	1.9	0.9	34.7	1.1	5.2	4.1	0.3	10.7	4.4	40.3	2.1	1	47.8	2	3.5	0.5	0.9	6.9	

	UNIVERSITY AVE Southbound				BELL ST Westbound				UNIVERSITY AVE Northbound				BELL ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	**6**	170	**16**	192	**7**	21	**26**	54	22	251	11	284	10	17	**5**	32	562
04:30 PM	5	157	12	174	5	22	20	47	23	239	11	273	**16**	16	5	**37**	531
04:45 PM	6	**183**	9	**198**	5	22	22	49	26	**258**	10	294	7	23	2	32	**573**
05:00 PM	6	149	11	166	5	**31**	25	**61**	**31**	251	**16**	**298**	7	**26**	3	36	561
Total Volume	23	659	48	730	22	96	93	211	102	999	48	1149	40	82	15	137	2227
% App. Total	3.2	90.3	6.6		10.4	45.5	44.1		8.9	86.9	4.2		29.2	59.9	10.9		
PHF	.958	.900	.750	.922	.786	.774	.894	.865	.823	.968	.750	.964	.625	.788	.750	.926	.972

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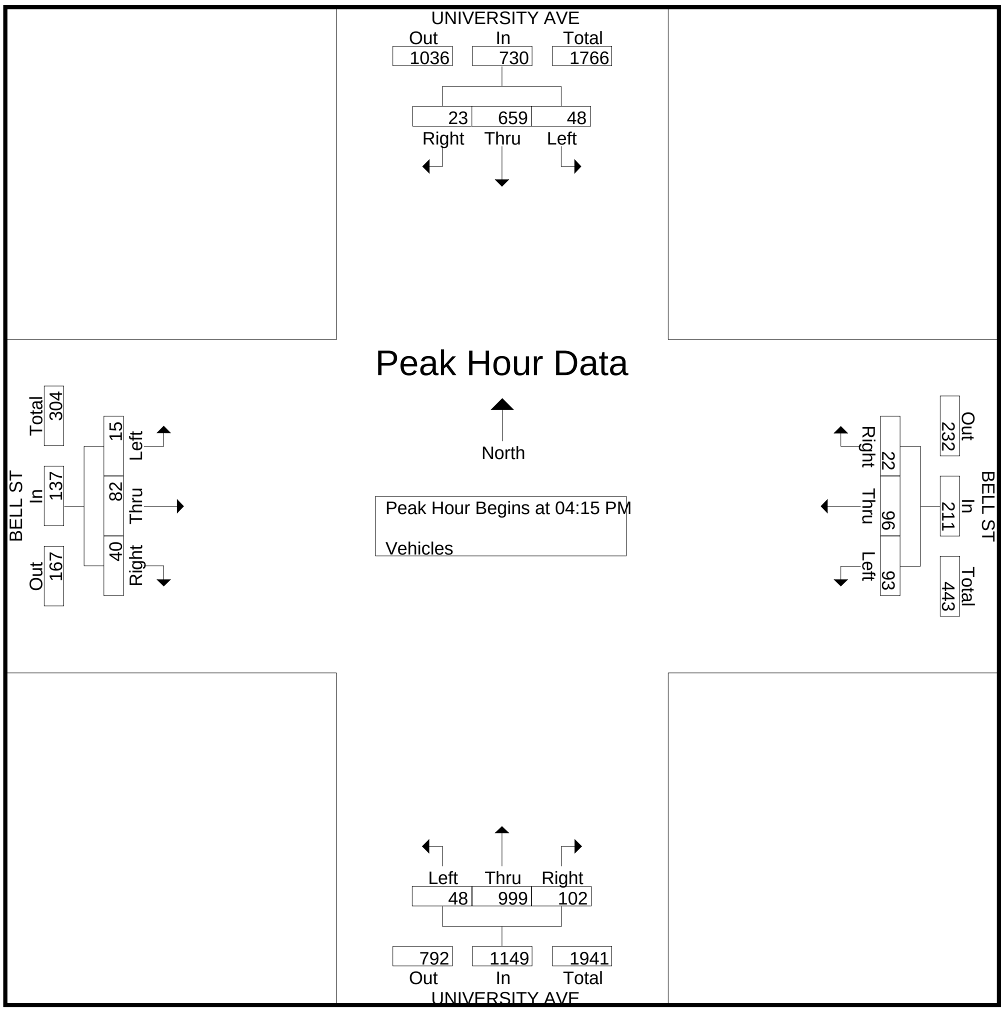

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File Name : 4PM FINAL
Site Code : 00000004
Start Date : 5/5/2015

Groups Printed- Bikes

	UNIVERSITY AVE Southbound					BELL ST Westbound					UNIVERSITY AVE Northbound					BELL ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
Total	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	1	0	0	1	5
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	1	2
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
05:45 PM	0	1	1	0	2	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	5
Total	0	3	1	0	4	0	2	0	0	2	0	3	0	0	3	1	0	0	0	1	10
Grand Total	0	4	1	0	5	0	2	0	0	2	0	6	0	0	6	1	1	0	0	2	15
Apprch %	0	80	20	0		0	100	0	0		0	100	0	0		50	50	0	0		
Total %	0	26.7	6.7	0	33.3	0	13.3	0	0	13.3	0	40	0	0	40	6.7	6.7	0	0	13.3	

	UNIVERSITY AVE Southbound				BELL ST Westbound				UNIVERSITY AVE Northbound				BELL ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**1**	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	**1**	0	**1**	0	0	0	0	**1**	0	0	**1**	2
05:30 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
05:45 PM	0	1	**1**	**2**	0	1	0	1	0	**2**	0	**2**	0	0	0	0	**5**
Total Volume	0	3	1	4	0	2	0	2	0	3	0	3	1	0	0	1	10
% App. Total	0	75	25		0	100	0		0	100	0		100	0	0		
PHF	.000	.750	.250	.500	.000	.500	.000	.500	.000	.375	.000	.375	.250	.000	.000	.250	.500

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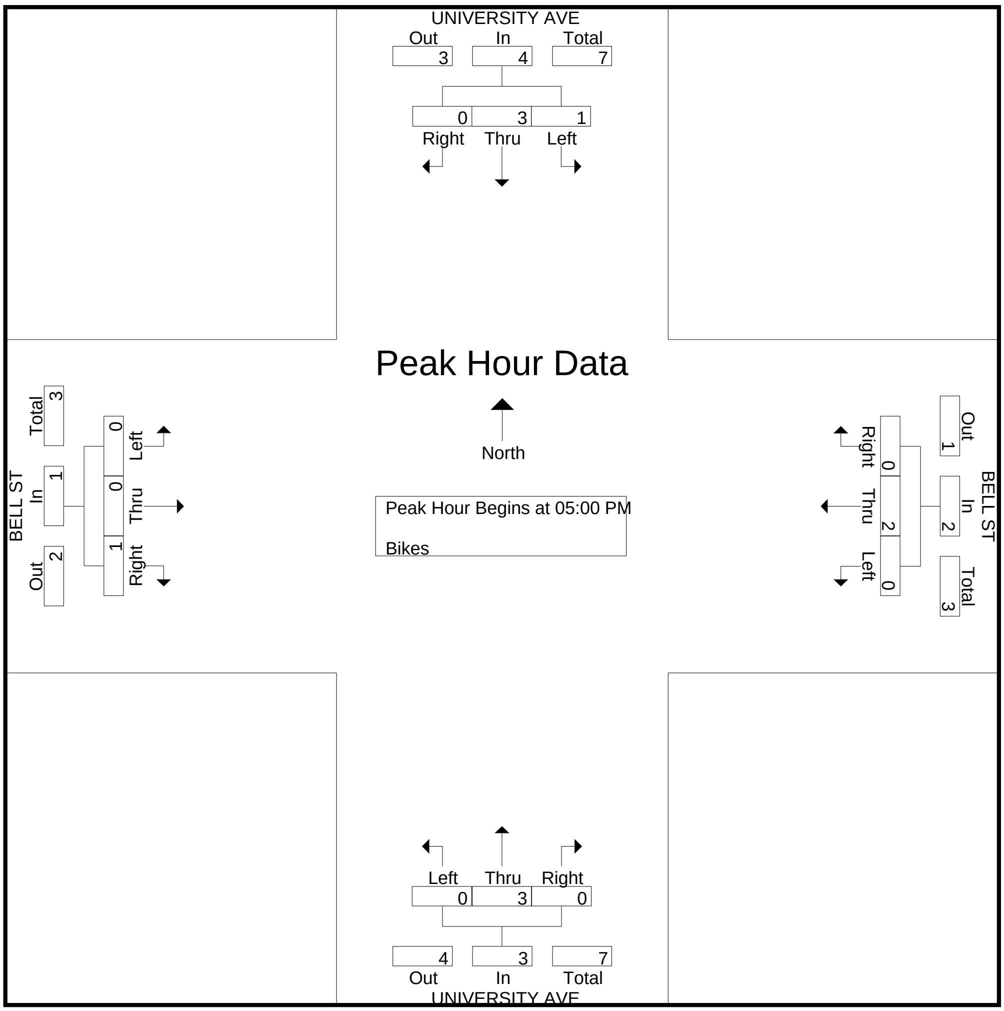

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File Name : 5AM FINAL
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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					DONOHOE ST Westbound					UNIVERSITY AVE Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	30	270	9	3	312	70	122	84	0	276	73	51	10	0	134	64	27	5	4	100	822
07:15 AM	20	264	7	2	293	73	115	122	0	310	82	66	16	0	164	107	25	0	9	141	908
07:30 AM	13	232	5	2	252	74	118	106	0	298	72	79	19	0	170	147	17	2	12	178	898
07:45 AM	16	230	6	1	253	91	120	139	0	350	102	119	44	0	265	137	10	3	8	158	1026
Total	79	996	27	8	1110	308	475	451	0	1234	329	315	89	0	733	455	79	10	33	577	3654
08:00 AM	17	196	7	10	230	94	136	128	0	358	84	98	36	0	218	102	30	2	14	148	954
08:15 AM	20	211	4	8	243	101	137	145	0	383	91	83	37	0	211	127	22	1	6	156	993
08:30 AM	12	228	6	5	251	108	128	110	0	346	83	62	19	0	164	128	35	2	6	171	932
08:45 AM	11	277	7	5	300	128	93	84	0	305	79	79	23	0	181	83	26	5	6	120	906
Total	60	912	24	28	1024	431	494	467	0	1392	337	322	115	0	774	440	113	10	32	595	3785
Grand Total	139	1908	51	36	2134	739	969	918	0	2626	666	637	204	0	1507	895	192	20	65	1172	7439
Apprch %	6.5	89.4	2.4	1.7		28.1	36.9	35	0		44.2	42.3	13.5	0		76.4	16.4	1.7	5.5		
Total %	1.9	25.6	0.7	0.5	28.7	9.9	13	12.3	0	35.3	9	8.6	2.7	0	20.3	12	2.6	0.3	0.9	15.8	

	UNIVERSITY AVE Southbound				DONOHOE ST Westbound				UNIVERSITY AVE Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	16	**230**	6	**252**	91	120	139	350	**102**	**119**	**44**	**265**	**137**	10	**3**	150	**1017**
08:00 AM	17	196	**7**	220	94	136	128	358	84	98	36	218	102	30	2	134	930
08:15 AM	**20**	211	4	235	101	**137**	**145**	**383**	91	83	37	211	127	22	1	150	979
08:30 AM	12	228	6	246	**108**	128	110	346	83	62	19	164	128	**35**	2	**165**	921
Total Volume	65	865	23	953	394	521	522	1437	360	362	136	858	494	97	8	599	3847
% App. Total	6.8	90.8	2.4		27.4	36.3	36.3		42	42.2	15.9		82.5	16.2	1.3		
PHF	.813	.940	.821	.945	.912	.951	.900	.938	.882	.761	.773	.809	.901	.693	.667	.908	.946

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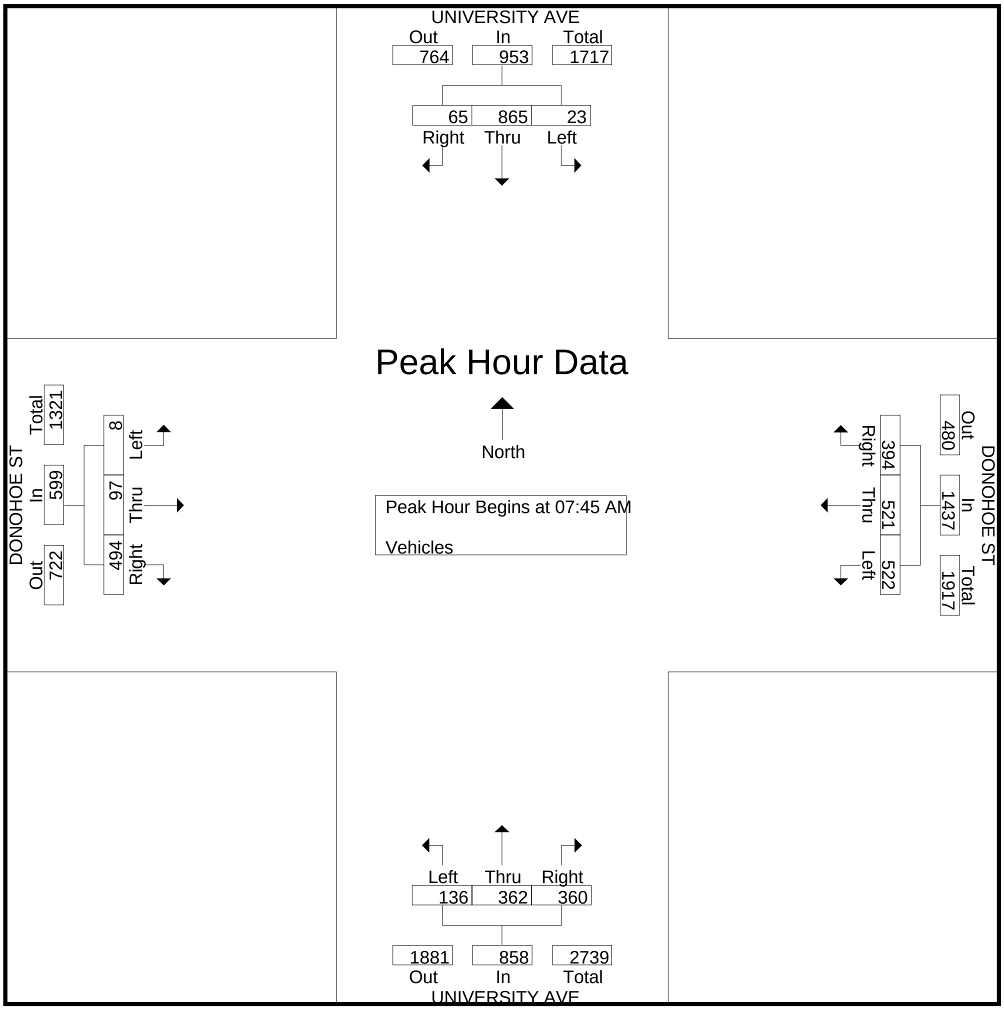

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File Name : 5AM FINAL
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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					DONOHOE ST Westbound					UNIVERSITY AVE Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	2
07:30 AM	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
07:45 AM	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	3
Total	1	2	0	0	3	0	0	1	0	1	2	1	0	0	3	0	0	0	0	0	7
08:00 AM	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	5
08:15 AM	0	6	0	0	6	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	8
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	2	2	0	4	0	0	0	0	0	5
08:45 AM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	13	0	0	13	0	0	1	0	1	0	3	2	0	5	1	0	0	0	1	20
Grand Total	1	15	0	0	16	0	0	2	0	2	2	4	2	0	8	1	0	0	0	1	27
Apprch %	6.2	93.8	0	0		0	0	100	0		25	50	25	0		100	0	0	0		
Total %	3.7	55.6	0	0	59.3	0	0	7.4	0	7.4	7.4	14.8	7.4	0	29.6	3.7	0	0	0	3.7	

	UNIVERSITY AVE Southbound				DONOHOE ST Westbound				UNIVERSITY AVE Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	1	0	1	0	0	**1**	**1**	0	1	0	1	0	0	0	0	3
08:00 AM	0	4	0	4	0	0	0	0	0	0	0	0	**1**	0	0	**1**	5
08:15 AM	0	**6**	0	**6**	0	0	1	1	0	1	0	1	0	0	0	0	**8**
08:30 AM	0	1	0	1	0	0	0	0	0	**2**	**2**	**4**	0	0	0	0	5
Total Volume	0	12	0	12	0	0	2	2	0	4	2	6	1	0	0	1	21
% App. Total	0	100	0		0	0	100		0	66.7	33.3		100	0	0		
PHF	.000	.500	.000	.500	.000	.000	.500	.500	.000	.500	.250	.375	.250	.000	.000	.250	.656

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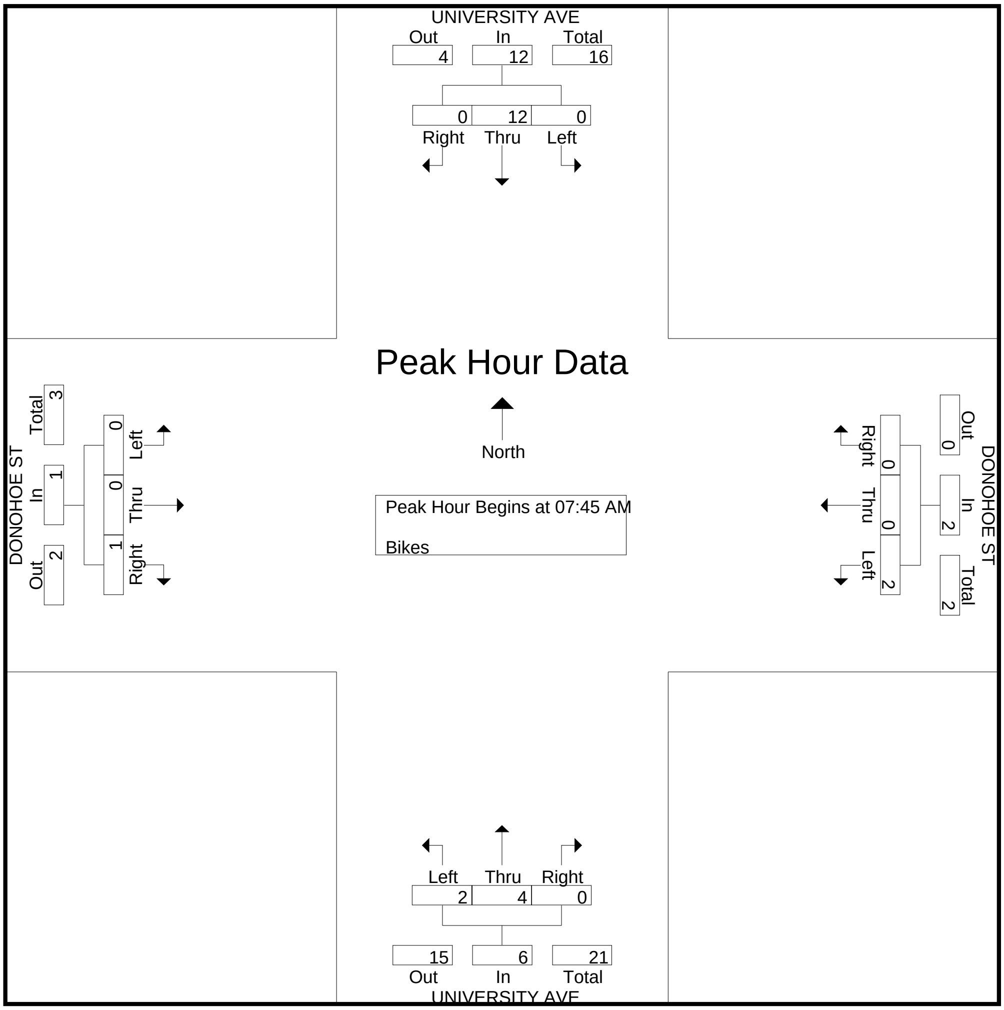

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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					DONOHOE ST Westbound					UNIVERSITY AVE Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	35	130	10	11	186	141	182	79	0	402	162	119	99	0	380	51	22	3	7	83	1051
04:15 PM	39	166	16	14	235	173	182	58	0	413	188	123	106	0	417	43	26	4	14	87	1152
04:30 PM	39	128	11	13	191	148	154	83	0	385	190	114	109	0	413	61	20	1	7	89	1078
04:45 PM	45	151	11	13	220	161	207	81	0	449	199	165	92	0	456	41	21	3	11	76	1201
Total	158	575	48	51	832	623	725	301	0	1649	739	521	406	0	1666	196	89	11	39	335	4482
05:00 PM	44	101	18	6	169	169	189	73	0	431	173	131	123	0	427	32	31	1	3	67	1094
05:15 PM	36	148	14	9	207	140	144	62	0	346	174	153	137	0	464	26	26	5	7	64	1081
05:30 PM	45	142	13	8	208	79	158	79	0	316	184	69	127	0	380	35	28	2	7	72	976
05:45 PM	32	145	4	4	185	88	173	58	0	319	213	105	140	0	458	40	23	4	5	72	1034
Total	157	536	49	27	769	476	664	272	0	1412	744	458	527	0	1729	133	108	12	22	275	4185
Grand Total	315	1111	97	78	1601	1099	1389	573	0	3061	1483	979	933	0	3395	329	197	23	61	610	8667
Apprch %	19.7	69.4	6.1	4.9		35.9	45.4	18.7	0		43.7	28.8	27.5	0		53.9	32.3	3.8	10		
Total %	3.6	12.8	1.1	0.9	18.5	12.7	16	6.6	0	35.3	17.1	11.3	10.8	0	39.2	3.8	2.3	0.3	0.7	7	

	UNIVERSITY AVE Southbound				DONOHOE ST Westbound				UNIVERSITY AVE Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	39	**166**	16	**221**	**173**	182	58	413	188	123	106	417	43	26	**4**	73	1124
04:30 PM	39	128	11	178	148	154	**83**	385	190	114	109	413	**61**	20	1	**82**	1058
04:45 PM	**45**	151	11	207	161	**207**	81	**449**	**199**	**165**	92	**456**	41	21	3	65	**1177**
05:00 PM	44	101	**18**	163	169	189	73	431	173	131	**123**	427	32	**31**	1	64	1085
Total Volume	167	546	56	769	651	732	295	1678	750	533	430	1713	177	98	9	284	4444
% App. Total	21.7	71	7.3		38.8	43.6	17.6		43.8	31.1	25.1		62.3	34.5	3.2		
PHF	.928	.822	.778	.870	.941	.884	.889	.934	.942	.808	.874	.939	.725	.790	.563	.866	.944

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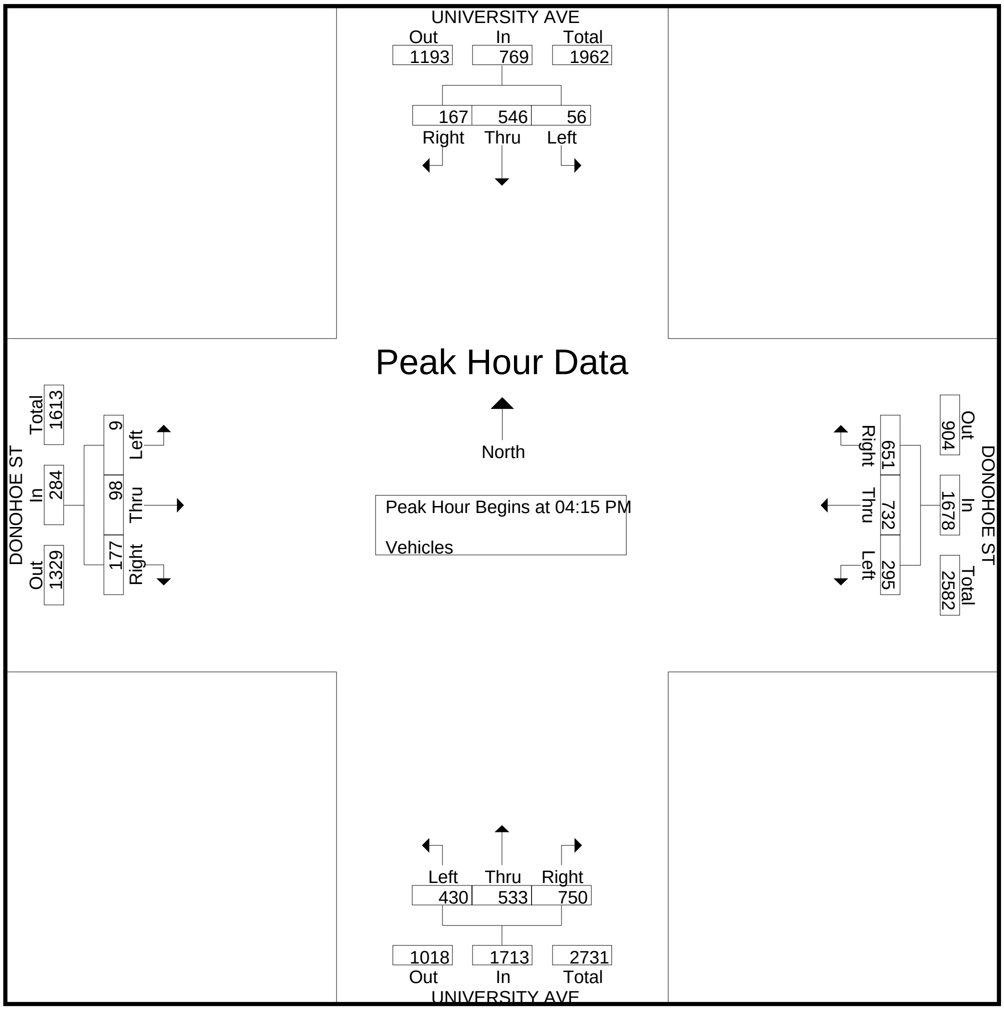

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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					DONOHOE ST Westbound					UNIVERSITY AVE Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0	0	0	2	3
04:30 PM	0	1	0	0	1	0	1	2	0	3	1	2	0	0	3	0	0	0	0	0	7
04:45 PM	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	1	0	0	0	1	4
Total	0	3	0	0	3	1	1	3	0	5	1	4	0	0	5	3	0	0	0	3	16
05:00 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
05:30 PM	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0	0	0	0	2
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
Total	0	0	0	0	0	1	0	1	0	2	1	5	0	0	6	0	0	0	0	0	8
Grand Total	0	3	0	0	3	2	1	4	0	7	2	9	0	0	11	3	0	0	0	3	24
Apprch %	0	100	0	0		28.6	14.3	57.1	0		18.2	81.8	0	0		100	0	0	0		
Total %	0	12.5	0	0	12.5	8.3	4.2	16.7	0	29.2	8.3	37.5	0	0	45.8	12.5	0	0	0	12.5	

	UNIVERSITY AVE Southbound				DONOHOE ST Westbound				UNIVERSITY AVE Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	**1**	0	**1**	**1**	0	0	1	0	0	0	0	0	0	0	0	2
04:15 PM	0	0	0	0	0	0	0	0	0	1	0	1	**2**	0	0	**2**	3
04:30 PM	0	1	0	1	0	**1**	**2**	**3**	**1**	**2**	0	**3**	0	0	0	0	**7**
04:45 PM	0	1	0	1	0	0	1	1	0	1	0	1	1	0	0	1	4
Total Volume	0	3	0	3	1	1	3	5	1	4	0	5	3	0	0	3	16
% App. Total	0	100	0		20	20	60		20	80	0		100	0	0		
PHF	.000	.750	.000	.750	.250	.250	.375	.417	.250	.500	.000	.417	.375	.000	.000	.375	.571

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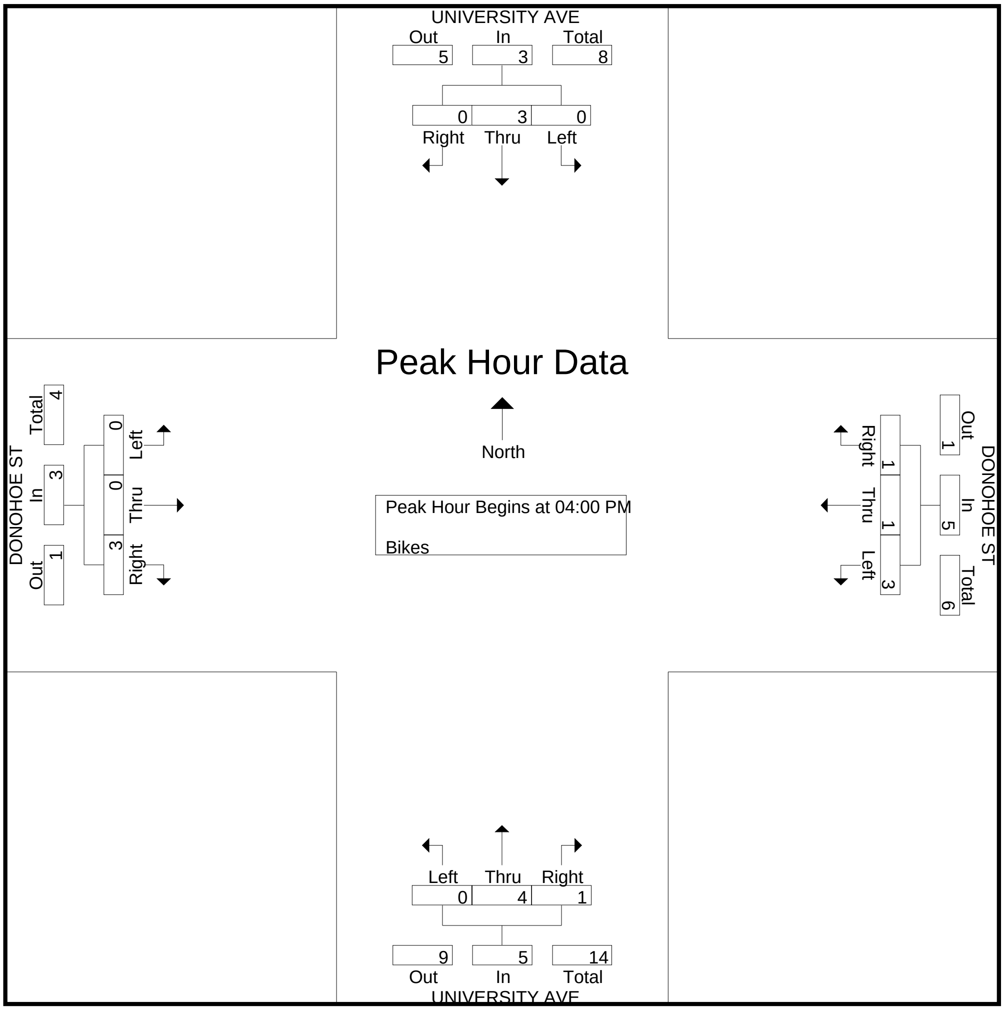

Traffic Data Service

Campbell, CA

(408) 377-2988

tdsbay@cs.com

File Name : 6AM FINAL
Site Code : 00000006
Start Date : 5/7/2015
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Groups Printed- Vehicles

	CAPITOL AVE Southbound					DONOHOE ST Westbound					US-101 NB OFF-RAMP Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	4	4	0	191	0	2	193	25	0	91	0	116	0	99	0	0	99	412
07:15 AM	0	0	0	9	9	0	215	0	0	215	32	0	76	0	108	0	110	0	0	110	442
07:30 AM	0	0	0	1	1	0	271	0	0	271	41	0	79	0	120	0	103	0	0	103	495
07:45 AM	0	0	0	5	5	0	273	0	1	274	38	0	93	1	132	0	119	0	0	119	530
Total	0	0	0	19	19	0	950	0	3	953	136	0	339	1	476	0	431	0	0	431	1879
08:00 AM	0	0	0	9	9	0	237	0	0	237	46	0	107	0	153	0	103	0	0	103	502
08:15 AM	0	0	0	10	10	0	261	0	0	261	31	0	108	0	139	0	119	0	0	119	529
08:30 AM	0	0	0	6	6	0	227	0	0	227	30	0	117	1	148	0	106	0	0	106	487
08:45 AM	0	0	0	8	8	0	190	0	0	190	42	0	123	0	165	0	107	0	0	107	470
Total	0	0	0	33	33	0	915	0	0	915	149	0	455	1	605	0	435	0	0	435	1988
Grand Total	0	0	0	52	52	0	1865	0	3	1868	285	0	794	2	1081	0	866	0	0	866	3867
Apprch %	0	0	0	100		0	99.8	0	0.2		26.4	0	73.5	0.2		0	100	0	0		
Total %	0	0	0	1.3	1.3	0	48.2	0	0.1	48.3	7.4	0	20.5	0.1	28	0	22.4	0	0	22.4	

	CAPITOL AVE Southbound				DONOHOE ST Westbound				US-101 NB OFF-RAMP Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	271	0	271	41	0	79	120	0	103	0	103	494
07:45 AM	0	0	0	0	0	**273**	0	**273**	38	0	93	131	0	**119**	0	**119**	**523**
08:00 AM	0	0	0	0	0	237	0	237	**46**	0	107	**153**	0	103	0	103	493
08:15 AM	0	0	0	0	0	261	0	261	31	0	**108**	139	0	119	0	119	519
Total Volume	0	0	0	0	0	1042	0	1042	156	0	387	543	0	444	0	444	2029
% App. Total	0	0	0		0	100	0		28.7	0	71.3		0	100	0		
PHF	.000	.000	.000	.000	.000	.954	.000	.954	.848	.000	.896	.887	.000	.933	.000	.933	.970

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File Name : 6AM FINAL
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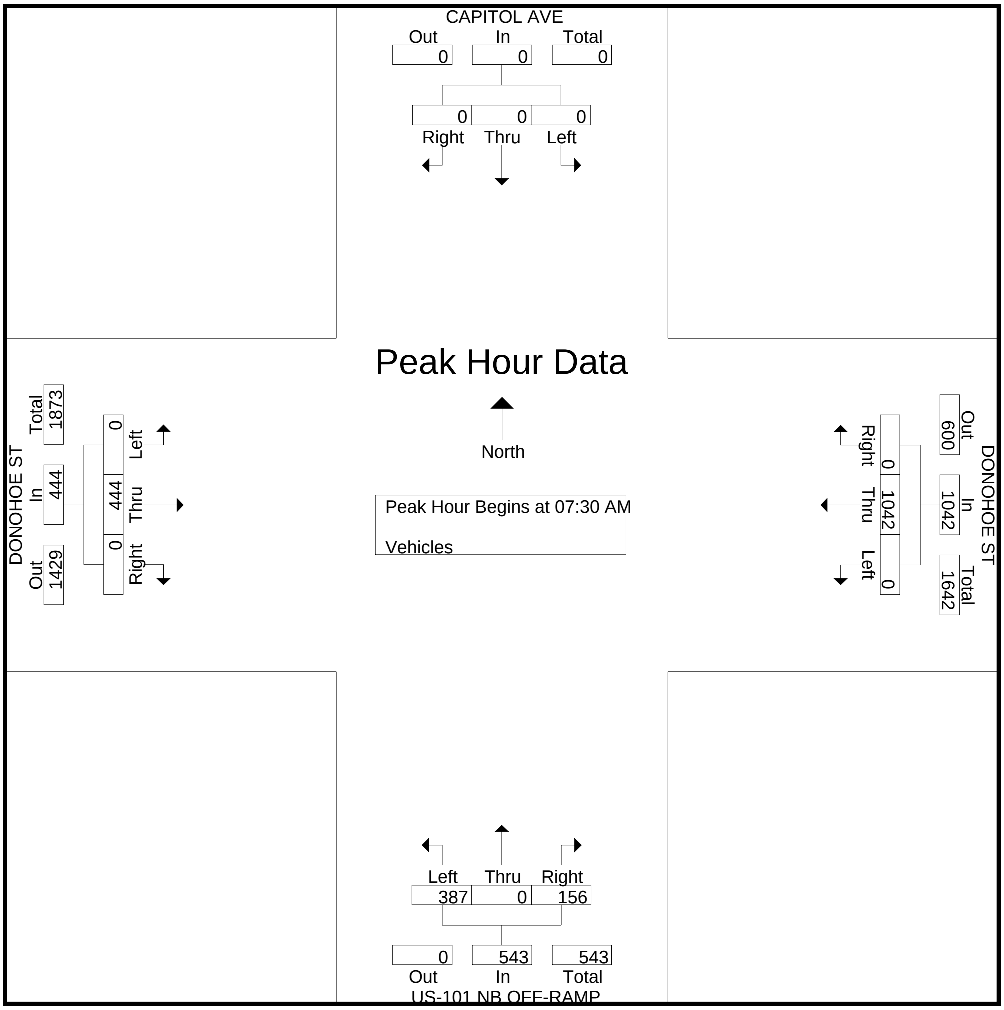

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File Name : 6AM FINAL
Site Code : 00000006
Start Date : 5/7/2015

Groups Printed- Bikes

	CAPITOL AVE Southbound					DONOHOE ST Westbound					US-101 NB OFF-RAMP Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
08:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	2	3
08:30 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Total	0	0	0	0	0	0	4	0	0	4	1	0	0	0	1	1	1	0	0	2	7
Grand Total	0	0	0	0	0	0	4	0	0	4	1	0	0	0	1	1	1	0	0	2	7
Apprch %	0	0	0	0		0	100	0	0		100	0	0	0		50	50	0	0		
Total %	0	0	0	0	0	0	57.1	0	0	57.1	14.3	0	0	0	14.3	14.3	14.3	0	0	28.6	

	CAPITOL AVE Southbound				DONOHOE ST Westbound				US-101 NB OFF-RAMP Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0	2
08:15 AM	0	0	0	0	0	0	0	0	**1**	0	0	**1**	**1**	**1**	0	**2**	**3**
08:30 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
08:45 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
Total Volume	0	0	0	0	0	4	0	4	1	0	0	1	1	1	0	2	7
% App. Total	0	0	0		0	100	0		100	0	0		50	50	0		
PHF	.000	.000	.000	.000	.000	.500	.000	.500	.250	.000	.000	.250	.250	.250	.000	.250	.583

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File Name : 6AM FINAL
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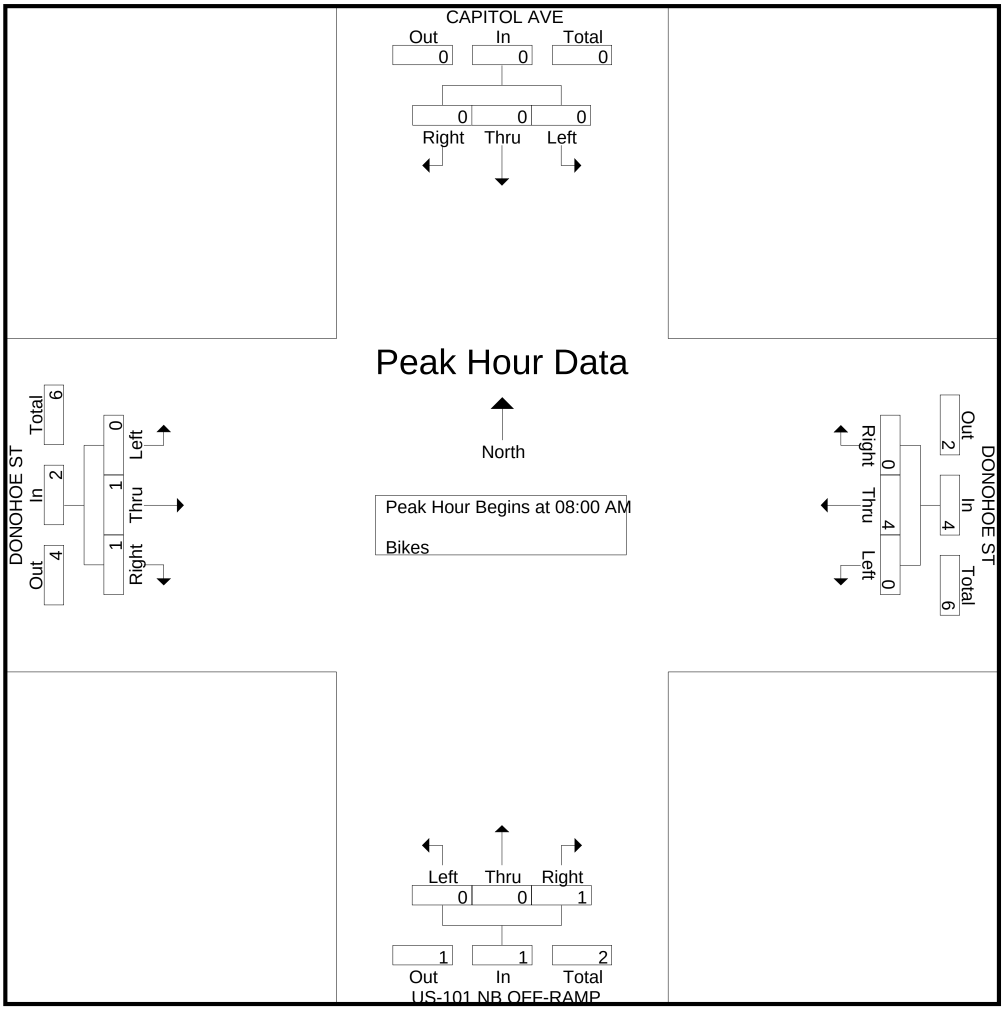

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File Name : 6PM FINAL
Site Code : 00000006
Start Date : 5/7/2015
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Groups Printed- Vehicles

	CAPITOL AVE Southbound					DONOHOE ST Westbound					US-101 NB OFF-RAMP Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	6	6	0	183	0	0	183	155	0	229	1	385	0	206	0	0	206	780
04:15 PM	0	0	0	12	12	0	187	0	0	187	157	0	217	0	374	0	218	0	0	218	791
04:30 PM	0	0	0	8	8	0	159	0	2	161	133	0	183	1	317	0	204	0	0	204	690
04:45 PM	0	0	0	5	5	0	152	0	1	153	168	0	206	0	374	0	225	0	0	225	757
Total	0	0	0	31	31	0	681	0	3	684	613	0	835	2	1450	0	853	0	0	853	3018
05:00 PM	0	0	0	9	9	0	191	0	1	192	140	0	203	0	343	0	225	0	0	225	769
05:15 PM	0	0	0	4	4	0	185	0	0	185	167	0	205	0	372	0	235	0	0	235	796
05:30 PM	0	0	0	5	5	0	159	0	0	159	171	0	243	0	414	0	208	0	0	208	786
05:45 PM	0	0	0	5	5	0	160	0	0	160	154	0	193	0	347	0	238	0	0	238	750
Total	0	0	0	23	23	0	695	0	1	696	632	0	844	0	1476	0	906	0	0	906	3101
Grand Total	0	0	0	54	54	0	1376	0	4	1380	1245	0	1679	2	2926	0	1759	0	0	1759	6119
Apprch %	0	0	0	100		0	99.7	0	0.3		42.5	0	57.4	0.1		0	100	0	0		
Total %	0	0	0	0.9	0.9	0	22.5	0	0.1	22.6	20.3	0	27.4	0	47.8	0	28.7	0	0	28.7	

	CAPITOL AVE Southbound				DONOHOE ST Westbound				US-101 NB OFF-RAMP Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	152	0	152	168	0	206	374	0	225	0	225	751
05:00 PM	0	0	0	0	0	**191**	0	**191**	140	0	203	343	0	225	0	225	759
05:15 PM	0	0	0	0	0	185	0	185	167	0	205	372	0	**235**	0	**235**	**792**
05:30 PM	0	0	0	0	0	159	0	159	**171**	0	**243**	**414**	0	208	0	208	781
Total Volume	0	0	0	0	0	687	0	687	646	0	857	1503	0	893	0	893	3083
% App. Total	0	0	0		0	100	0		43	0	57		0	100	0		
PHF	.000	.000	.000	.000	.000	.899	.000	.899	.944	.000	.882	.908	.000	.950	.000	.950	.973

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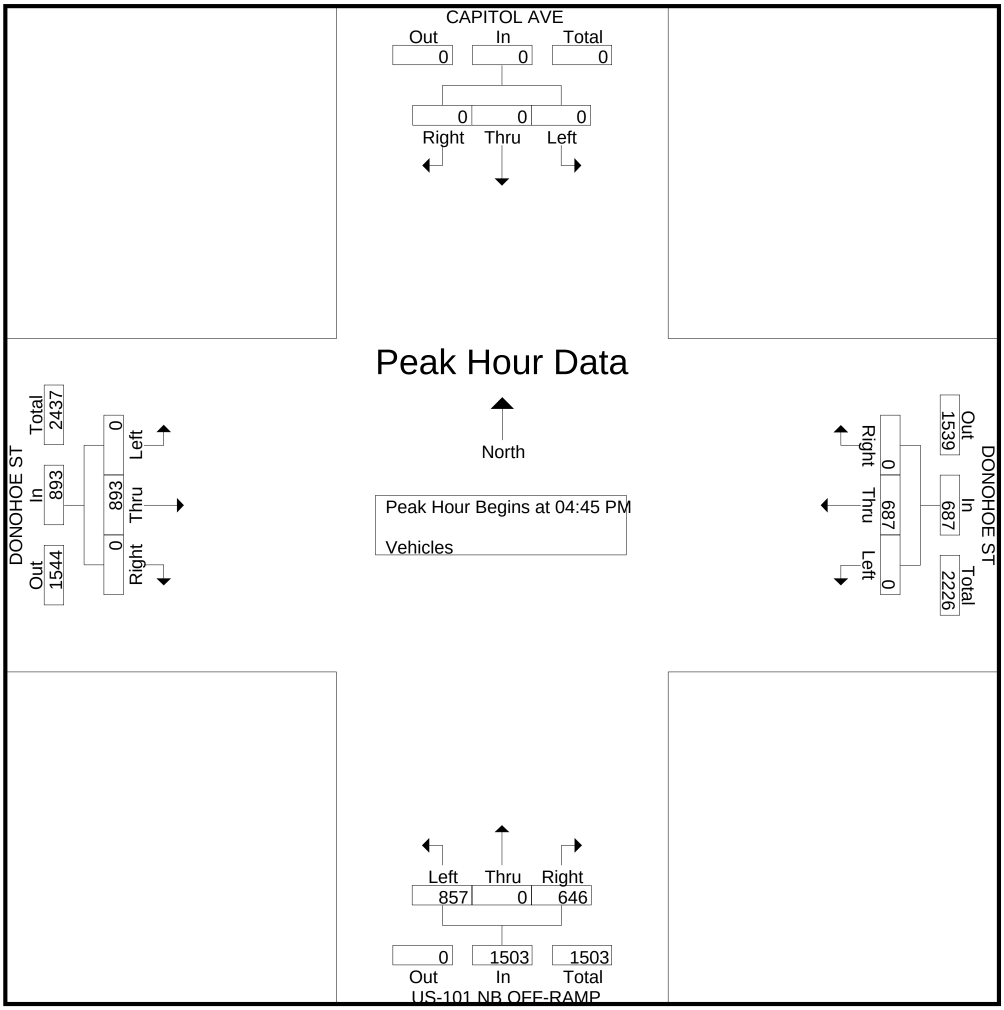

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File Name : 6PM FINAL
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Groups Printed- Bikes

	CAPITOL AVE Southbound					DONOHOE ST Westbound					US-101 NB OFF-RAMP Northbound					DONOHOE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
05:00 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Total	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	4
Grand Total	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	6
Apprch %	0	0	0	0		0	100	0	0		0	0	0	0		0	100	0	0		
Total %	0	0	0	0	0	0	50	0	0	50	0	0	0	0	0	0	50	0	0	50	

	CAPITOL AVE Southbound				DONOHOE ST Westbound				US-101 NB OFF-RAMP Northbound				DONOHOE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	0	0	0	0	**2**	0	**2**	0	0	0	0	0	0	0	0	**2**
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	**1**	0	**1**	2
Total Volume	0	0	0	0	0	3	0	3	0	0	0	0	0	1	0	1	4
% App. Total	0	0	0		0	100	0		0	0	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.375	.000	.375	.000	.000	.000	.000	.000	.250	.000	.250	.500

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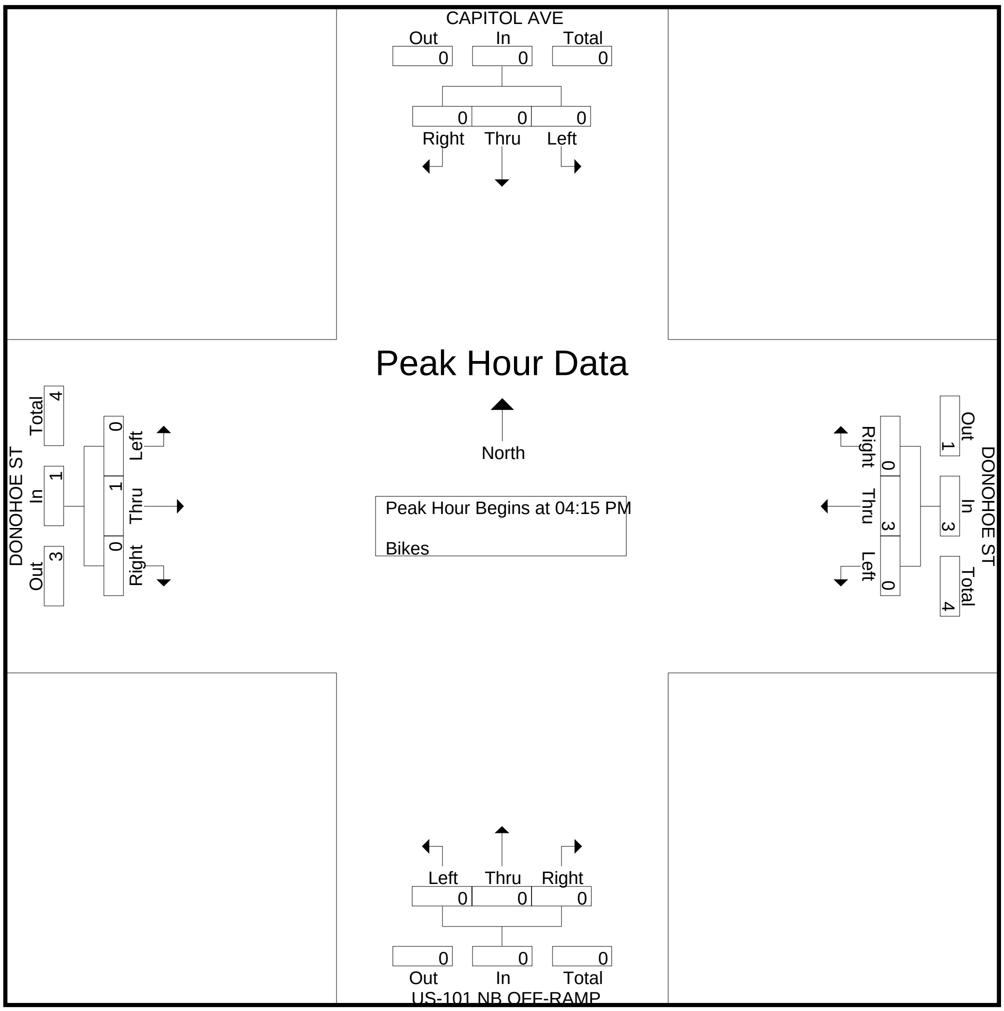

Traffic Data Service

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File Name : 7AM FINAL
Site Code : 00000007
Start Date : 5/5/2015
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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					US-101 SB RAMPS Westbound					UNIVERSITY AVE Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	248	217	0	465	64	0	57	0	121	73	153	0	0	226	0	0	0	0	0	812
07:15 AM	0	318	236	0	554	61	0	62	0	123	98	174	0	0	272	0	0	0	0	0	949
07:30 AM	0	326	238	0	564	70	0	72	0	142	97	183	0	0	280	0	0	0	0	0	986
07:45 AM	0	340	237	0	577	80	0	95	0	175	97	288	0	0	385	0	0	0	0	0	1137
Total	0	1232	928	0	2160	275	0	286	0	561	365	798	0	0	1163	0	0	0	0	0	3884
08:00 AM	0	365	201	0	566	66	0	96	0	162	130	252	0	0	382	0	0	0	0	0	1110
08:15 AM	0	404	192	0	596	64	0	72	0	136	116	219	0	0	335	0	0	0	0	0	1067
08:30 AM	0	365	211	0	576	64	0	97	0	161	110	173	0	0	283	0	0	0	0	0	1020
08:45 AM	0	309	222	0	531	65	0	76	0	141	81	180	0	0	261	0	0	0	0	0	933
Total	0	1443	826	0	2269	259	0	341	0	600	437	824	0	0	1261	0	0	0	0	0	4130
Grand Total	0	2675	1754	0	4429	534	0	627	0	1161	802	1622	0	0	2424	0	0	0	0	0	8014
Apprch %	0	60.4	39.6	0		46	0	54	0		33.1	66.9	0	0		0	0	0	0		
Total %	0	33.4	21.9	0	55.3	6.7	0	7.8	0	14.5	10	20.2	0	0	30.2	0	0	0	0	0	

	UNIVERSITY AVE Southbound				US-101 SB RAMPS Westbound				UNIVERSITY AVE Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	340	**237**	577	**80**	0	95	**175**	97	**288**	0	**385**	0	0	0	0	**1137**
08:00 AM	0	365	201	566	66	0	96	162	**130**	252	0	382	0	0	0	0	1110
08:15 AM	0	**404**	192	**596**	64	0	72	136	116	219	0	335	0	0	0	0	1067
08:30 AM	0	365	211	576	64	0	**97**	161	110	173	0	283	0	0	0	0	1020
Total Volume	0	1474	841	2315	274	0	360	634	453	932	0	1385	0	0	0	0	4334
% App. Total	0	63.7	36.3		43.2	0	56.8		32.7	67.3	0		0	0	0		
PHF	.000	.912	.887	.971	.856	.000	.928	.906	.871	.809	.000	.899	.000	.000	.000	.000	.953

Traffic Data Service

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File Name : 7AM FINAL
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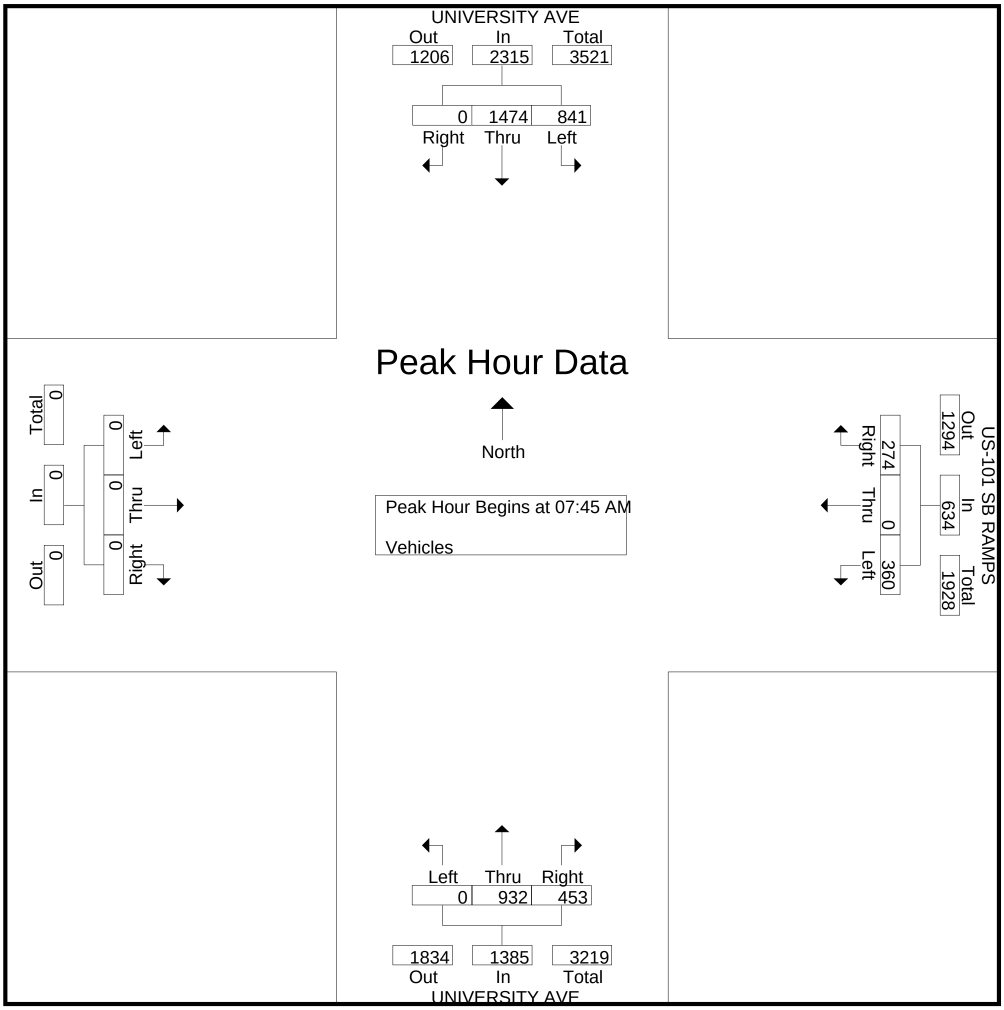

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File Name : 7AM FINAL
Site Code : 00000007
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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					US-101 SB RAMPS Westbound					UNIVERSITY AVE Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
07:30 AM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
07:45 AM	0	4	0	0	4	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	5
Total	0	7	0	0	7	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	10
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
08:30 AM	0	1	0	0	1	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	6
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
Total	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	8
Grand Total	0	8	0	0	8	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	18
Apprch %	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
Total %	0	44.4	0	0	44.4	0	0	0	0	0	0	55.6	0	0	55.6	0	0	0	0	0	

	UNIVERSITY AVE Southbound				US-101 SB RAMPS Westbound				UNIVERSITY AVE Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	**4**	0	**4**	0	0	0	0	0	1	0	1	0	0	0	0	5
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
08:30 AM	0	1	0	1	0	0	0	0	0	**5**	0	**5**	0	0	0	0	**6**
Total Volume	0	5	0	5	0	0	0	0	0	7	0	7	0	0	0	0	12
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.313	.000	.313	.000	.000	.000	.000	.000	.350	.000	.350	.000	.000	.000	.000	.500

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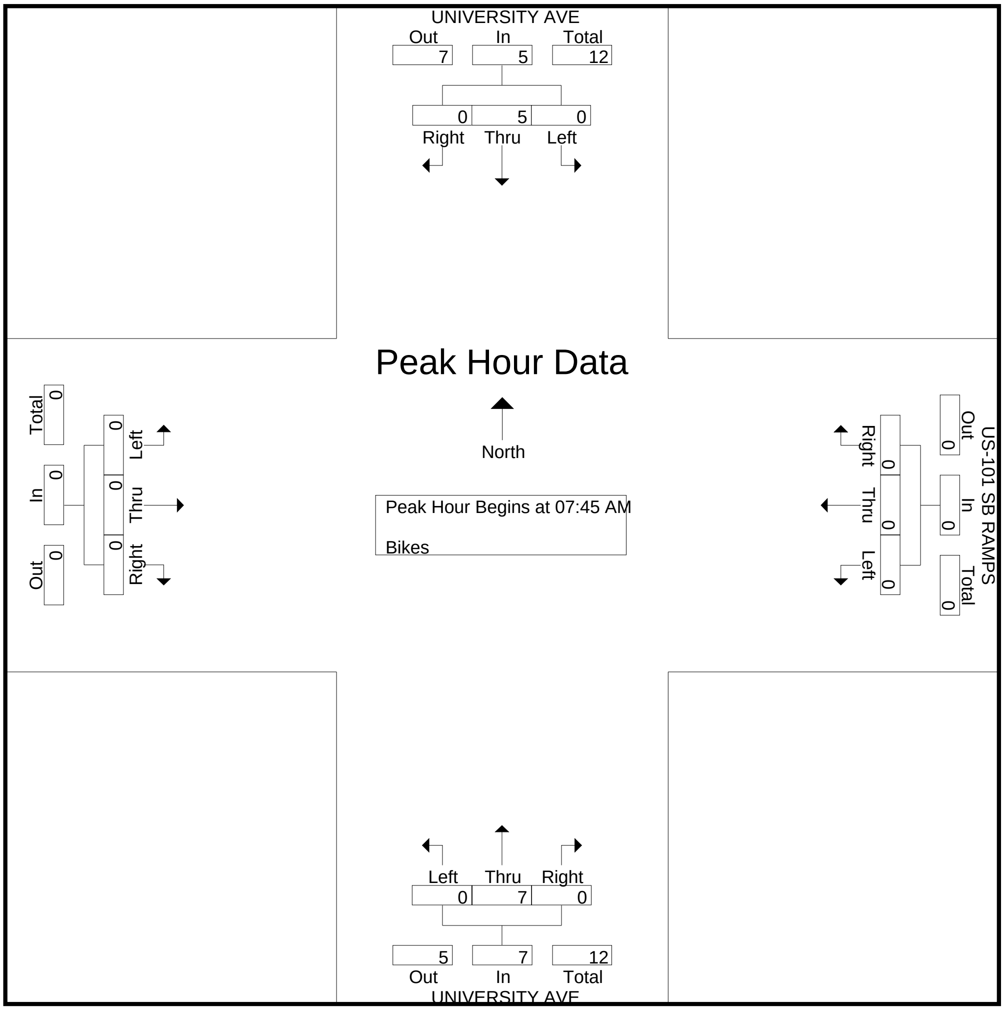

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File Name : 7PM FINAL
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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					US-101 SB RAMPS Westbound					UNIVERSITY AVE Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	212	117	0	329	166	0	80	2	248	100	294	1	0	395	0	0	0	0	0	972
04:15 PM	0	189	109	0	298	183	0	72	0	255	99	306	0	0	405	0	0	0	0	0	958
04:30 PM	0	225	144	0	369	170	0	70	0	240	93	336	0	0	429	0	0	0	0	0	1038
04:45 PM	0	206	113	0	319	188	0	80	1	269	82	332	0	0	414	0	0	0	0	0	1002
Total	0	832	483	0	1315	707	0	302	3	1012	374	1268	1	0	1643	0	0	0	0	0	3970
05:00 PM	0	182	118	0	300	206	0	65	0	271	64	296	0	0	360	0	0	0	0	0	931
05:15 PM	0	193	121	0	314	182	0	79	0	261	86	346	0	0	432	0	0	0	0	0	1007
05:30 PM	0	196	147	0	343	187	0	66	0	253	74	286	0	0	360	0	0	0	0	0	956
05:45 PM	0	198	120	0	318	172	0	60	0	232	76	329	0	0	405	0	0	0	0	0	955
Total	0	769	506	0	1275	747	0	270	0	1017	300	1257	0	0	1557	0	0	0	0	0	3849
Grand Total	0	1601	989	0	2590	1454	0	572	3	2029	674	2525	1	0	3200	0	0	0	0	0	7819
Apprch %	0	61.8	38.2	0		71.7	0	28.2	0.1		21.1	78.9	0	0		0	0	0	0		
Total %	0	20.5	12.6	0	33.1	18.6	0	7.3	0	25.9	8.6	32.3	0	0	40.9	0	0	0	0	0	

	UNIVERSITY AVE Southbound				US-101 SB RAMPS Westbound				UNIVERSITY AVE Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	**225**	**144**	**369**	170	0	70	240	**93**	336	0	429	0	0	0	0	**1038**
04:45 PM	0	206	113	319	188	0	**80**	268	82	332	0	414	0	0	0	0	1001
05:00 PM	0	182	118	300	**206**	0	65	**271**	64	296	0	360	0	0	0	0	931
05:15 PM	0	193	121	314	182	0	79	261	86	**346**	0	**432**	0	0	0	0	1007
Total Volume	0	806	496	1302	746	0	294	1040	325	1310	0	1635	0	0	0	0	3977
% App. Total	0	61.9	38.1		71.7	0	28.3		19.9	80.1	0		0	0	0		
PHF	.000	.896	.861	.882	.905	.000	.919	.959	.874	.947	.000	.946	.000	.000	.000	.000	.958

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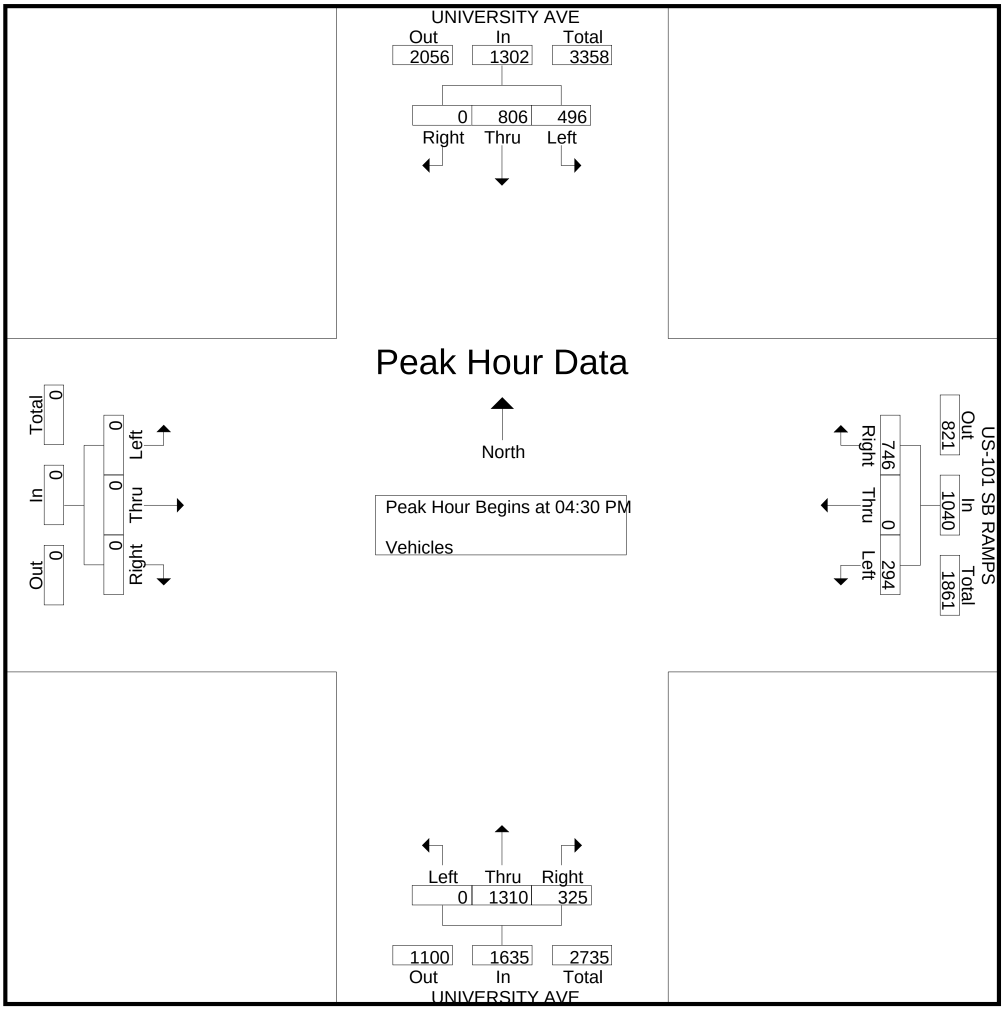

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File Name : 7PM FINAL
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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					US-101 SB RAMPS Westbound					UNIVERSITY AVE Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
04:15 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	3
04:45 PM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	4
Total	0	5	0	0	5	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	11
05:00 PM	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	6
05:15 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
05:45 PM	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	5
Total	0	9	0	0	9	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	16
Grand Total	0	14	0	0	14	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	27
Apprch %	0	100	0	0		0	0	0	0		0	100	0	0		0	0	0	0		
Total %	0	51.9	0	0	51.9	0	0	0	0	0	0	48.1	0	0	48.1	0	0	0	0	0	

	UNIVERSITY AVE Southbound				US-101 SB RAMPS Westbound				UNIVERSITY AVE Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	0	0	0	0	**3**	0	**3**	0	0	0	0	3
04:45 PM	0	2	0	2	0	0	0	0	0	2	0	2	0	0	0	0	4
05:00 PM	0	**4**	0	**4**	0	0	0	0	0	2	0	2	0	0	0	0	**6**
05:15 PM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
Total Volume	0	7	0	7	0	0	0	0	0	9	0	9	0	0	0	0	16
% App. Total	0	100	0		0	0	0		0	100	0		0	0	0		
PHF	.000	.438	.000	.438	.000	.000	.000	.000	.000	.750	.000	.750	.000	.000	.000	.000	.667

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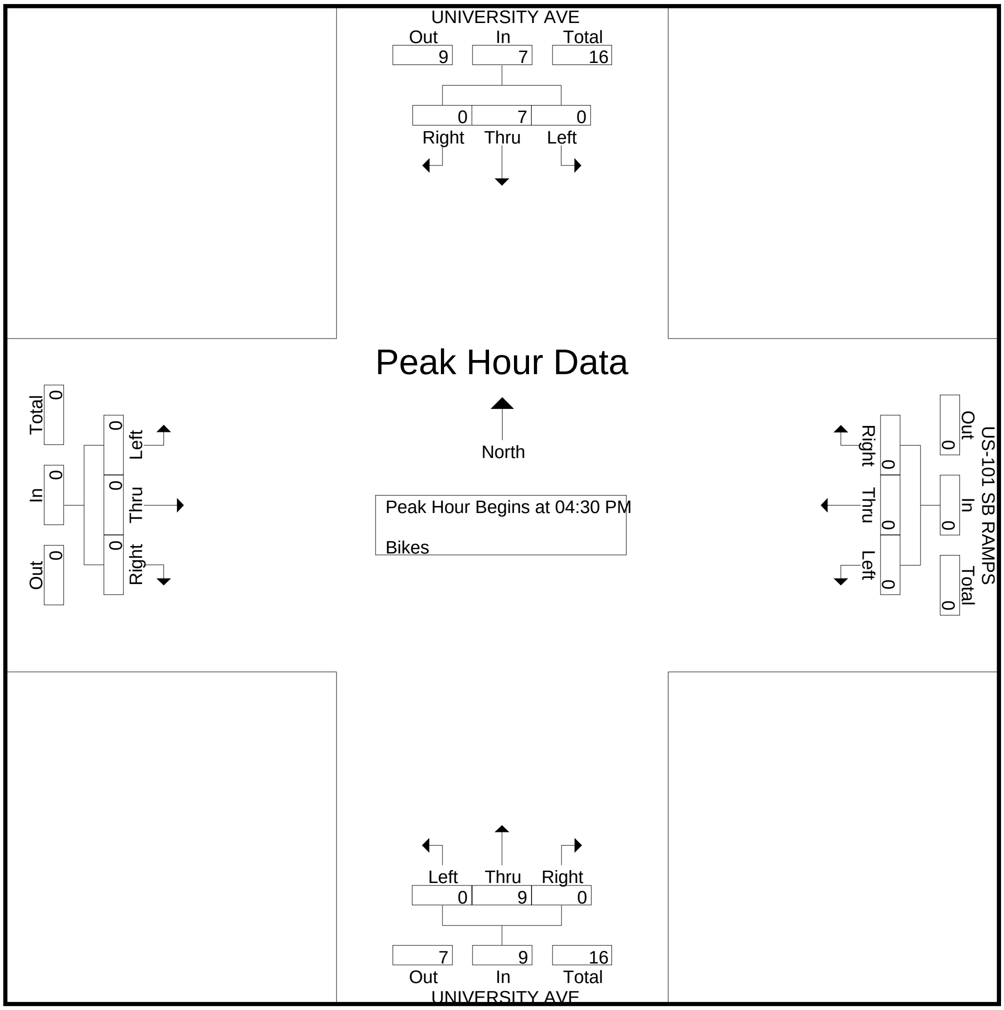

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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					WOODLAND AVE Westbound					UNIVERSITY AVE Northbound					WOODLAND AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	71	214	31	0	316	67	20	6	2	95	3	81	4	7	95	2	11	74	9	96	602
07:15 AM	105	233	52	0	390	76	23	10	1	110	2	125	9	12	148	8	19	78	3	108	756
07:30 AM	91	263	54	0	408	76	19	6	1	102	4	130	10	5	149	7	13	81	4	105	764
07:45 AM	111	271	50	0	432	116	20	6	1	143	7	175	9	10	201	6	15	96	1	118	894
Total	378	981	187	0	1546	335	82	28	5	450	16	511	32	34	593	23	58	329	17	427	3016
08:00 AM	155	213	51	0	419	85	21	4	0	110	6	177	13	22	218	12	14	112	0	138	885
08:15 AM	151	230	55	0	436	65	32	5	0	102	4	156	7	7	174	16	22	89	4	131	843
08:30 AM	116	258	55	0	429	45	14	4	0	63	2	137	6	12	157	10	33	95	8	146	795
08:45 AM	97	226	55	0	378	53	22	5	0	80	5	139	17	9	170	15	16	63	6	100	728
Total	519	927	216	0	1662	248	89	18	0	355	17	609	43	50	719	53	85	359	18	515	3251
Grand Total	897	1908	403	0	3208	583	171	46	5	805	33	1120	75	84	1312	76	143	688	35	942	6267
Apprch %	28	59.5	12.6	0		72.4	21.2	5.7	0.6		2.5	85.4	5.7	6.4		8.1	15.2	73	3.7		
Total %	14.3	30.4	6.4	0	51.2	9.3	2.7	0.7	0.1	12.8	0.5	17.9	1.2	1.3	20.9	1.2	2.3	11	0.6	15	

	UNIVERSITY AVE Southbound				WOODLAND AVE Westbound				UNIVERSITY AVE Northbound				WOODLAND AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	111	**271**	50	432	**116**	20	**6**	**142**	**7**	175	9	191	6	15	96	117	**882**
08:00 AM	**155**	213	51	419	85	21	4	110	6	**177**	**13**	**196**	12	14	**112**	**138**	863
08:15 AM	151	230	**55**	**436**	65	**32**	5	102	4	156	7	167	**16**	22	89	127	832
08:30 AM	116	258	55	429	45	14	4	63	2	137	6	145	10	**33**	95	138	775
Total Volume	533	972	211	1716	311	87	19	417	19	645	35	699	44	84	392	520	3352
% App. Total	31.1	56.6	12.3		74.6	20.9	4.6		2.7	92.3	5		8.5	16.2	75.4		
PHF	.860	.897	.959	.984	.670	.680	.792	.734	.679	.911	.673	.892	.688	.636	.875	.942	.950

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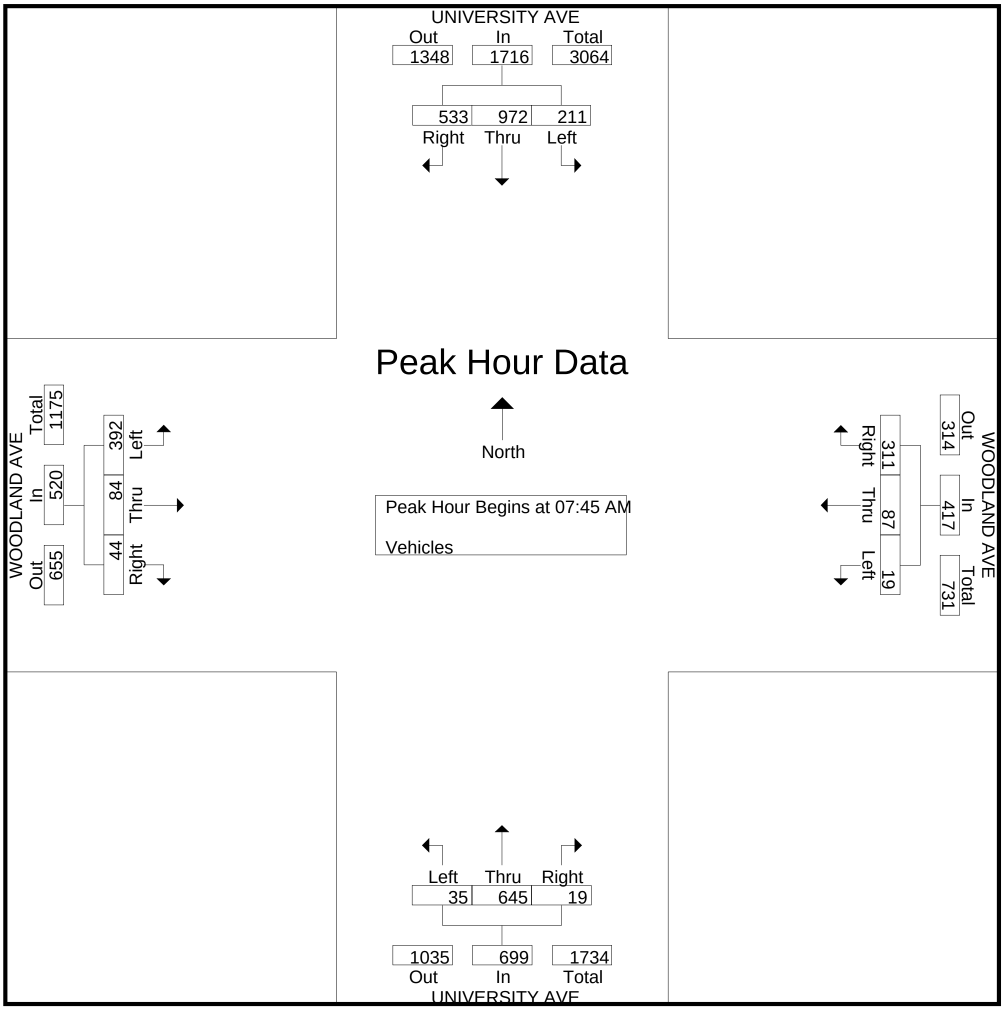

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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					WOODLAND AVE Westbound					UNIVERSITY AVE Northbound					WOODLAND AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
07:15 AM	0	0	0	0	0	1	1	0	0	2	0	1	1	0	2	0	0	0	0	0	4
07:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	1	0	0	2	3
07:45 AM	0	1	0	0	1	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	4
Total	0	1	0	0	1	1	2	1	0	4	0	2	3	0	5	1	1	0	0	2	12
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	3
08:30 AM	0	0	0	0	0	1	0	0	0	1	0	2	1	0	3	0	1	0	0	1	5
08:45 AM	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	1	0	0	1	3
Total	0	0	0	0	0	1	1	4	0	6	0	2	1	0	3	0	2	0	0	2	11
Grand Total	0	1	0	0	1	2	3	5	0	10	0	4	4	0	8	1	3	0	0	4	23
Apprch %	0	100	0	0		20	30	50	0		0	50	50	0		25	75	0	0		
Total %	0	4.3	0	0	4.3	8.7	13	21.7	0	43.5	0	17.4	17.4	0	34.8	4.3	13	0	0	17.4	

	UNIVERSITY AVE Southbound				WOODLAND AVE Westbound				UNIVERSITY AVE Northbound				WOODLAND AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	**1**	1	0	0	0	0	1
07:15 AM	0	0	0	0	**1**	**1**	0	**2**	0	**1**	1	**2**	0	0	0	0	**4**
07:30 AM	0	0	0	0	0	0	**1**	1	0	0	0	0	**1**	**1**	0	**2**	3
07:45 AM	0	**1**	0	**1**	0	1	0	1	0	1	1	2	0	0	0	0	4
Total Volume	0	1	0	1	1	2	1	4	0	2	3	5	1	1	0	2	12
% App. Total	0	100	0		25	50	25		0	40	60		50	50	0		
PHF	.000	.250	.000	.250	.250	.500	.250	.500	.000	.500	.750	.625	.250	.250	.000	.250	.750

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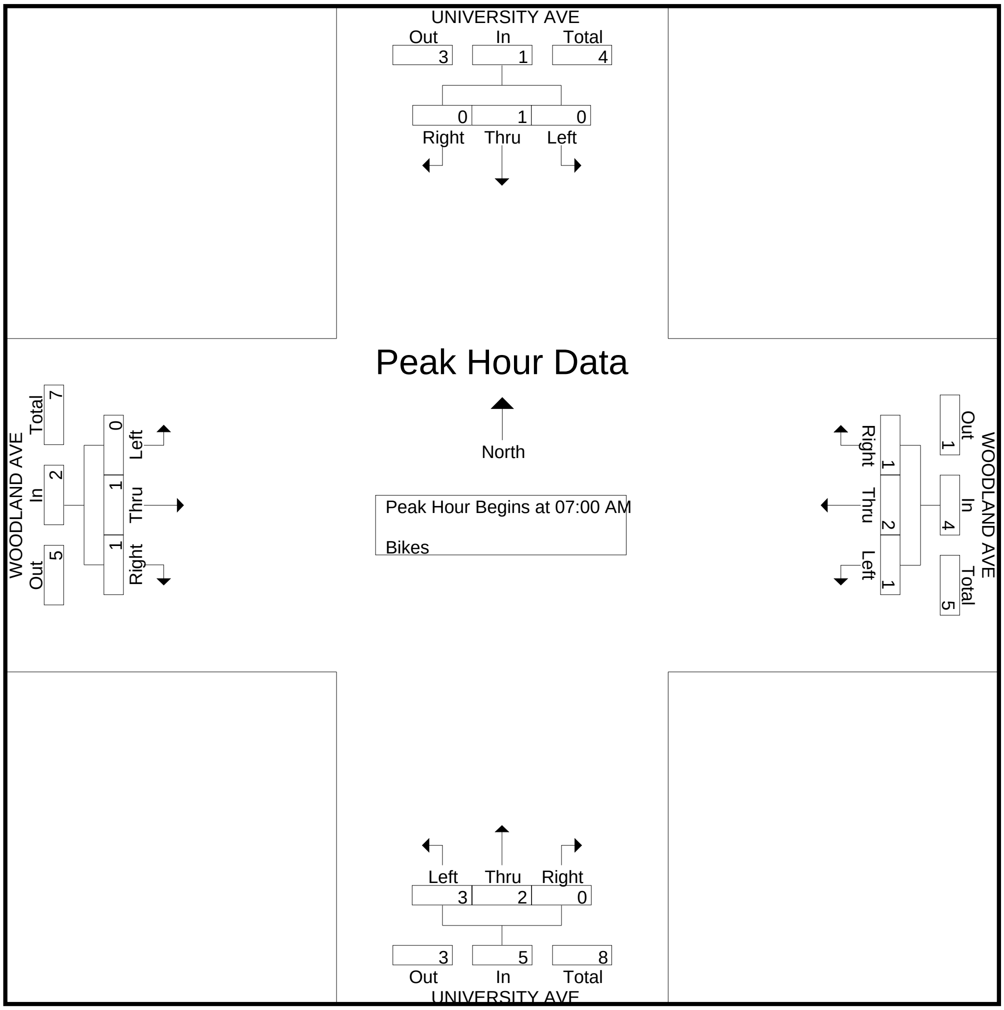

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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					WOODLAND AVE Westbound					UNIVERSITY AVE Northbound					WOODLAND AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	80	130	70	0	280	77	20	4	0	101	6	187	11	12	216	17	22	132	4	175	772
04:15 PM	68	156	50	0	274	74	16	3	0	93	5	221	3	17	246	13	20	93	14	140	753
04:30 PM	86	150	45	0	281	87	25	4	2	118	3	200	6	18	227	10	20	121	9	160	786
04:45 PM	83	168	44	0	295	80	12	2	4	98	4	226	8	11	249	9	30	93	10	142	784
Total	317	604	209	0	1130	318	73	13	6	410	18	834	28	58	938	49	92	439	37	617	3095
05:00 PM	76	119	53	0	248	92	24	2	0	118	3	153	14	6	176	15	28	134	10	187	729
05:15 PM	86	146	33	0	265	98	25	2	2	127	6	203	4	14	227	20	23	115	10	168	787
05:30 PM	92	131	38	0	261	91	26	5	0	122	2	168	10	9	189	16	44	115	7	182	754
05:45 PM	95	144	31	0	270	106	23	4	0	133	3	175	10	4	192	10	34	108	10	162	757
Total	349	540	155	0	1044	387	98	13	2	500	14	699	38	33	784	61	129	472	37	699	3027
Grand Total	666	1144	364	0	2174	705	171	26	8	910	32	1533	66	91	1722	110	221	911	74	1316	6122
Apprch %	30.6	52.6	16.7	0		77.5	18.8	2.9	0.9		1.9	89	3.8	5.3		8.4	16.8	69.2	5.6		
Total %	10.9	18.7	5.9	0	35.5	11.5	2.8	0.4	0.1	14.9	0.5	25	1.1	1.5	28.1	1.8	3.6	14.9	1.2	21.5	

	UNIVERSITY AVE Southbound				WOODLAND AVE Westbound				UNIVERSITY AVE Northbound				WOODLAND AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	80	130	**70**	280	77	20	**4**	101	**6**	187	**11**	204	**17**	22	**132**	**171**	756
04:15 PM	68	156	50	274	74	16	3	93	5	221	3	229	13	20	93	126	722
04:30 PM	**86**	150	45	281	**87**	**25**	4	**116**	3	200	6	209	10	20	121	151	757
04:45 PM	83	**168**	44	**295**	80	12	2	94	4	**226**	8	**238**	9	**30**	93	132	**759**
Total Volume	317	604	209	1130	318	73	13	404	18	834	28	880	49	92	439	580	2994
% App. Total	28.1	53.5	18.5		78.7	18.1	3.2		2	94.8	3.2		8.4	15.9	75.7		
PHF	.922	.899	.746	.958	.914	.730	.813	.871	.750	.923	.636	.924	.721	.767	.831	.848	.986

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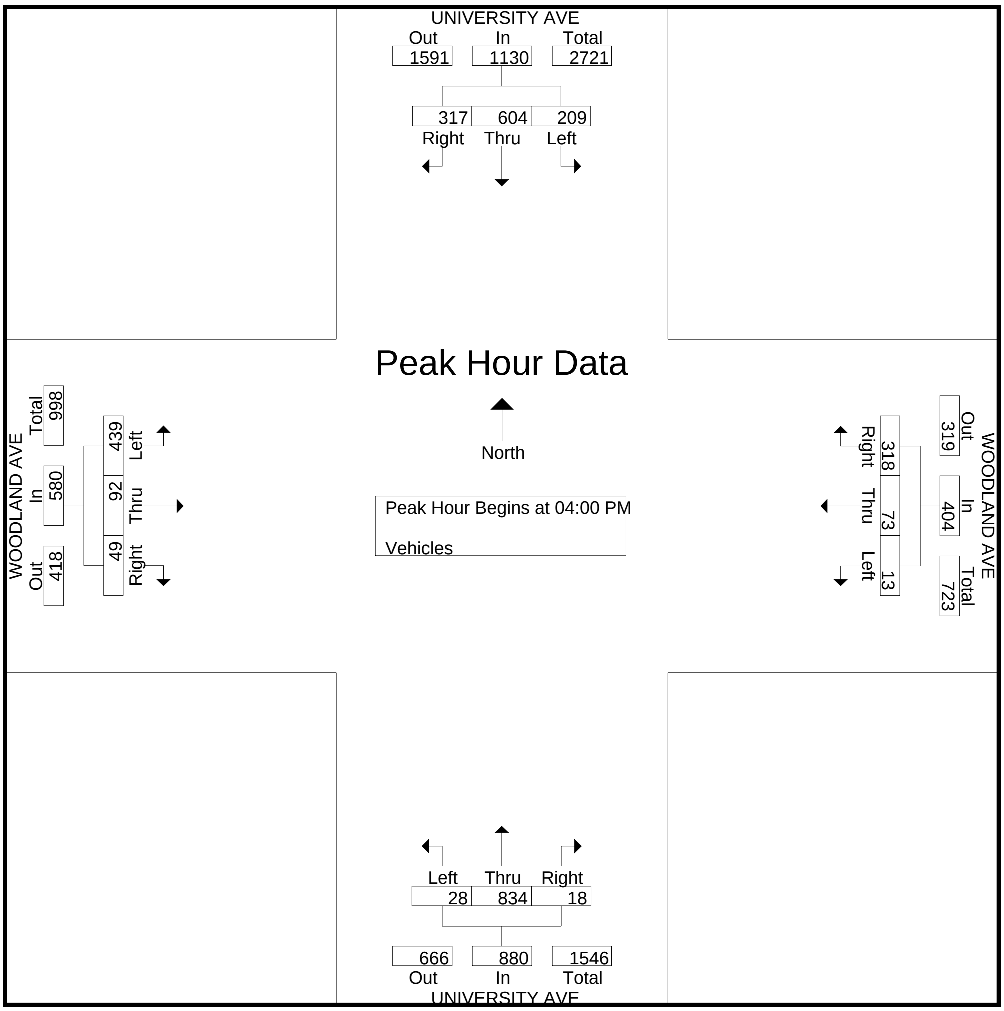

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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					WOODLAND AVE Westbound					UNIVERSITY AVE Northbound					WOODLAND AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
04:15 PM	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	2
04:30 PM	0	0	1	0	1	0	0	2	0	2	2	1	0	0	3	0	0	0	0	0	6
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
Total	0	1	1	0	2	0	1	2	0	3	2	6	0	0	8	0	1	0	0	1	14
05:00 PM	0	4	1	0	5	1	0	0	0	1	2	1	0	0	3	2	0	0	0	2	11
05:15 PM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	1	0	1	0	2	4
05:30 PM	1	1	0	0	2	0	0	1	0	1	1	1	0	0	2	2	0	0	0	2	7
05:45 PM	0	0	0	0	0	1	0	0	0	1	2	1	1	0	4	0	0	0	0	0	5
Total	1	5	1	0	7	2	1	1	0	4	6	3	1	0	10	5	0	1	0	6	27
Grand Total	1	6	2	0	9	2	2	3	0	7	8	9	1	0	18	5	1	1	0	7	41
Apprch %	11.1	66.7	22.2	0		28.6	28.6	42.9	0		44.4	50	5.6	0		71.4	14.3	14.3	0		
Total %	2.4	14.6	4.9	0	22	4.9	4.9	7.3	0	17.1	19.5	22	2.4	0	43.9	12.2	2.4	2.4	0	17.1	

	UNIVERSITY AVE Southbound				WOODLAND AVE Westbound				UNIVERSITY AVE Northbound				WOODLAND AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**4**	**1**	**5**	**1**	0	0	**1**	**2**	**1**	0	3	**2**	0	0	**2**	**11**
05:15 PM	0	0	0	0	0	**1**	0	1	1	0	0	1	1	0	**1**	2	4
05:30 PM	**1**	1	0	2	0	0	**1**	1	1	1	0	2	2	0	0	2	7
05:45 PM	0	0	0	0	1	0	0	1	2	1	**1**	**4**	0	0	0	0	5
Total Volume	1	5	1	7	2	1	1	4	6	3	1	10	5	0	1	6	27
% App. Total	14.3	71.4	14.3		50	25	25		60	30	10		83.3	0	16.7		
PHF	.250	.313	.250	.350	.500	.250	.250	1.00	.750	.750	.250	.625	.625	.000	.250	.750	.614

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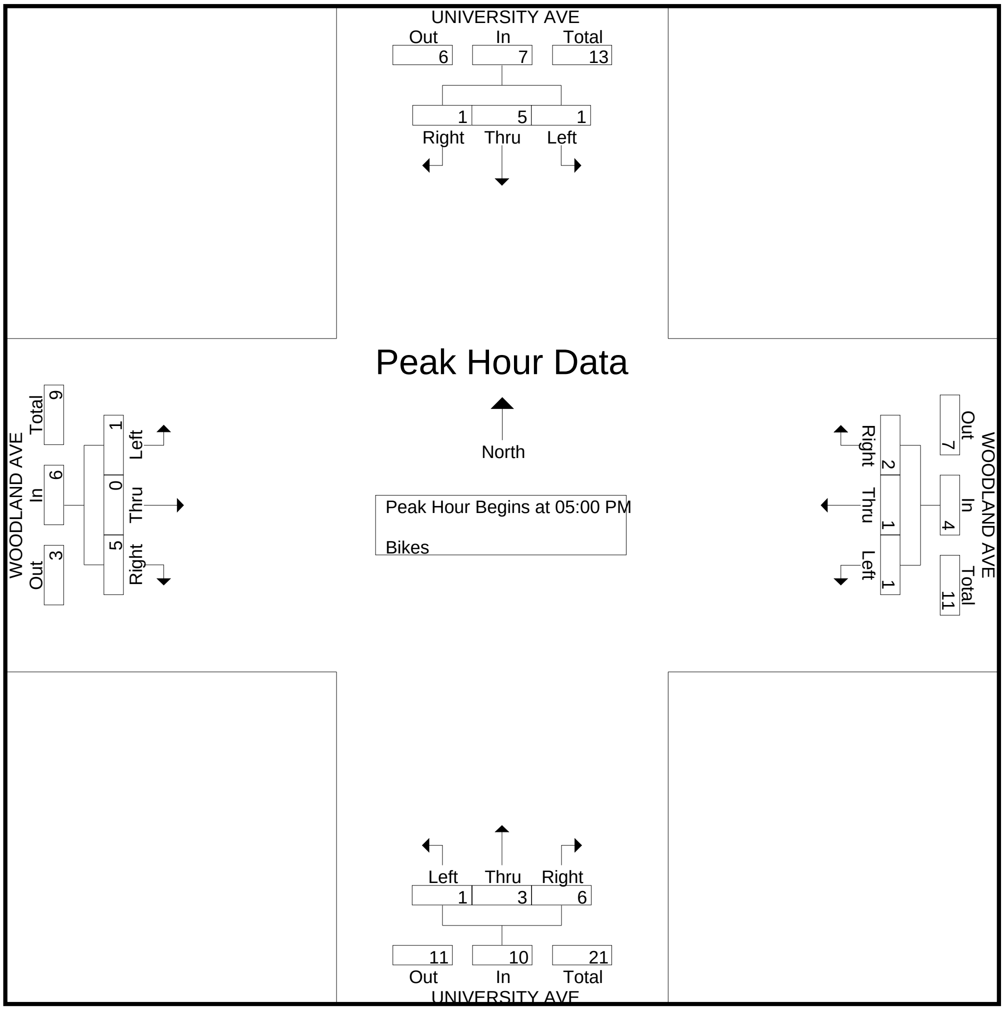

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File Name : 9AM FINAL
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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					MIDDLEFIELD RD Westbound					UNIVERSITY AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	31	128	30	0	189	5	21	3	1	30	4	43	4	0	51	7	38	10	0	55	325
07:15 AM	28	110	18	0	156	15	31	4	1	51	2	38	6	1	47	16	50	27	1	94	348
07:30 AM	31	130	27	2	190	6	43	1	4	54	4	76	6	0	86	10	65	22	6	103	433
07:45 AM	30	142	32	0	204	12	55	3	6	76	9	71	11	0	91	9	101	25	3	138	509
Total	120	510	107	2	739	38	150	11	12	211	19	228	27	1	275	42	254	84	10	390	1615
08:00 AM	25	111	30	3	169	18	52	4	3	77	4	66	9	1	80	13	103	25	2	143	469
08:15 AM	45	121	29	2	197	18	56	8	6	88	7	61	7	0	75	13	73	31	16	133	493
08:30 AM	32	133	28	0	193	12	68	13	2	95	6	53	2	2	63	23	76	32	3	134	485
08:45 AM	41	132	26	0	199	17	64	9	3	93	8	60	7	0	75	18	100	22	8	148	515
Total	143	497	113	5	758	65	240	34	14	353	25	240	25	3	293	67	352	110	29	558	1962
Grand Total	263	1007	220	7	1497	103	390	45	26	564	44	468	52	4	568	109	606	194	39	948	3577
Apprch %	17.6	67.3	14.7	0.5		18.3	69.1	8	4.6		7.7	82.4	9.2	0.7		11.5	63.9	20.5	4.1		
Total %	7.4	28.2	6.2	0.2	41.9	2.9	10.9	1.3	0.7	15.8	1.2	13.1	1.5	0.1	15.9	3	16.9	5.4	1.1	26.5	

	UNIVERSITY AVE Southbound				MIDDLEFIELD RD Westbound				UNIVERSITY AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	25	111	**30**	166	**18**	52	4	74	4	**66**	**9**	**79**	13	**103**	25	**141**	460
08:15 AM	**45**	121	29	195	18	56	8	82	7	61	7	75	13	73	31	117	469
08:30 AM	32	**133**	28	193	12	**68**	**13**	**93**	6	53	2	61	**23**	76	**32**	131	478
08:45 AM	41	132	26	**199**	17	64	9	90	**8**	60	7	75	18	100	22	140	**504**
Total Volume	143	497	113	753	65	240	34	339	25	240	25	290	67	352	110	529	1911
% App. Total	19	66	15		19.2	70.8	10		8.6	82.8	8.6		12.7	66.5	20.8		
PHF	.794	.934	.942	.946	.903	.882	.654	.911	.781	.909	.694	.918	.728	.854	.859	.938	.948

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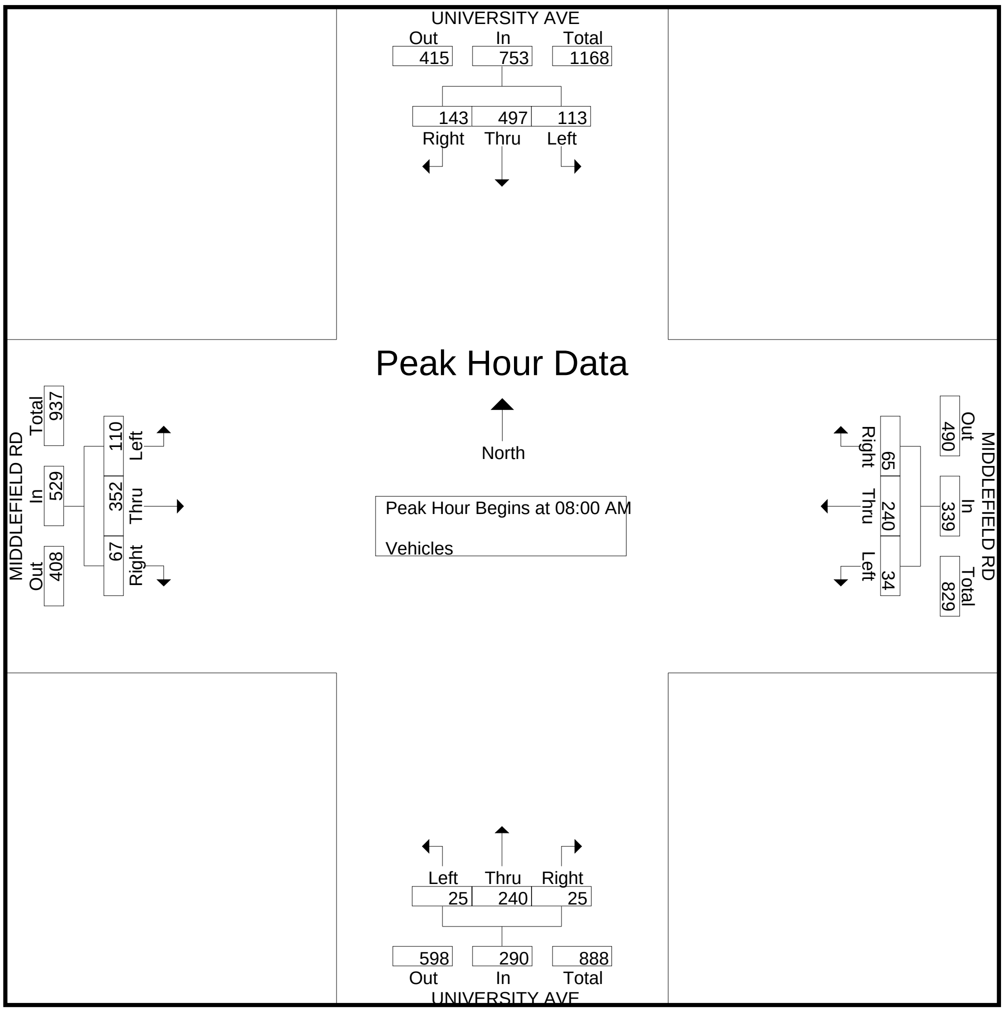

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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					MIDDLEFIELD RD Westbound					UNIVERSITY AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
07:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:30 AM	0	2	0	0	2	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	4
07:45 AM	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	4
Total	0	9	0	0	9	0	1	0	0	1	1	0	0	0	1	0	1	0	0	1	12
08:00 AM	0	7	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
08:15 AM	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7	10
08:30 AM	0	7	0	0	7	0	2	1	0	3	1	2	0	0	3	1	0	2	0	3	16
08:45 AM	1	6	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7
Total	1	22	0	0	23	0	3	1	0	4	1	2	0	0	3	1	7	2	0	10	40
Grand Total	1	31	0	0	32	0	4	1	0	5	2	2	0	0	4	1	8	2	0	11	52
Apprch %	3.1	96.9	0	0		0	80	20	0		50	50	0	0		9.1	72.7	18.2	0		
Total %	1.9	59.6	0	0	61.5	0	7.7	1.9	0	9.6	3.8	3.8	0	0	7.7	1.9	15.4	3.8	0	21.2	

	UNIVERSITY AVE Southbound				MIDDLEFIELD RD Westbound				UNIVERSITY AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	**7**	0	**7**	0	0	0	0	0	0	0	0	0	0	0	0	7
08:15 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	**7**	0	**7**	10
08:30 AM	0	7	0	7	0	**2**	**1**	**3**	**1**	**2**	0	**3**	**1**	0	**2**	3	**16**
08:45 AM	**1**	6	0	7	0	0	0	0	0	0	0	0	0	0	0	0	7
Total Volume	1	22	0	23	0	3	1	4	1	2	0	3	1	7	2	10	40
% App. Total	4.3	95.7	0		0	75	25		33.3	66.7	0		10	70	20		
PHF	.250	.786	.000	.821	.000	.375	.250	.333	.250	.250	.000	.250	.250	.250	.250	.357	.625

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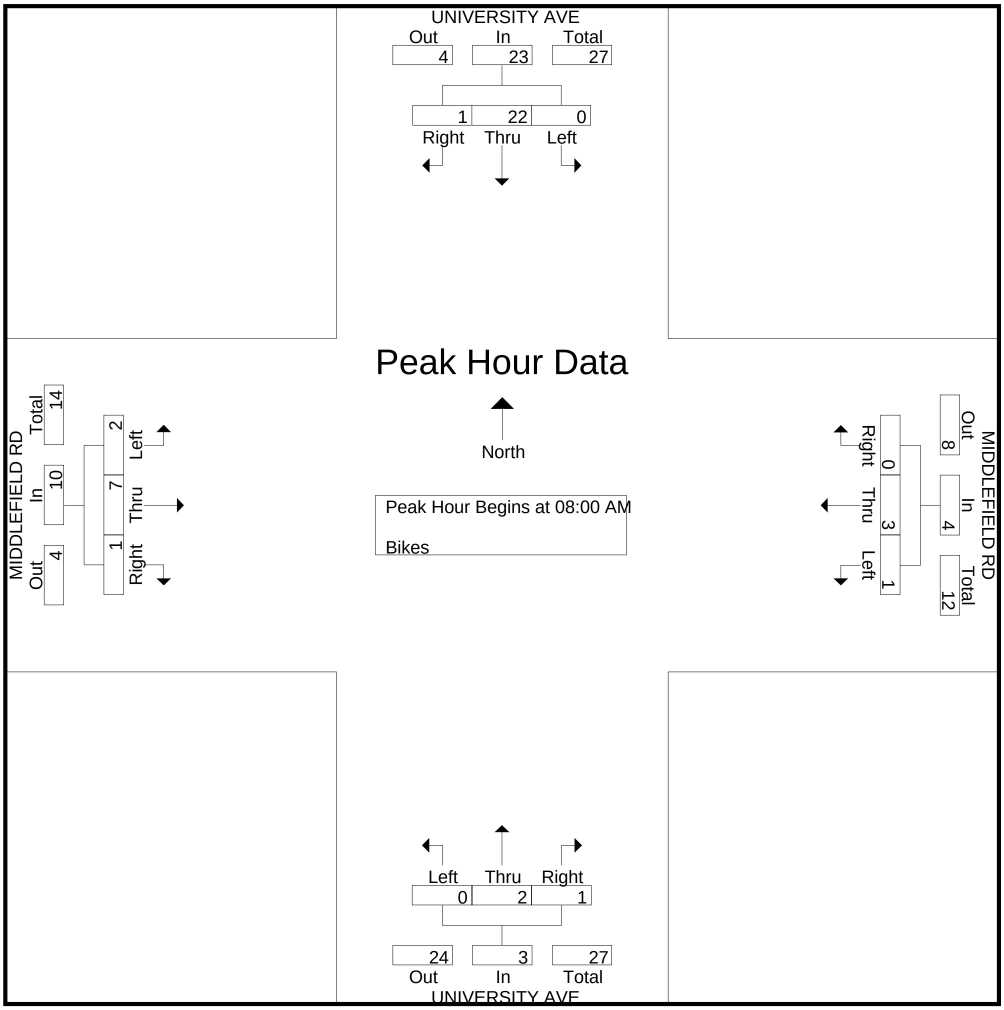

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Groups Printed- Vehicles

	UNIVERSITY AVE Southbound					MIDDLEFIELD RD Westbound					UNIVERSITY AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	17	86	18	0	121	21	76	7	3	107	10	79	22	0	111	17	93	29	2	141	480
04:15 PM	22	104	21	1	148	25	74	9	2	110	9	83	20	1	113	15	81	26	5	127	498
04:30 PM	28	87	28	0	143	22	84	5	3	114	8	99	14	4	125	9	101	27	7	144	526
04:45 PM	19	97	14	0	130	19	85	6	3	113	8	77	10	1	96	14	95	19	3	131	470
Total	86	374	81	1	542	87	319	27	11	444	35	338	66	6	445	55	370	101	17	543	1974
05:00 PM	19	70	11	0	100	11	104	6	8	129	15	65	24	0	104	15	93	21	4	133	466
05:15 PM	20	76	17	1	114	29	94	9	2	134	9	70	7	1	87	15	118	14	8	155	490
05:30 PM	25	66	19	3	113	19	85	5	9	118	2	85	13	2	102	15	128	24	4	171	504
05:45 PM	18	72	21	0	111	13	102	10	4	129	4	82	17	1	104	17	113	22	1	153	497
Total	82	284	68	4	438	72	385	30	23	510	30	302	61	4	397	62	452	81	17	612	1957
Grand Total	168	658	149	5	980	159	704	57	34	954	65	640	127	10	842	117	822	182	34	1155	3931
Apprch %	17.1	67.1	15.2	0.5		16.7	73.8	6	3.6		7.7	76	15.1	1.2		10.1	71.2	15.8	2.9		
Total %	4.3	16.7	3.8	0.1	24.9	4	17.9	1.5	0.9	24.3	1.7	16.3	3.2	0.3	21.4	3	20.9	4.6	0.9	29.4	

	UNIVERSITY AVE Southbound				MIDDLEFIELD RD Westbound				UNIVERSITY AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	17	86	18	121	21	76	7	104	**10**	79	**22**	111	**17**	93	**29**	**139**	475
04:15 PM	22	**104**	21	**147**	**25**	74	**9**	108	9	83	20	112	15	81	26	122	489
04:30 PM	**28**	87	**28**	143	22	84	5	**111**	8	**99**	14	**121**	9	**101**	27	137	**512**
04:45 PM	19	97	14	130	19	**85**	6	110	8	77	10	95	14	95	19	128	463
Total Volume	86	374	81	541	87	319	27	433	35	338	66	439	55	370	101	526	1939
% App. Total	15.9	69.1	15		20.1	73.7	6.2		8	77	15		10.5	70.3	19.2		
PHF	.768	.899	.723	.920	.870	.938	.750	.975	.875	.854	.750	.907	.809	.916	.871	.946	.947

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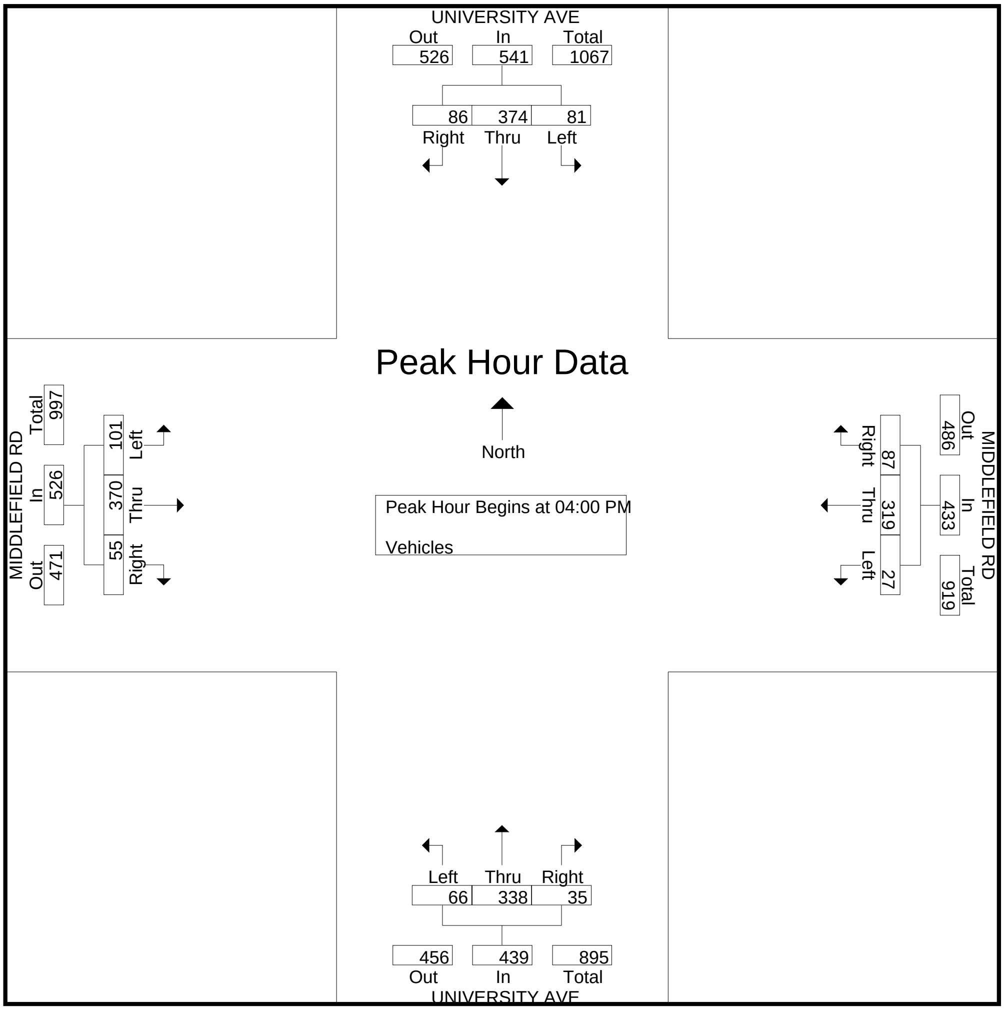

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Groups Printed- Bikes

	UNIVERSITY AVE Southbound					MIDDLEFIELD RD Westbound					UNIVERSITY AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	5
04:15 PM	0	3	0	0	3	0	0	1	0	1	0	4	0	0	4	0	0	0	0	0	8
04:30 PM	0	4	0	0	4	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	5
04:45 PM	0	4	0	0	4	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	8
Total	0	11	0	0	11	0	1	1	0	2	0	13	0	0	13	0	0	0	0	0	26
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	1	5	0	0	6	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	7
05:30 PM	0	3	0	0	3	0	0	0	0	0	0	3	1	0	4	0	0	0	0	0	7
05:45 PM	0	1	1	0	2	0	0	0	0	0	0	3	0	0	3	1	1	0	0	2	7
Total	1	9	1	0	11	0	0	0	0	0	0	6	2	0	8	1	1	0	0	2	21
Grand Total	1	20	1	0	22	0	1	1	0	2	0	19	2	0	21	1	1	0	0	2	47
Apprch %	4.5	90.9	4.5	0		0	50	50	0		0	90.5	9.5	0		50	50	0	0		
Total %	2.1	42.6	2.1	0	46.8	0	2.1	2.1	0	4.3	0	40.4	4.3	0	44.7	2.1	2.1	0	0	4.3	

	UNIVERSITY AVE Southbound				MIDDLEFIELD RD Westbound				UNIVERSITY AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	0	0	0	0	**5**	0	**5**	0	0	0	0	5
04:15 PM	0	3	0	3	0	0	**1**	**1**	0	4	0	4	0	0	0	0	**8**
04:30 PM	0	**4**	0	**4**	0	0	0	0	0	1	0	1	0	0	0	0	5
04:45 PM	0	4	0	4	0	**1**	0	1	0	3	0	3	0	0	0	0	8
Total Volume	0	11	0	11	0	1	1	2	0	13	0	13	0	0	0	0	26
% App. Total	0	100	0		0	50	50		0	100	0		0	0	0		
PHF	.000	.688	.000	.688	.000	.250	.250	.500	.000	.650	.000	.650	.000	.000	.000	.000	.813

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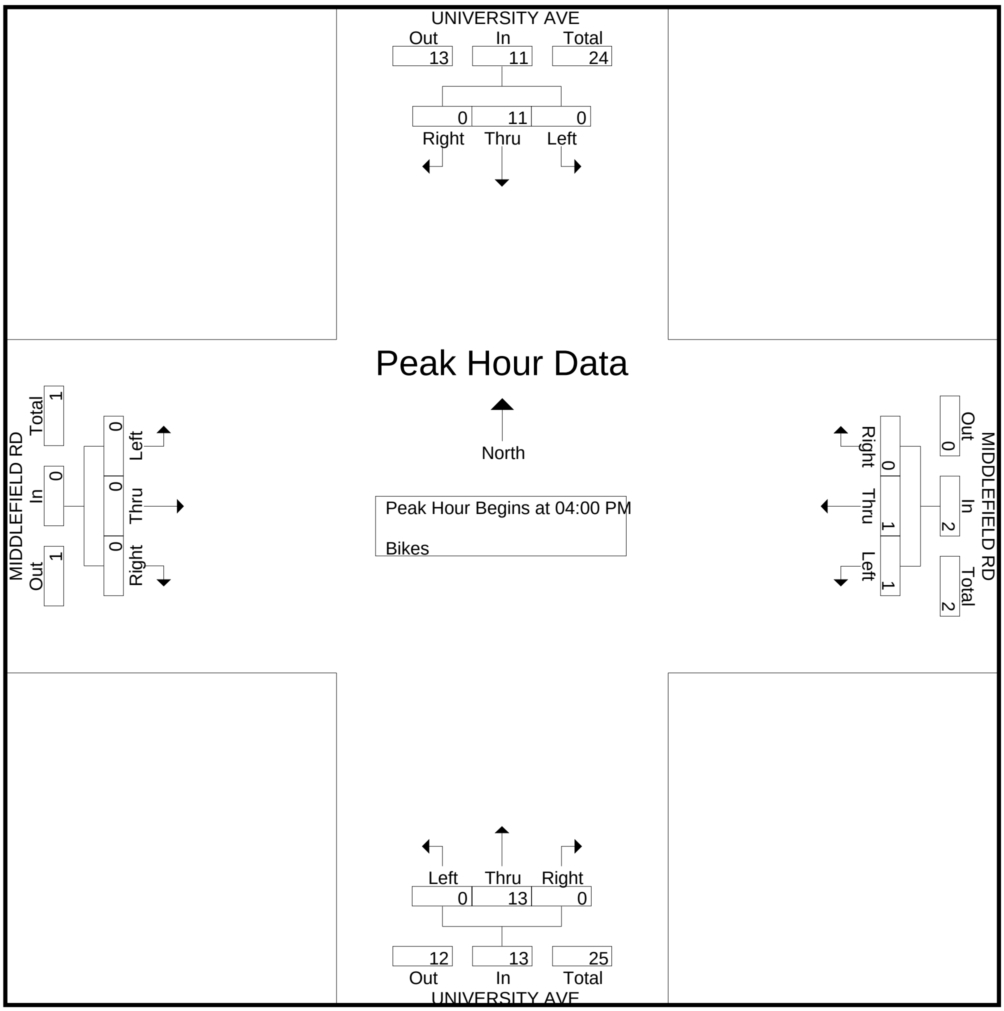

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Groups Printed- Vehicles

	LYTTON AVE Southbound					MIDDLEFIELD RD Westbound					LYTTON AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	17	0	0	17	0	31	24	4	59	2	5	23	0	30	79	64	0	1	144	250
07:15 AM	1	23	0	2	26	0	49	14	3	66	14	5	27	0	46	75	74	1	1	151	289
07:30 AM	0	20	0	2	22	3	57	20	3	83	13	1	31	0	45	86	91	0	1	178	328
07:45 AM	1	37	2	0	40	2	68	24	4	98	10	5	28	0	43	99	119	2	2	222	403
Total	2	97	2	4	105	5	205	82	14	306	39	16	109	0	164	339	348	3	5	695	1270
08:00 AM	2	27	1	0	30	1	61	23	3	88	19	9	34	2	64	80	117	1	3	201	383
08:15 AM	2	25	1	1	29	2	70	34	1	107	19	16	33	1	69	89	102	2	0	193	398
08:30 AM	2	30	1	0	33	2	66	34	1	103	13	6	32	0	51	79	115	1	2	197	384
08:45 AM	0	29	1	2	32	2	76	38	2	118	20	8	19	0	47	89	130	1	2	222	419
Total	6	111	4	3	124	7	273	129	7	416	71	39	118	3	231	337	464	5	7	813	1584
Grand Total	8	208	6	7	229	12	478	211	21	722	110	55	227	3	395	676	812	8	12	1508	2854
Apprch %	3.5	90.8	2.6	3.1		1.7	66.2	29.2	2.9		27.8	13.9	57.5	0.8		44.8	53.8	0.5	0.8		
Total %	0.3	7.3	0.2	0.2	8	0.4	16.7	7.4	0.7	25.3	3.9	1.9	8	0.1	13.8	23.7	28.5	0.3	0.4	52.8	

	LYTTON AVE Southbound				MIDDLEFIELD RD Westbound				LYTTON AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**2**	27	**1**	30	1	61	23	85	19	9	**34**	62	80	117	1	198	375
08:15 AM	2	25	1	28	**2**	70	34	106	19	**16**	33	**68**	**89**	102	**2**	193	395
08:30 AM	2	**30**	1	**33**	2	66	34	102	13	6	32	51	79	115	1	195	381
08:45 AM	0	29	1	30	2	**76**	**38**	**116**	**20**	8	19	47	89	**130**	1	**220**	**413**
Total Volume	6	111	4	121	7	273	129	409	71	39	118	228	337	464	5	806	1564
% App. Total	5	91.7	3.3		1.7	66.7	31.5		31.1	17.1	51.8		41.8	57.6	0.6		
PHF	.750	.925	1.00	.917	.875	.898	.849	.881	.888	.609	.868	.838	.947	.892	.625	.916	.947

Traffic Data Service

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File Name : 10AM FINAL
Site Code : 00000010
Start Date : 5/5/2015
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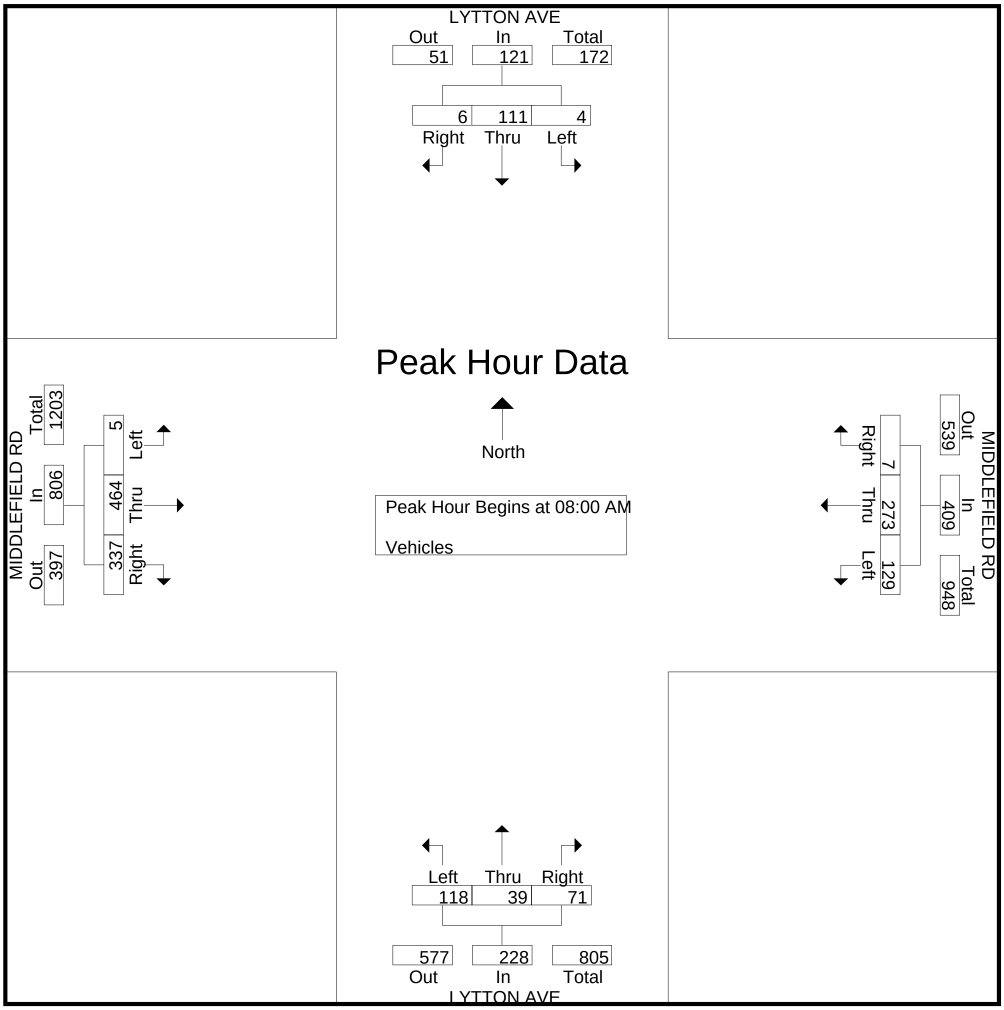

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File Name : 10AM FINAL
Site Code : 00000010
Start Date : 5/5/2015
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Groups Printed- Bikes

	LYTTON AVE Southbound					MIDDLEFIELD RD Westbound					LYTTON AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
07:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	3
07:30 AM	0	4	0	0	4	0	0	2	0	2	0	1	0	0	1	0	0	0	0	0	7
07:45 AM	0	7	0	0	7	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	10
Total	0	14	0	0	14	0	0	2	0	2	0	5	2	0	7	0	0	0	0	0	23
08:00 AM	0	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	7
08:15 AM	0	8	0	0	8	0	2	0	0	2	0	0	0	0	0	0	7	0	0	7	17
08:30 AM	0	4	0	0	4	0	2	0	0	2	2	1	0	0	3	0	1	0	0	1	10
08:45 AM	0	10	0	0	10	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	11
Total	0	28	0	0	28	0	4	0	0	4	2	2	0	0	4	0	9	0	0	9	45
Grand Total	0	42	0	0	42	0	4	2	0	6	2	7	2	0	11	0	9	0	0	9	68
Apprch %	0	100	0	0		0	66.7	33.3	0		18.2	63.6	18.2	0		0	100	0	0		
Total %	0	61.8	0	0	61.8	0	5.9	2.9	0	8.8	2.9	10.3	2.9	0	16.2	0	13.2	0	0	13.2	

	LYTTON AVE Southbound				MIDDLEFIELD RD Westbound				LYTTON AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	6	0	6	0	0	0	0	0	0	0	0	0	1	0	1	7
08:15 AM	0	8	0	8	0	**2**	0	**2**	0	0	0	0	0	**7**	0	**7**	**17**
08:30 AM	0	4	0	4	0	2	0	2	**2**	**1**	0	**3**	0	1	0	1	10
08:45 AM	0	**10**	0	**10**	0	0	0	0	0	1	0	1	0	0	0	0	11
Total Volume	0	28	0	28	0	4	0	4	2	2	0	4	0	9	0	9	45
% App. Total	0	100	0		0	100	0		50	50	0		0	100	0		
PHF	.000	.700	.000	.700	.000	.500	.000	.500	.250	.500	.000	.333	.000	.321	.000	.321	.662

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File Name : 10AM FINAL
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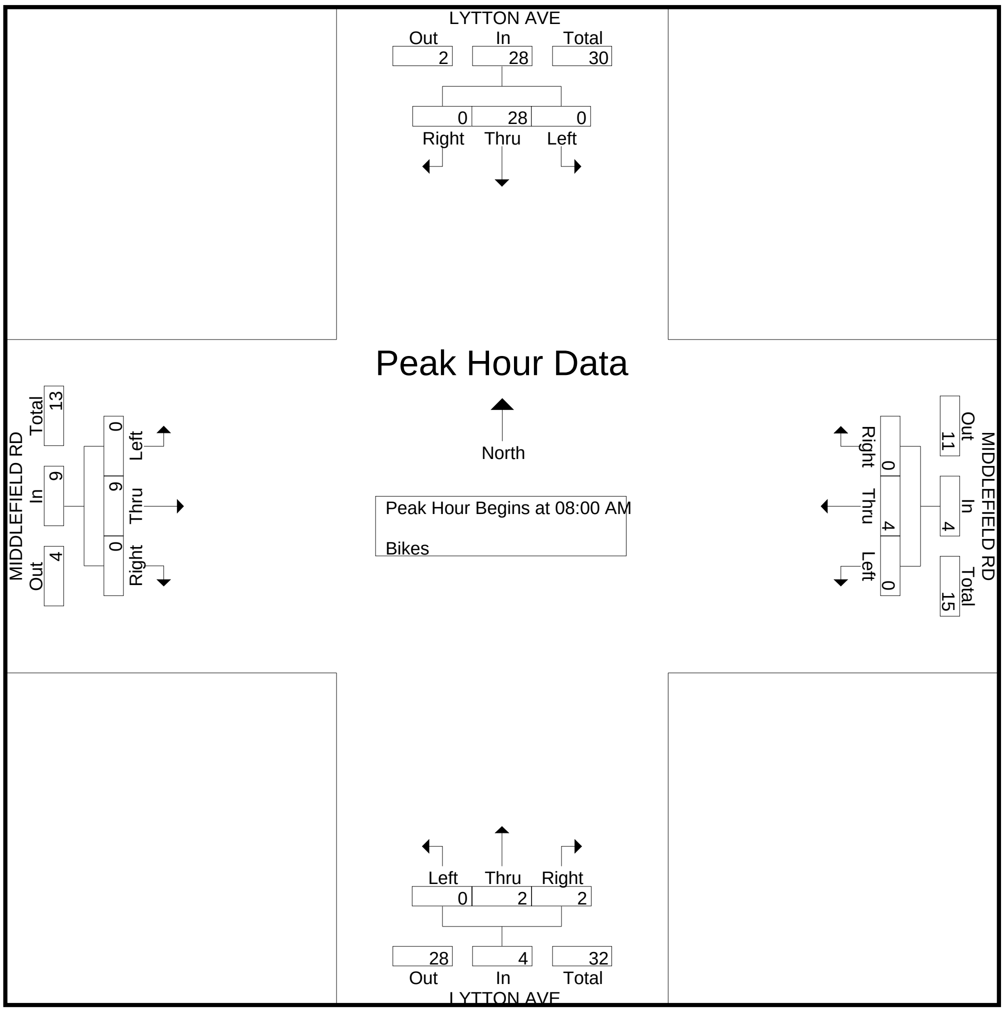

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File Name : 10PM FINAL
Site Code : 00000010
Start Date : 5/5/2015
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Groups Printed- Vehicles

	LYTTON AVE Southbound					MIDDLEFIELD RD Westbound					LYTTON AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	2	15	2	0	19	0	88	18	6	112	32	55	68	3	158	37	105	3	0	145	434
04:15 PM	4	12	0	1	17	4	99	22	6	131	25	34	70	0	129	38	95	6	1	140	417
04:30 PM	3	13	3	0	19	4	99	23	1	127	27	38	48	0	113	40	122	2	0	164	423
04:45 PM	3	19	1	0	23	3	85	16	3	107	21	60	77	1	159	39	104	2	1	146	435
Total	12	59	6	1	78	11	371	79	16	477	105	187	263	4	559	154	426	13	2	595	1709
05:00 PM	3	15	0	0	18	7	133	23	5	168	13	44	65	0	122	35	117	5	8	165	473
05:15 PM	2	11	1	0	14	3	91	19	2	115	17	51	70	0	138	52	127	2	2	183	450
05:30 PM	2	21	1	0	24	2	103	23	0	128	22	41	62	0	125	44	139	2	1	186	463
05:45 PM	1	19	0	0	20	4	118	19	3	144	16	43	41	0	100	48	129	7	0	184	448
Total	8	66	2	0	76	16	445	84	10	555	68	179	238	0	485	179	512	16	11	718	1834
Grand Total	20	125	8	1	154	27	816	163	26	1032	173	366	501	4	1044	333	938	29	13	1313	3543
Apprch %	13	81.2	5.2	0.6		2.6	79.1	15.8	2.5		16.6	35.1	48	0.4		25.4	71.4	2.2	1		
Total %	0.6	3.5	0.2	0	4.3	0.8	23	4.6	0.7	29.1	4.9	10.3	14.1	0.1	29.5	9.4	26.5	0.8	0.4	37.1	

	LYTTON AVE Southbound				MIDDLEFIELD RD Westbound				LYTTON AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**3**	15	0	18	**7**	**133**	**23**	**163**	13	44	65	122	35	117	5	157	460
05:15 PM	2	11	**1**	14	3	91	19	113	17	**51**	**70**	**138**	**52**	127	2	181	446
05:30 PM	2	**21**	1	**24**	2	103	23	128	**22**	41	62	125	44	**139**	2	**185**	**462**
05:45 PM	1	19	0	20	4	118	19	141	16	43	41	100	48	129	**7**	184	445
Total Volume	8	66	2	76	16	445	84	545	68	179	238	485	179	512	16	707	1813
% App. Total	10.5	86.8	2.6		2.9	81.7	15.4		14	36.9	49.1		25.3	72.4	2.3		
PHF	.667	.786	.500	.792	.571	.836	.913	.836	.773	.877	.850	.879	.861	.921	.571	.955	.981

Traffic Data Service

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File Name : 10PM FINAL
Site Code : 00000010
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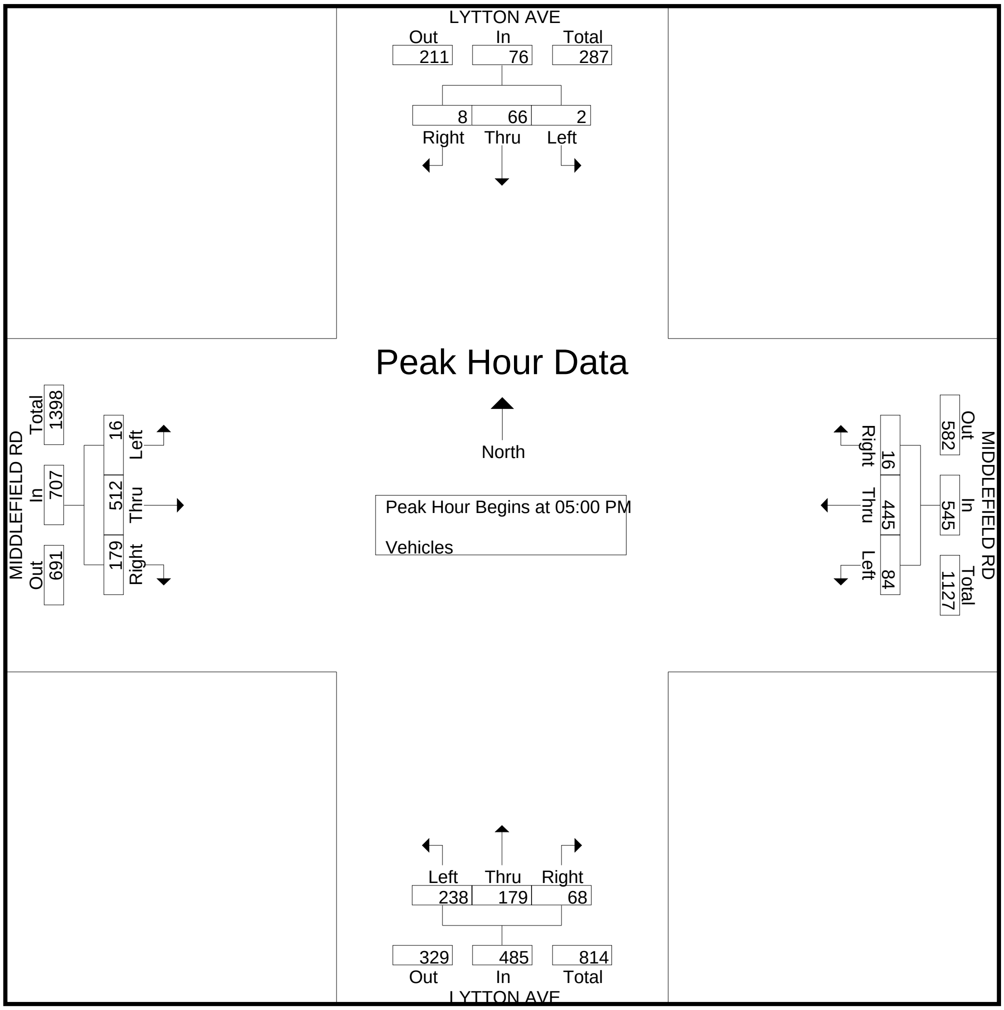

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File Name : 10PM FINAL
Site Code : 00000010
Start Date : 5/5/2015
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Groups Printed- Bikes

	LYTTON AVE Southbound					MIDDLEFIELD RD Westbound					LYTTON AVE Northbound					MIDDLEFIELD RD Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	4	0	0	4	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5
04:15 PM	0	0	0	0	0	0	0	0	0	0	1	3	0	0	4	0	0	0	0	0	4
04:30 PM	1	1	0	0	2	0	0	0	0	0	0	4	0	0	4	0	1	0	0	1	7
04:45 PM	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	0	0	0	0	0	4
Total	1	5	0	0	6	0	1	0	0	1	2	10	0	0	12	0	1	0	0	1	20
05:00 PM	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	7
05:15 PM	0	0	0	0	0	0	1	0	0	1	1	6	0	0	7	0	0	0	0	0	8
05:30 PM	0	0	0	0	0	0	2	0	0	2	0	3	0	0	3	0	0	0	0	0	5
05:45 PM	0	1	0	0	1	2	0	0	0	2	1	2	0	0	3	0	1	0	0	1	7
Total	0	2	0	0	2	2	3	0	0	5	2	17	0	0	19	0	1	0	0	1	27
Grand Total	1	7	0	0	8	2	4	0	0	6	4	27	0	0	31	0	2	0	0	2	47
Apprch %	12.5	87.5	0	0		33.3	66.7	0	0		12.9	87.1	0	0		0	100	0	0		
Total %	2.1	14.9	0	0	17	4.3	8.5	0	0	12.8	8.5	57.4	0	0	66	0	4.3	0	0	4.3	

	LYTTON AVE Southbound				MIDDLEFIELD RD Westbound				LYTTON AVE Northbound				MIDDLEFIELD RD Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	**1**	0	**1**	0	0	0	0	0	**6**	0	6	0	0	0	0	7
05:15 PM	0	0	0	0	0	1	0	1	**1**	6	0	**7**	0	0	0	0	**8**
05:30 PM	0	0	0	0	0	**2**	0	**2**	0	3	0	3	0	0	0	0	5
05:45 PM	0	1	0	1	**2**	0	0	2	1	2	0	3	0	**1**	0	**1**	7
Total Volume	0	2	0	2	2	3	0	5	2	17	0	19	0	1	0	1	27
% App. Total	0	100	0		40	60	0		10.5	89.5	0		0	100	0		
PHF	.000	.500	.000	.500	.250	.375	.000	.625	.500	.708	.000	.679	.000	.250	.000	.250	.844

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File Name : 10PM FINAL

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Start Date : 5/5/2015

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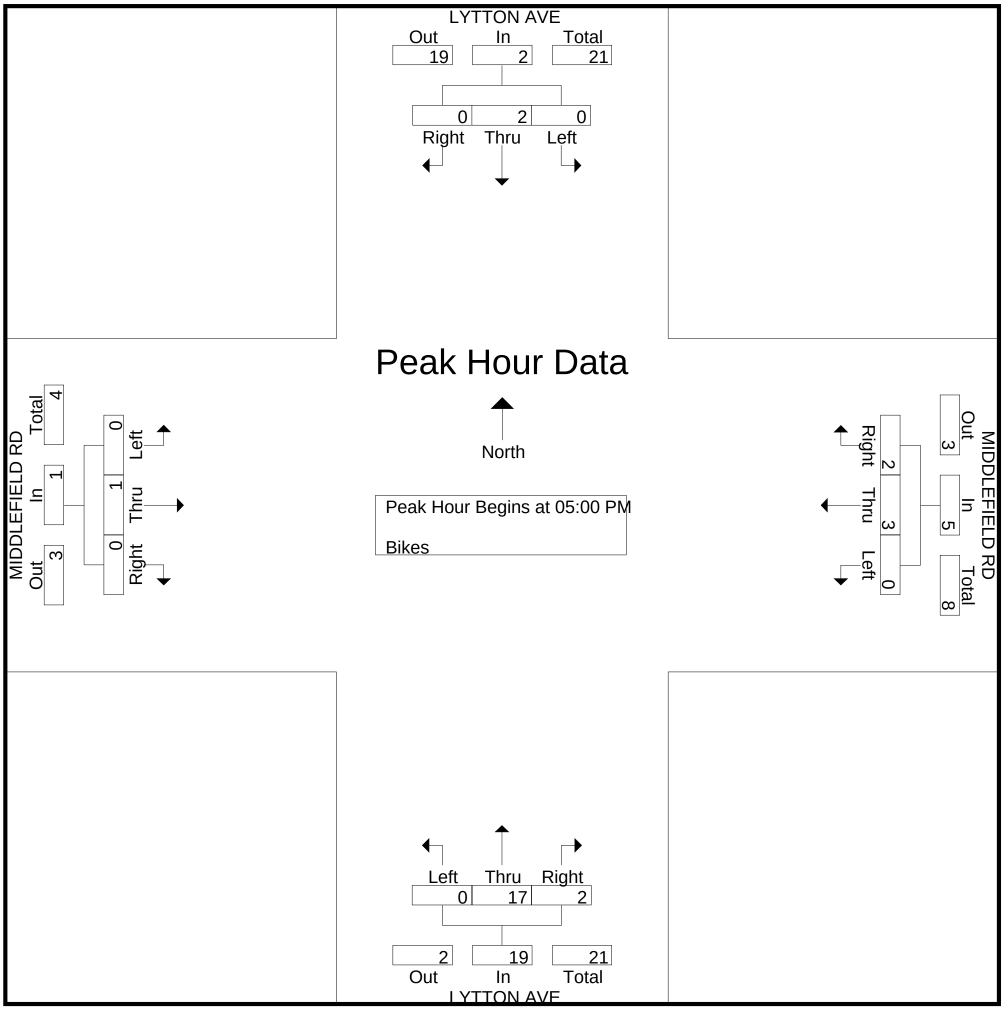

Traffic Data Service

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File Name : 11AM FINAL
Site Code : 00000011
Start Date : 5/7/2015
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Groups Printed- Vehicles

	Southbound					BAYFRONT EXPY Westbound					WEST CAMPUS PROJECT DW Northbound					BAYFRONT EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	702	8	0	710	3	0	4	0	7	6	197	0	0	203	920
07:15 AM	0	0	0	0	0	0	735	17	0	752	3	0	3	0	6	9	197	0	0	206	964
07:30 AM	0	0	0	0	0	0	715	21	0	736	2	0	3	0	5	9	256	0	0	265	1006
07:45 AM	0	0	0	0	0	0	651	30	0	681	1	0	3	0	4	6	228	0	0	234	919
Total	0	0	0	0	0	0	2803	76	0	2879	9	0	13	0	22	30	878	0	0	908	3809
08:00 AM	0	0	0	0	0	0	621	16	0	637	4	0	2	5	11	6	270	0	0	276	924
08:15 AM	0	0	0	0	0	0	590	27	0	617	4	0	2	2	8	19	273	0	0	292	917
08:30 AM	0	0	0	0	0	0	571	45	0	616	4	0	2	2	8	16	255	0	0	271	895
08:45 AM	0	0	0	0	0	0	675	61	0	736	7	0	6	9	22	29	298	0	0	327	1085
Total	0	0	0	0	0	0	2457	149	0	2606	19	0	12	18	49	70	1096	0	0	1166	3821
Grand Total	0	0	0	0	0	0	5260	225	0	5485	28	0	25	18	71	100	1974	0	0	2074	7630
Apprch %	0	0	0	0		0	95.9	4.1	0		39.4	0	35.2	25.4		4.8	95.2	0	0		
Total %	0	0	0	0	0	0	68.9	2.9	0	71.9	0.4	0	0.3	0.2	0.9	1.3	25.9	0	0	27.2	

	Southbound				BAYFRONT EXPY Westbound				WEST CAMPUS PROJECT DW Northbound				BAYFRONT EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	702	8	710	**3**	0	**4**	**7**	6	197	0	203	920
07:15 AM	0	0	0	0	0	**735**	17	**752**	3	0	3	6	**9**	197	0	206	964
07:30 AM	0	0	0	0	0	715	21	736	2	0	3	5	9	**256**	0	**265**	**1006**
07:45 AM	0	0	0	0	0	651	**30**	681	1	0	3	4	6	228	0	234	919
Total Volume	0	0	0	0	0	2803	76	2879	9	0	13	22	30	878	0	908	3809
% App. Total	0	0	0		0	97.4	2.6		40.9	0	59.1		3.3	96.7	0		
PHF	.000	.000	.000	.000	.000	.953	.633	.957	.750	.000	.813	.786	.833	.857	.000	.857	.947

Traffic Data Service

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File Name : 11AM FINAL
Site Code : 00000011
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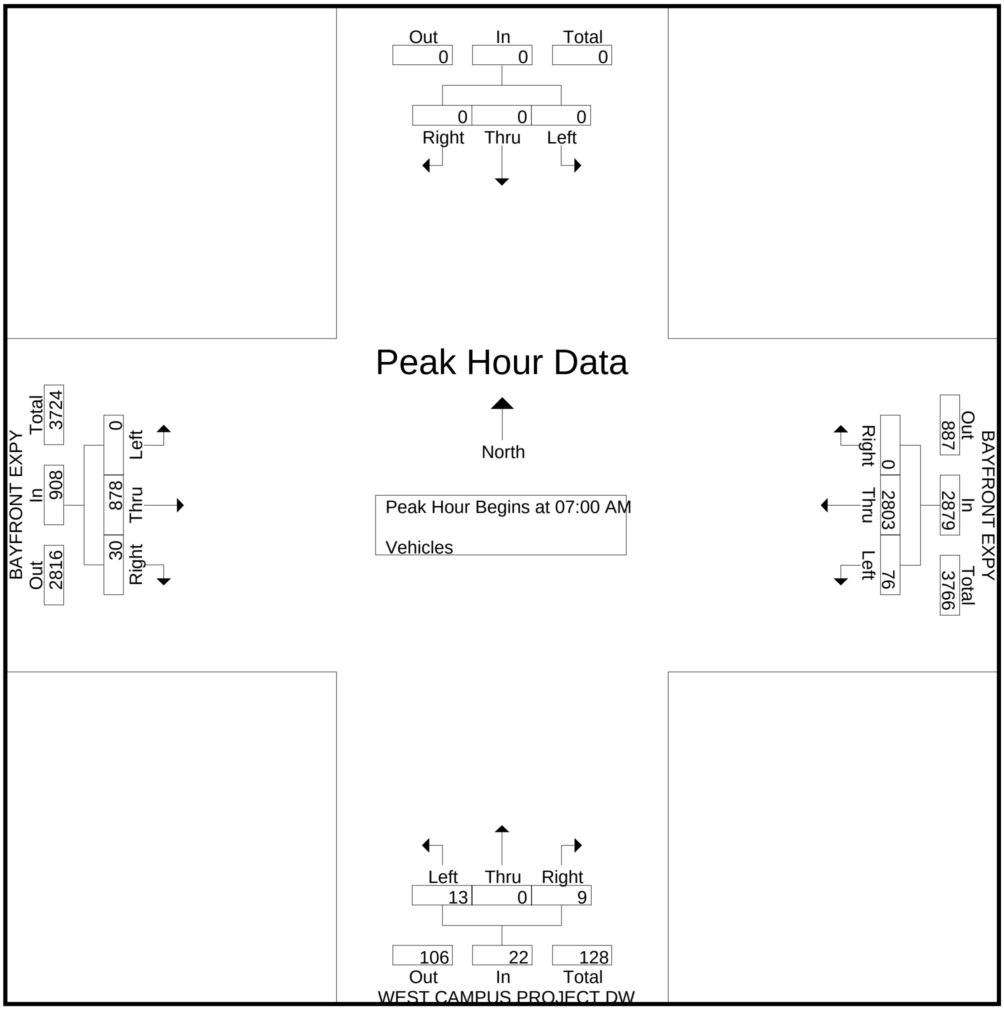

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File Name : 11AM FINAL
Site Code : 00000011
Start Date : 5/7/2015

Groups Printed- Bikes

	Southbound					BAYFRONT EXPY Westbound					WEST CAMPUS PROJECT DW Northbound					BAYFRONT EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Apprch %	0	0	0	0		0	0	0	0		0	0	0	0		0	0	0	0		
Total %																					

	Southbound				BAYFRONT EXPY Westbound				WEST CAMPUS PROJECT DW Northbound				BAYFRONT EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% App. Total	0	0	0		0	0	0		0	0	0		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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File Name : 11AM FINAL
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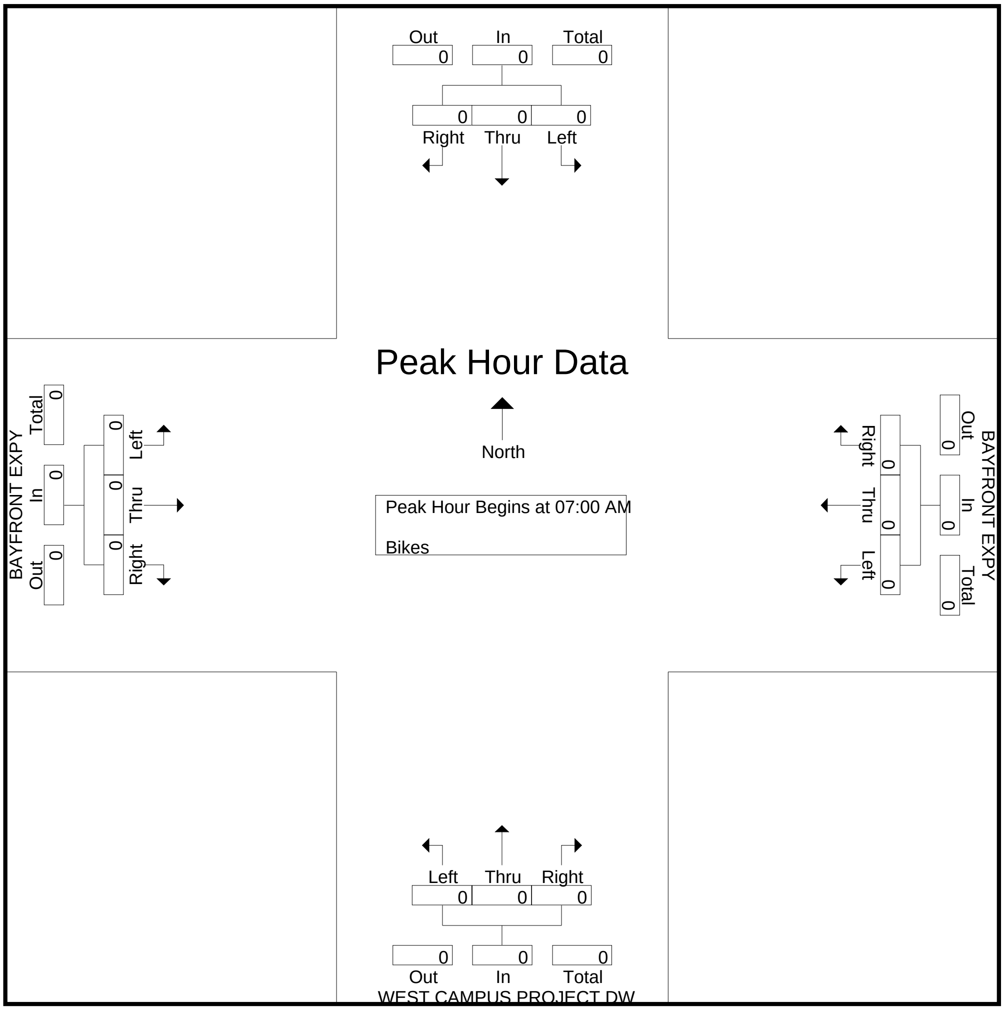

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File Name : 11PM FINAL
Site Code : 00000011
Start Date : 5/7/2015
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Groups Printed- Vehicles

	Southbound					BAYFRONT EXPY Westbound					WEST CAMPUS PROJECT DW Northbound					BAYFRONT EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	189	17	0	206	7	0	13	3	23	4	538	0	0	542	771
04:15 PM	0	0	0	0	0	0	232	8	0	240	5	0	13	5	23	1	579	0	0	580	843
04:30 PM	0	0	0	0	0	0	222	18	0	240	20	0	16	3	39	3	546	0	0	549	828
04:45 PM	0	0	0	0	0	0	194	17	0	211	4	0	9	6	19	3	496	0	0	499	729
Total	0	0	0	0	0	0	837	60	0	897	36	0	51	17	104	11	2159	0	0	2170	3171
05:00 PM	0	0	0	0	0	0	232	16	0	248	15	0	11	8	34	5	474	0	0	479	761
05:15 PM	0	0	0	0	0	0	224	17	0	241	13	0	20	1	34	4	550	0	0	554	829
05:30 PM	0	0	0	0	0	0	197	17	0	214	17	0	21	6	44	5	465	0	0	470	728
05:45 PM	0	0	0	0	0	0	197	10	0	207	17	0	16	4	37	5	529	0	0	534	778
Total	0	0	0	0	0	0	850	60	0	910	62	0	68	19	149	19	2018	0	0	2037	3096
Grand Total	0	0	0	0	0	0	1687	120	0	1807	98	0	119	36	253	30	4177	0	0	4207	6267
Apprch %	0	0	0	0		0	93.4	6.6	0		38.7	0	47	14.2		0.7	99.3	0	0		
Total %	0	0	0	0	0	0	26.9	1.9	0	28.8	1.6	0	1.9	0.6	4	0.5	66.7	0	0	67.1	

	Southbound				BAYFRONT EXPY Westbound				WEST CAMPUS PROJECT DW Northbound				BAYFRONT EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	0	0	0	0	189	17	206	7	0	13	20	**4**	538	0	542	768
04:15 PM	0	0	0	0	0	**232**	8	**240**	5	0	13	18	1	**579**	0	**580**	**838**
04:30 PM	0	0	0	0	0	222	**18**	240	**20**	0	**16**	**36**	3	546	0	549	825
04:45 PM	0	0	0	0	0	194	17	211	4	0	9	13	3	496	0	499	723
Total Volume	0	0	0	0	0	837	60	897	36	0	51	87	11	2159	0	2170	3154
% App. Total	0	0	0		0	93.3	6.7		41.4	0	58.6		0.5	99.5	0		
PHF	.000	.000	.000	.000	.000	.902	.833	.934	.450	.000	.797	.604	.688	.932	.000	.935	.941

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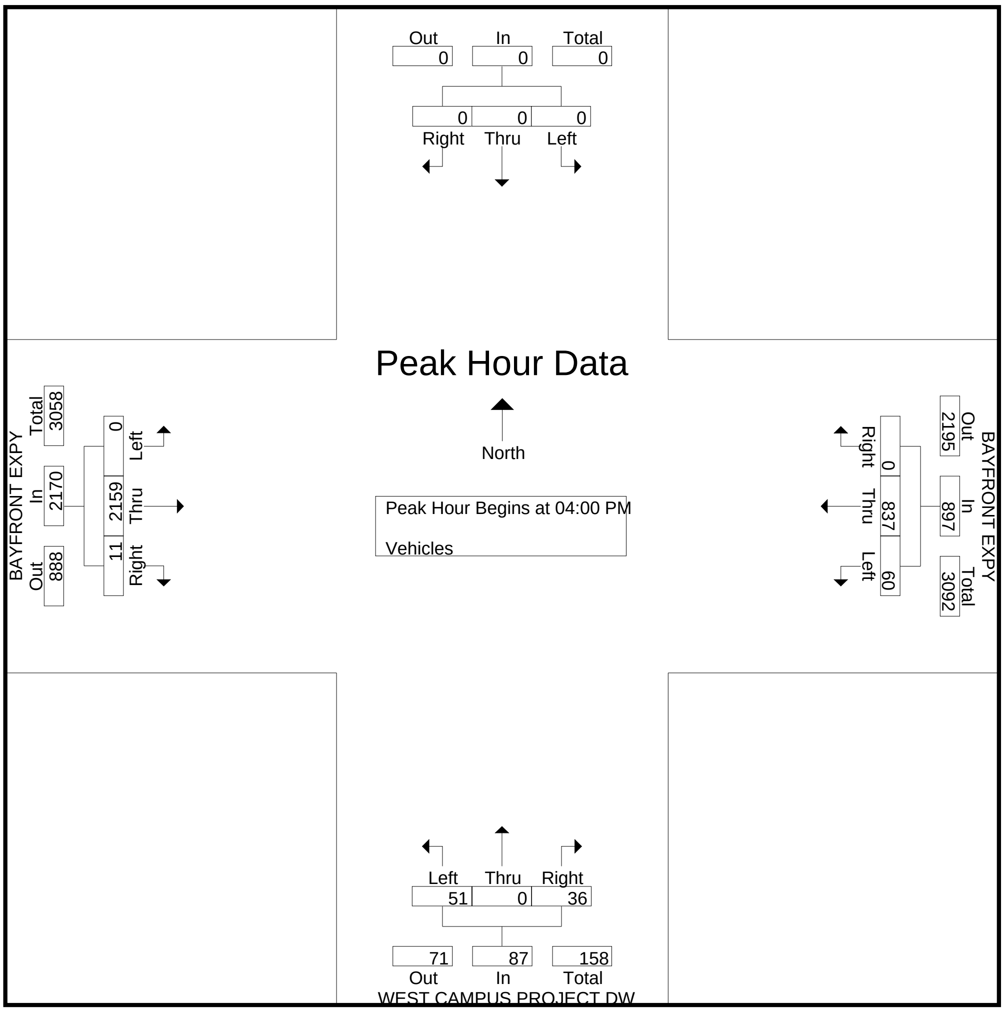

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File Name : 11PM FINAL
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Groups Printed- Bikes

	Southbound					BAYFRONT EXPY Westbound					WEST CAMPUS PROJECT DW Northbound					BAYFRONT EXPY Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
Total	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2
Apprch %	0	0	0	0		0	0	0	0		0	0	100	0		0	0	0	0		
Total %	0	0	0	0	0	0	0	0	0	0	0	0	100	0	100	0	0	0	0	0	

	Southbound				BAYFRONT EXPY Westbound				WEST CAMPUS PROJECT DW Northbound				BAYFRONT EXPY Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	0	0	0	0	0	0	0	0	0	**1**	**1**	0	0	0	0	**1**
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1
Total Volume	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	2
% App. Total	0	0	0		0	0	0		0	0	100		0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.500	.000	.000	.000	.000	.500

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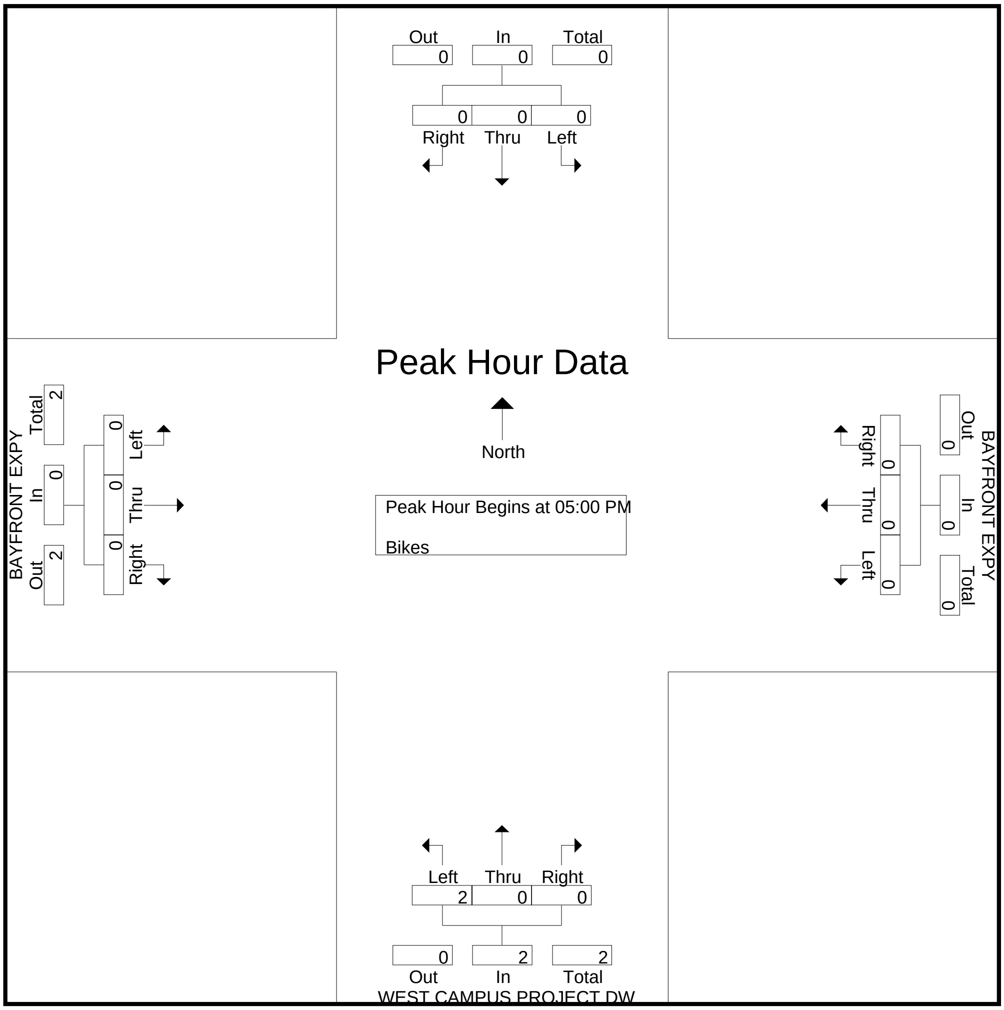

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File Name : 12AM FINAL
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Groups Printed- Vehicles

	CHILCO ST Southbound					HAMILTON AVE Westbound					CHILCO ST Northbound					HAMILTON AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	15	7	3	26	17	5	3	1	26	6	8	3	5	22	4	6	7	5	22	96
07:15 AM	1	9	8	0	18	23	9	4	0	36	1	10	7	6	24	3	6	8	1	18	96
07:30 AM	2	16	13	0	31	40	9	7	1	57	2	23	4	3	32	5	11	12	0	28	148
07:45 AM	3	23	5	2	33	31	9	4	3	47	2	25	1	1	29	0	7	7	0	14	123
Total	7	63	33	5	108	111	32	18	5	166	11	66	15	15	107	12	30	34	6	82	463
08:00 AM	5	16	16	0	37	29	19	4	0	52	1	22	3	0	26	3	12	7	0	22	137
08:15 AM	5	24	16	3	48	31	14	7	0	52	5	18	5	5	33	8	11	11	3	33	166
08:30 AM	3	24	13	4	44	19	5	3	0	27	3	16	0	1	20	8	2	9	1	20	111
08:45 AM	2	18	6	1	27	19	2	2	0	23	0	15	3	0	18	1	5	3	0	9	77
Total	15	82	51	8	156	98	40	16	0	154	9	71	11	6	97	20	30	30	4	84	491
Grand Total	22	145	84	13	264	209	72	34	5	320	20	137	26	21	204	32	60	64	10	166	954
Apprch %	8.3	54.9	31.8	4.9		65.3	22.5	10.6	1.6		9.8	67.2	12.7	10.3		19.3	36.1	38.6	6		
Total %	2.3	15.2	8.8	1.4	27.7	21.9	7.5	3.6	0.5	33.5	2.1	14.4	2.7	2.2	21.4	3.4	6.3	6.7	1	17.4	

	CHILCO ST Southbound				HAMILTON AVE Westbound				CHILCO ST Northbound				HAMILTON AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	2	16	13	31	**40**	9	**7**	**56**	2	23	4	**29**	5	11	**12**	28	144
07:45 AM	3	23	5	31	31	9	4	44	2	**25**	1	28	0	7	7	14	117
08:00 AM	**5**	16	**16**	37	29	**19**	4	52	1	22	3	26	3	**12**	7	22	137
08:15 AM	5	**24**	16	**45**	31	14	7	52	**5**	18	**5**	28	**8**	11	11	**30**	**155**
Total Volume	15	79	50	144	131	51	22	204	10	88	13	111	16	41	37	94	553
% App. Total	10.4	54.9	34.7		64.2	25	10.8		9	79.3	11.7		17	43.6	39.4		
PHF	.750	.823	.781	.800	.819	.671	.786	.911	.500	.880	.650	.957	.500	.854	.771	.783	.892

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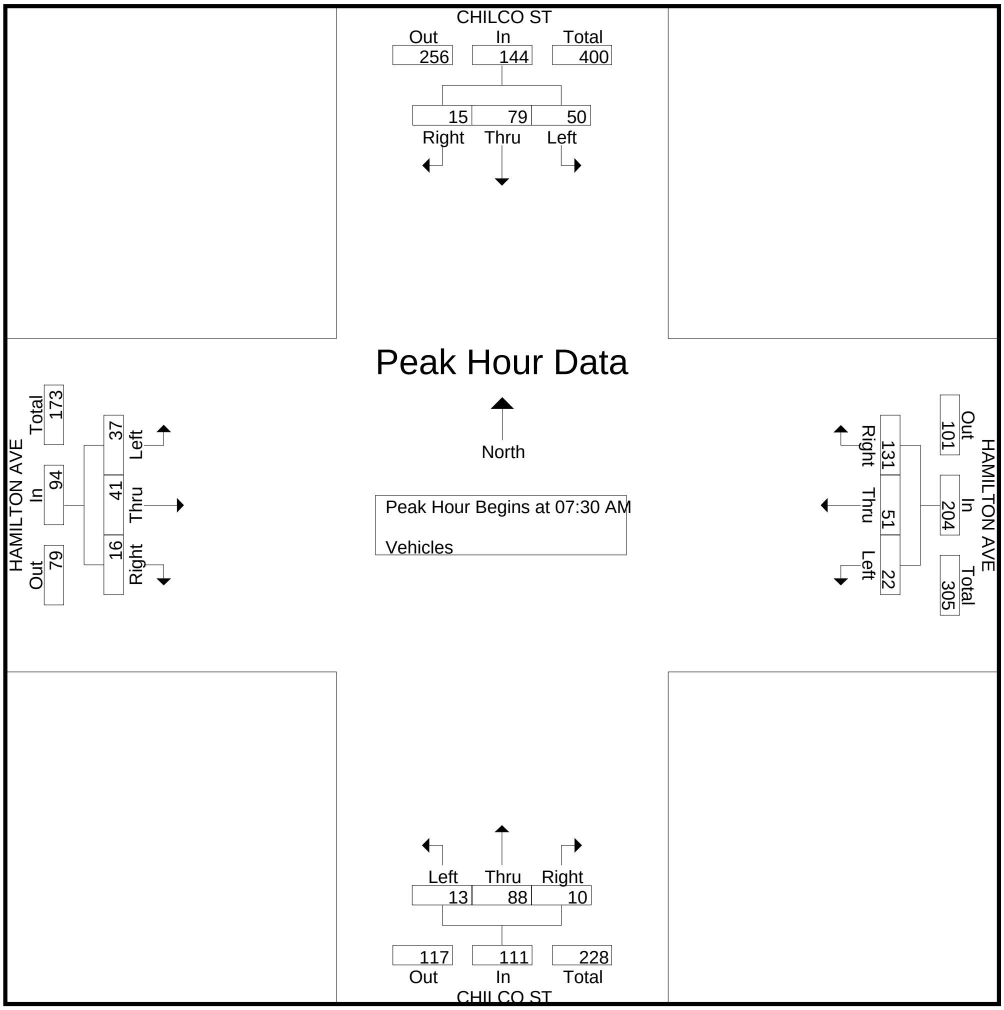

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Groups Printed- Bikes

	CHILCO ST Southbound					HAMILTON AVE Westbound					CHILCO ST Northbound					HAMILTON AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	2	0	2	4
07:30 AM	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	3
07:45 AM	0	3	0	0	3	2	0	0	0	2	0	0	0	0	0	0	0	1	0	1	6
Total	0	5	0	0	5	3	2	0	0	5	0	0	0	0	0	0	0	4	0	4	14
08:00 AM	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	3	0	4	5
08:15 AM	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0	0	2	0	2	5
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	2	0	2	3
08:45 AM	4	1	0	0	5	0	1	0	0	1	0	4	0	0	4	0	1	0	0	1	11
Total	4	3	1	0	8	0	2	0	0	2	0	5	0	0	5	0	2	7	0	9	24
Grand Total	4	8	1	0	13	3	4	0	0	7	0	5	0	0	5	0	2	11	0	13	38
Apprch %	30.8	61.5	7.7	0		42.9	57.1	0	0		0	100	0	0		0	15.4	84.6	0		
Total %	10.5	21.1	2.6	0	34.2	7.9	10.5	0	0	18.4	0	13.2	0	0	13.2	0	5.3	28.9	0	34.2	

	CHILCO ST Southbound				HAMILTON AVE Westbound				CHILCO ST Northbound				HAMILTON AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	**1**	1	0	0	0	0	0	0	0	0	0	**1**	**3**	**4**	5
08:15 AM	0	**2**	0	2	0	**1**	0	**1**	0	0	0	0	0	0	2	2	5
08:30 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	2	3
08:45 AM	**4**	1	0	**5**	0	1	0	1	0	**4**	0	**4**	0	1	0	1	**11**
Total Volume	4	3	1	8	0	2	0	2	0	5	0	5	0	2	7	9	24
% App. Total	50	37.5	12.5		0	100	0		0	100	0		0	22.2	77.8		
PHF	.250	.375	.250	.400	.000	.500	.000	.500	.000	.313	.000	.313	.000	.500	.583	.563	.545

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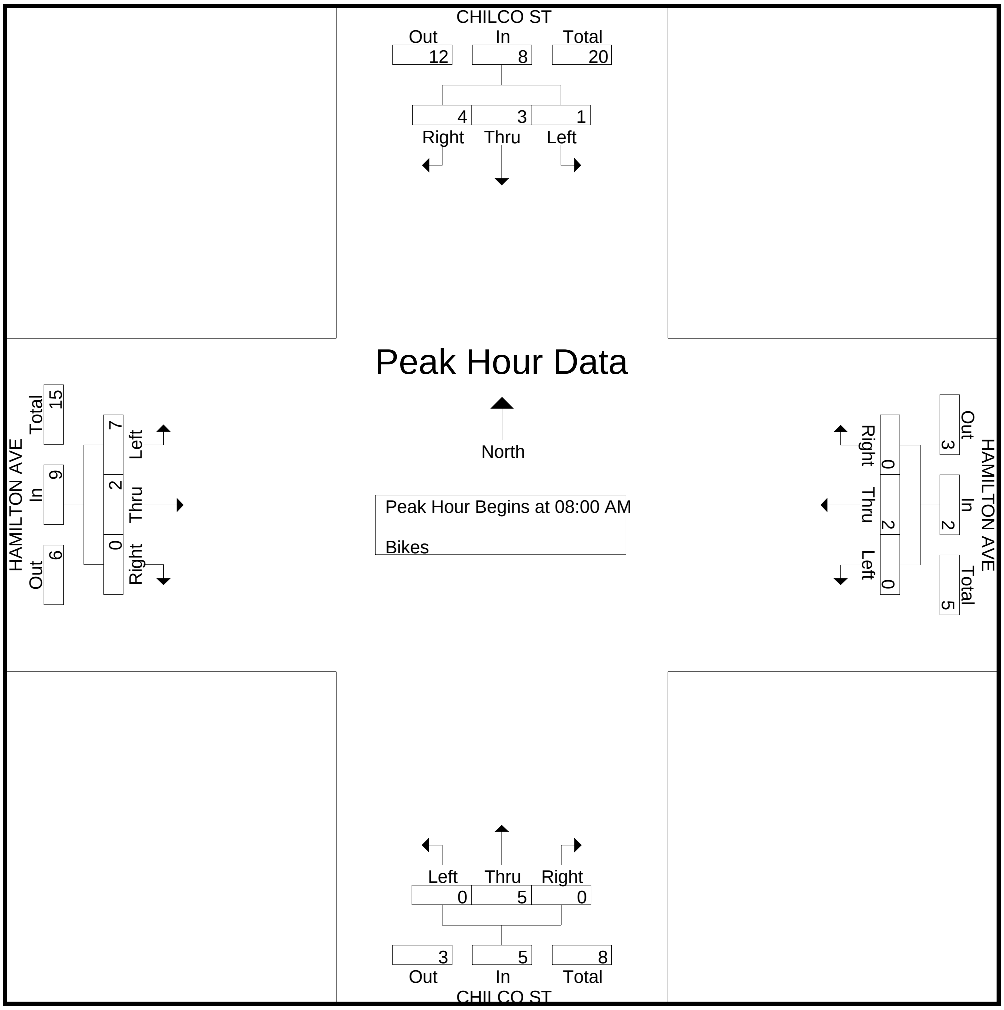

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File Name : 12PM FINAL
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Groups Printed- Vehicles

	CHILCO ST Southbound					HAMILTON AVE Westbound					CHILCO ST Northbound					HAMILTON AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	5	40	4	0	49	10	2	1	0	13	4	14	5	5	28	2	16	3	1	22	112
04:15 PM	6	48	8	1	63	12	4	3	0	19	3	7	1	5	16	2	17	8	0	27	125
04:30 PM	2	57	10	0	69	16	7	2	0	25	4	13	4	0	21	4	24	4	0	32	147
04:45 PM	6	76	20	0	102	9	7	3	0	19	5	16	2	4	27	1	22	6	0	29	177
Total	19	221	42	1	283	47	20	9	0	76	16	50	12	14	92	9	79	21	1	110	561
05:00 PM	11	81	17	2	111	12	2	3	1	18	5	17	1	1	24	3	40	4	1	48	201
05:15 PM	8	109	12	1	130	13	6	0	0	19	4	14	7	1	26	6	32	8	0	46	221
05:30 PM	6	112	21	1	140	12	3	1	4	20	6	17	4	1	28	6	31	5	0	42	230
05:45 PM	11	105	21	0	137	10	5	3	0	18	3	15	7	0	25	6	21	4	1	32	212
Total	36	407	71	4	518	47	16	7	5	75	18	63	19	3	103	21	124	21	2	168	864
Grand Total	55	628	113	5	801	94	36	16	5	151	34	113	31	17	195	30	203	42	3	278	1425
Apprch %	6.9	78.4	14.1	0.6		62.3	23.8	10.6	3.3		17.4	57.9	15.9	8.7		10.8	73	15.1	1.1		
Total %	3.9	44.1	7.9	0.4	56.2	6.6	2.5	1.1	0.4	10.6	2.4	7.9	2.2	1.2	13.7	2.1	14.2	2.9	0.2	19.5	

	CHILCO ST Southbound				HAMILTON AVE Westbound				CHILCO ST Northbound				HAMILTON AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**11**	81	17	109	12	2	**3**	17	5	**17**	1	23	3	**40**	4	**47**	196
05:15 PM	8	109	12	129	**13**	**6**	0	**19**	4	14	**7**	25	**6**	32	**8**	46	219
05:30 PM	6	**112**	**21**	**139**	12	3	1	16	**6**	17	4	**27**	6	31	5	42	**224**
05:45 PM	11	105	21	137	10	5	3	18	3	15	7	25	6	21	4	31	211
Total Volume	36	407	71	514	47	16	7	70	18	63	19	100	21	124	21	166	850
% App. Total	7	79.2	13.8		67.1	22.9	10		18	63	19		12.7	74.7	12.7		
PHF	.818	.908	.845	.924	.904	.667	.583	.921	.750	.926	.679	.926	.875	.775	.656	.883	.949

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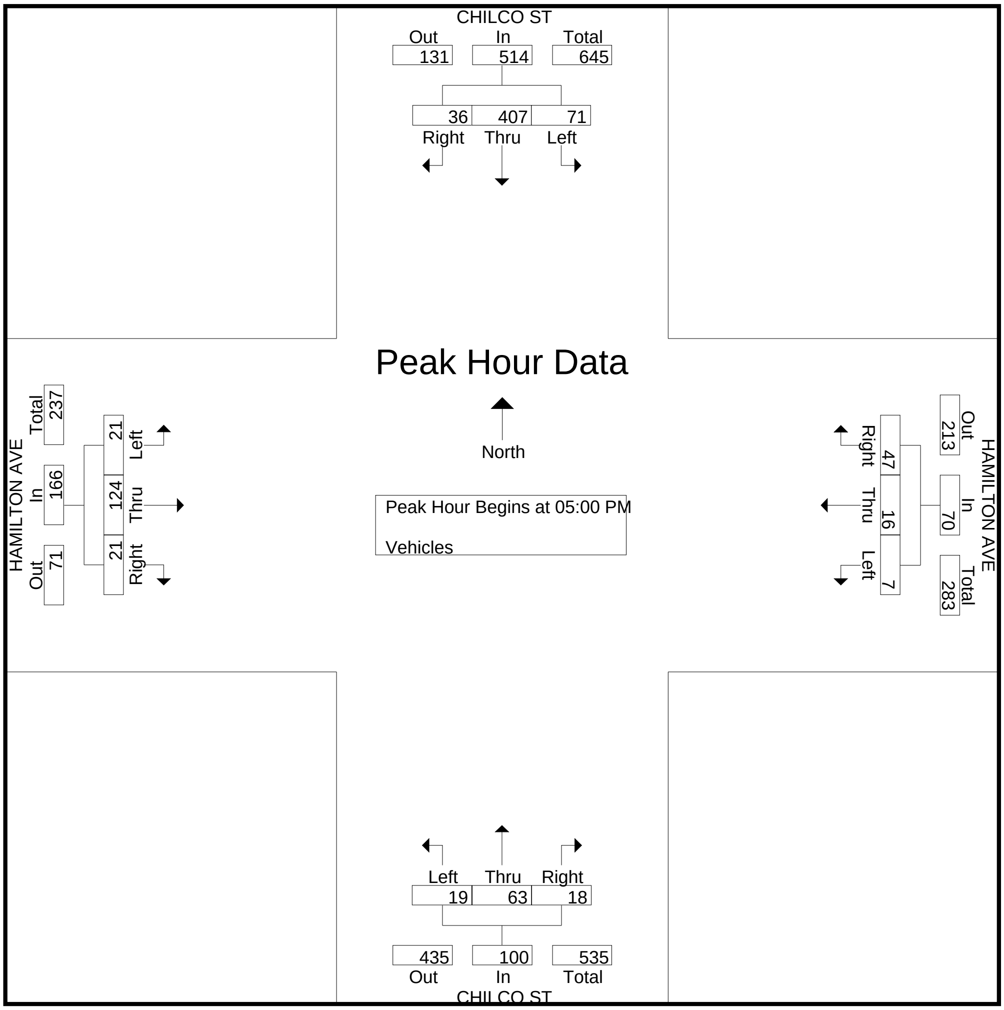

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Groups Printed- Bikes

	CHILCO ST Southbound					HAMILTON AVE Westbound					CHILCO ST Northbound					HAMILTON AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	3
04:15 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	1	1	1	0	3	1	2	0	0	3	0	0	0	0	0	0	1	0	0	1	7
04:45 PM	1	0	1	0	2	1	1	0	0	2	0	1	0	0	1	0	1	0	0	1	6
Total	3	1	3	0	7	2	3	1	0	6	0	1	0	0	1	0	3	0	0	3	17
05:00 PM	2	1	0	0	3	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	5
05:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	2	4	0	0	6	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	7
05:45 PM	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	3
Total	4	6	0	0	10	0	5	0	0	5	0	0	0	0	0	0	1	0	0	1	16
Grand Total	7	7	3	0	17	2	8	1	0	11	0	1	0	0	1	0	4	0	0	4	33
Apprch %	41.2	41.2	17.6	0		18.2	72.7	9.1	0		0	100	0	0		0	100	0	0		
Total %	21.2	21.2	9.1	0	51.5	6.1	24.2	3	0	33.3	0	3	0	0	3	0	12.1	0	0	12.1	

	CHILCO ST Southbound				HAMILTON AVE Westbound				CHILCO ST Northbound				HAMILTON AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	1	**1**	**1**	**3**	**1**	**2**	0	**3**	0	0	0	0	0	**1**	0	**1**	**7**
04:45 PM	1	0	1	2	1	1	0	2	0	**1**	0	**1**	0	1	0	1	6
05:00 PM	**2**	1	0	3	0	1	0	1	0	0	0	0	0	1	0	1	5
Total Volume	5	2	2	9	2	4	0	6	0	1	0	1	0	3	0	3	19
% App. Total	55.6	22.2	22.2		33.3	66.7	0		0	100	0		0	100	0		
PHF	.625	.500	.500	.750	.500	.500	.000	.500	.000	.250	.000	.250	.000	.750	.000	.750	.679

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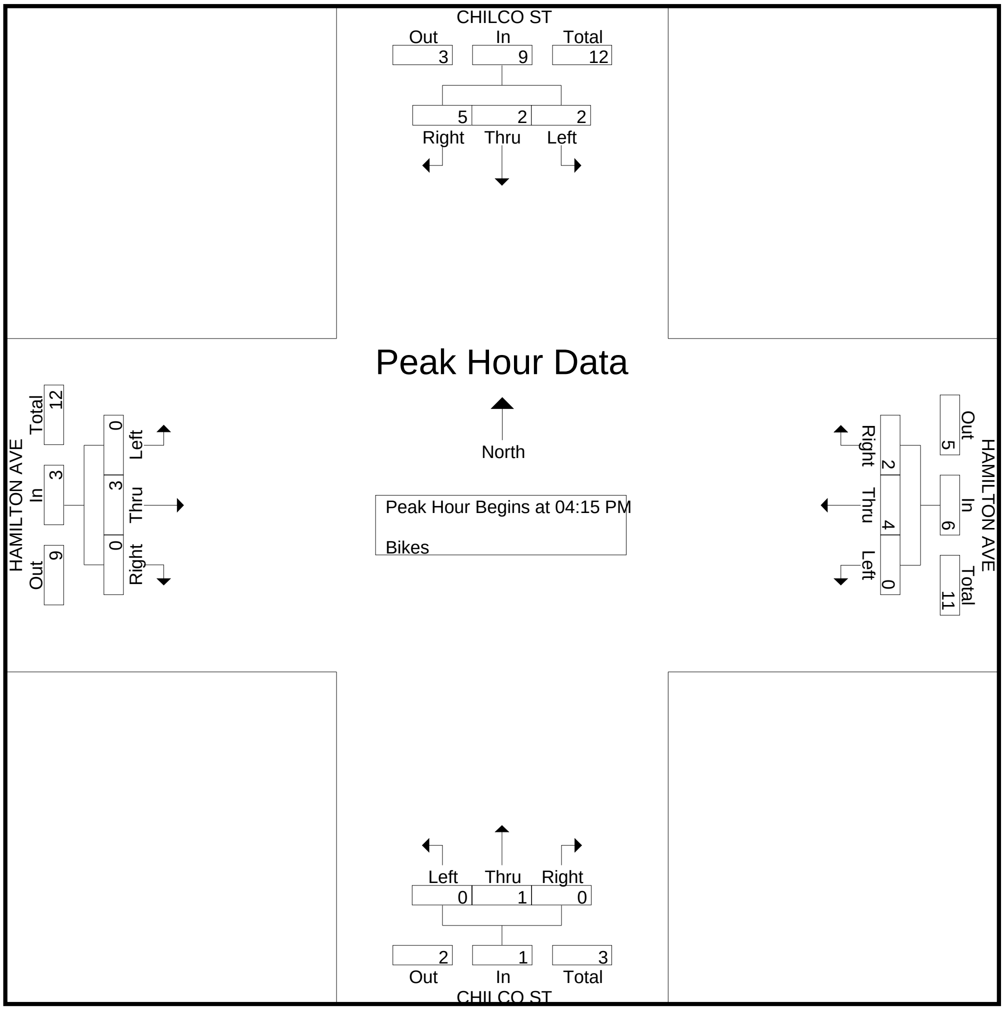

Traffic Data Service

Campbell, CA
(408) 377-2988
tdsbay@cs.com

File Name : 13AM FINAL
Site Code : 00000013
Start Date : 5/6/2015

Groups Printed- Vehicles

	CHILCO ST Southbound					Westbound					CHILCO ST Northbound					TERMINAL AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	10	0	0	14	0	0	0	0	0	0	29	2	0	31	10	0	23	1	34	79
07:15 AM	9	7	0	0	16	0	0	0	0	0	0	38	3	0	41	11	0	23	1	35	92
07:30 AM	9	22	0	0	31	0	0	0	0	0	0	68	6	0	74	9	0	34	0	43	148
07:45 AM	15	23	0	1	39	0	0	0	0	0	0	51	12	0	63	9	0	36	0	45	147
Total	37	62	0	1	100	0	0	0	0	0	0	186	23	0	209	39	0	116	2	157	466
08:00 AM	16	27	0	0	43	0	0	0	0	0	0	42	15	0	57	11	0	23	0	34	134
08:15 AM	22	29	0	3	54	0	0	0	0	0	0	45	15	0	60	16	0	22	1	39	153
08:30 AM	9	29	0	0	38	0	0	0	0	0	0	40	4	0	44	8	0	20	1	29	111
08:45 AM	5	21	0	0	26	0	0	0	0	0	0	33	4	1	38	4	0	8	0	12	76
Total	52	106	0	3	161	0	0	0	0	0	0	160	38	1	199	39	0	73	2	114	474
Grand Total	89	168	0	4	261	0	0	0	0	0	0	346	61	1	408	78	0	189	4	271	940
Apprch %	34.1	64.4	0	1.5		0	0	0	0		0	84.8	15	0.2		28.8	0	69.7	1.5		
Total %	9.5	17.9	0	0.4	27.8	0	0	0	0	0	0	36.8	6.5	0.1	43.4	8.3	0	20.1	0.4	28.8	

	CHILCO ST Southbound				Westbound				CHILCO ST Northbound				TERMINAL AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	9	22	0	31	0	0	0	0	0	**68**	6	**74**	9	0	34	43	148
07:45 AM	15	23	0	38	0	0	0	0	0	51	12	63	9	0	**36**	**45**	146
08:00 AM	16	27	0	43	0	0	0	0	0	42	**15**	57	11	0	23	34	134
08:15 AM	**22**	**29**	0	**51**	0	0	0	0	0	45	15	60	**16**	0	22	38	**149**
Total Volume	62	101	0	163	0	0	0	0	0	206	48	254	45	0	115	160	577
% App. Total	38	62	0		0	0	0		0	81.1	18.9		28.1	0	71.9		
PHF	.705	.871	.000	.799	.000	.000	.000	.000	.000	.757	.800	.858	.703	.000	.799	.889	.968

Traffic Data Service

Campbell, CA
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File Name : 13AM FINAL
Site Code : 00000013
Start Date : 5/6/2015
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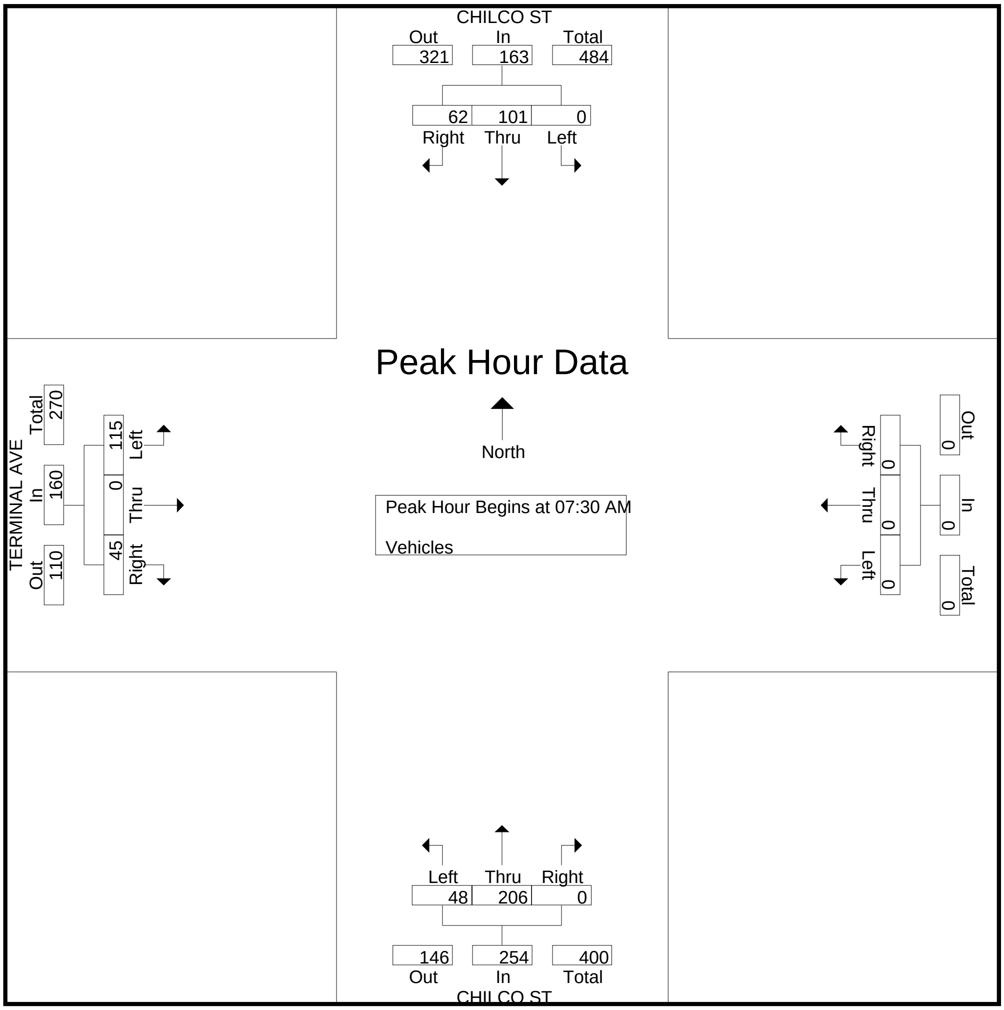

Traffic Data Service

Campbell, CA
(408) 377-2988
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File Name : 13AM FINAL
Site Code : 00000013
Start Date : 5/6/2015
Page No : 1

Groups Printed- Bikes

	CHILCO ST Southbound					Westbound					CHILCO ST Northbound					TERMINAL AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
07:15 AM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	4
07:30 AM	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	2	0	1	0	3	6
Total	0	3	0	0	3	0	0	0	0	0	0	10	0	0	10	2	0	1	0	3	16
08:00 AM	0	1	0	0	1	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	5
08:15 AM	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	1	0	2	0	3	6
08:45 AM	0	4	0	0	4	0	0	0	0	0	0	2	2	0	4	0	0	0	0	0	8
Total	0	7	0	0	7	0	0	0	0	0	0	12	2	0	14	1	0	2	0	3	24
Grand Total	0	10	0	0	10	0	0	0	0	0	0	22	2	0	24	3	0	3	0	6	40
Apprch %	0	100	0	0		0	0	0	0		0	91.7	8.3	0		50	0	50	0		
Total %	0	25	0	0	25	0	0	0	0	0	0	55	5	0	60	7.5	0	7.5	0	15	

	CHILCO ST Southbound				Westbound				CHILCO ST Northbound				TERMINAL AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	1	0	1	0	0	0	0	0	**4**	0	**4**	0	0	0	0	5
08:15 AM	0	2	0	2	0	0	0	0	0	3	0	3	0	0	0	0	5
08:30 AM	0	0	0	0	0	0	0	0	0	3	0	3	**1**	0	**2**	**3**	6
08:45 AM	0	**4**	0	**4**	0	0	0	0	0	2	**2**	4	0	0	0	0	**8**
Total Volume	0	7	0	7	0	0	0	0	0	12	2	14	1	0	2	3	24
% App. Total	0	100	0		0	0	0		0	85.7	14.3		33.3	0	66.7		
PHF	.000	.438	.000	.438	.000	.000	.000	.000	.000	.750	.250	.875	.250	.000	.250	.250	.750

Traffic Data Service

Campbell, CA
(408) 377-2988
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File Name : 13AM FINAL
Site Code : 00000013
Start Date : 5/6/2015
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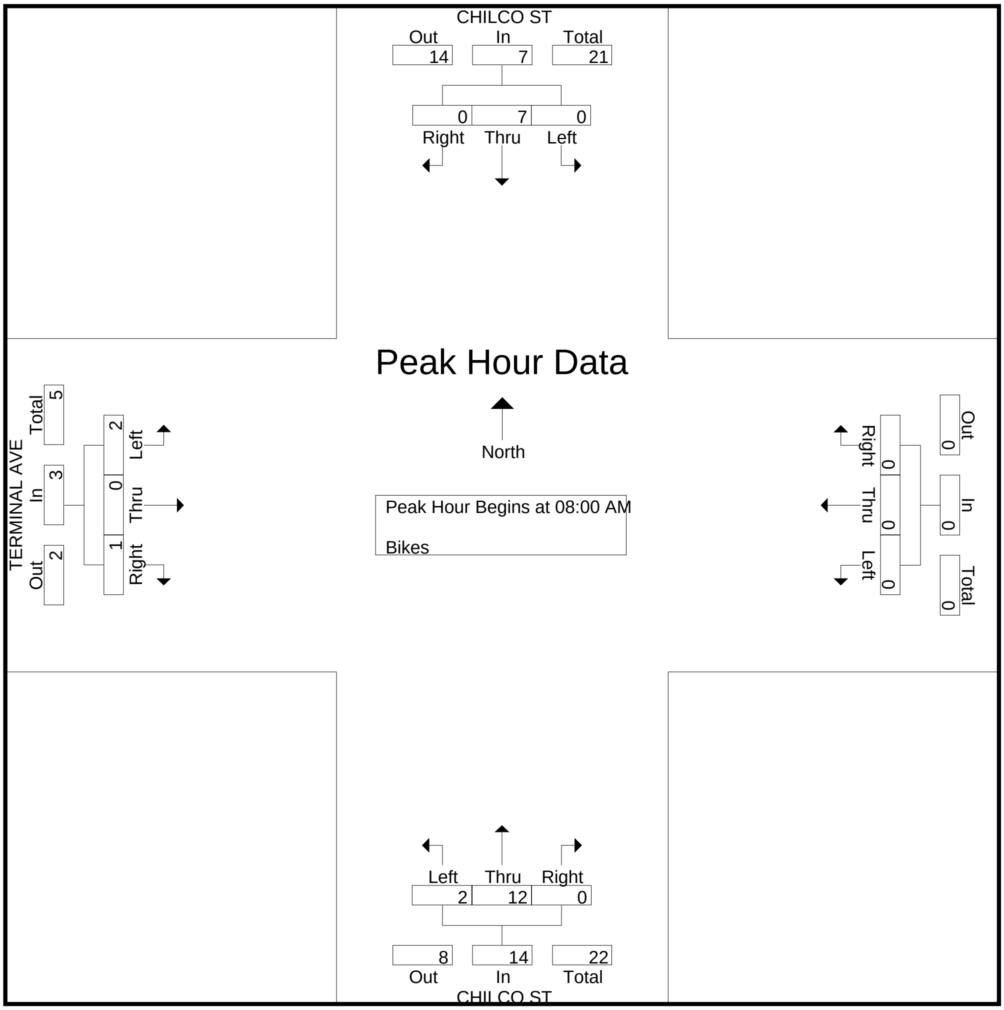

Traffic Data Service

Campbell, CA
(408) 377-2988
tdsbay@cs.com

File Name : 13PM FINAL
Site Code : 00000013
Start Date : 5/6/2015

Groups Printed- Vehicles

	CHILCO ST Southbound					Westbound					CHILCO ST Northbound					TERMINAL AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	21	43	0	0	64	0	0	0	0	0	0	23	5	1	29	10	0	13	0	23	116
04:15 PM	23	48	0	0	71	0	0	0	0	0	0	20	7	0	27	9	0	8	0	17	115
04:30 PM	35	70	0	0	105	0	0	0	0	0	0	27	6	0	33	3	0	3	3	9	147
04:45 PM	40	90	0	0	130	0	0	0	0	0	0	28	4	0	32	7	0	10	0	17	179
Total	119	251	0	0	370	0	0	0	0	0	0	98	22	1	121	29	0	34	3	66	557
05:00 PM	42	105	0	0	147	0	0	0	0	0	0	30	3	0	33	3	0	8	1	12	192
05:15 PM	39	128	0	0	167	0	0	0	0	0	0	32	4	0	36	4	0	12	2	18	221
05:30 PM	39	135	0	1	175	0	0	0	0	0	0	28	7	0	35	3	0	8	2	13	223
05:45 PM	42	134	0	0	176	0	0	0	0	0	0	22	7	0	29	4	0	12	3	19	224
Total	162	502	0	1	665	0	0	0	0	0	0	112	21	0	133	14	0	40	8	62	860
Grand Total	281	753	0	1	1035	0	0	0	0	0	0	210	43	1	254	43	0	74	11	128	1417
Apprch %	27.1	72.8	0	0.1		0	0	0	0		0	82.7	16.9	0.4		33.6	0	57.8	8.6		
Total %	19.8	53.1	0	0.1	73	0	0	0	0	0	0	14.8	3	0.1	17.9	3	0	5.2	0.8	9	

	CHILCO ST Southbound				Westbound				CHILCO ST Northbound				TERMINAL AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**42**	105	0	147	0	0	0	0	0	30	3	33	3	0	8	11	191
05:15 PM	39	128	0	167	0	0	0	0	0	**32**	4	**36**	**4**	0	**12**	**16**	219
05:30 PM	39	**135**	0	174	0	0	0	0	0	28	**7**	35	3	0	8	11	220
05:45 PM	42	134	0	**176**	0	0	0	0	0	22	7	29	4	0	12	16	**221**
Total Volume	162	502	0	664	0	0	0	0	0	112	21	133	14	0	40	54	851
% App. Total	24.4	75.6	0		0	0	0		0	84.2	15.8		25.9	0	74.1		
PHF	.964	.930	.000	.943	.000	.000	.000	.000	.000	.875	.750	.924	.875	.000	.833	.844	.963

Traffic Data Service

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File Name : 13PM FINAL
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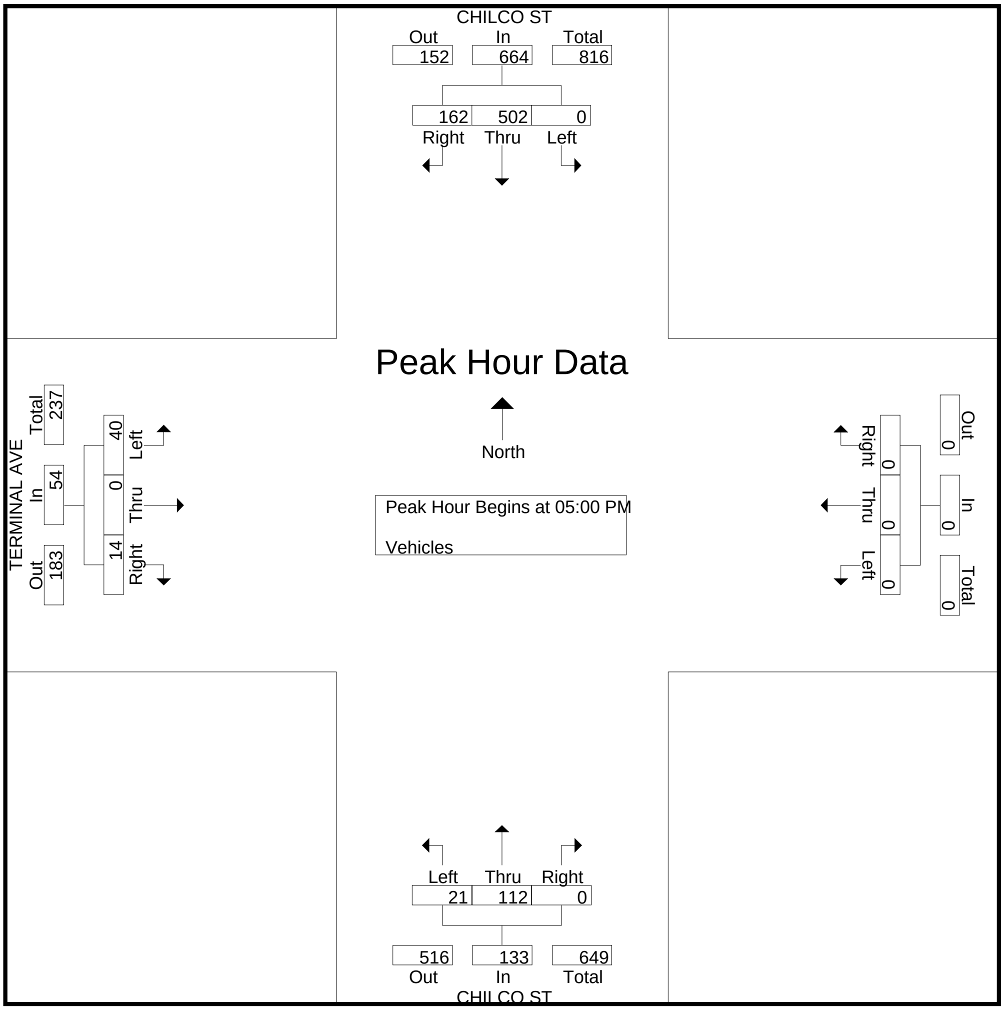

Traffic Data Service

Campbell, CA
(408) 377-2988
tdsbay@cs.com

File Name : 13PM FINAL
Site Code : 00000013
Start Date : 5/6/2015
Page No : 1

Groups Printed- Bikes

	CHILCO ST Southbound					Westbound					CHILCO ST Northbound					TERMINAL AVE Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	2	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
04:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	1	3	0	0	4	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	5
04:45 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	1	0	1	4
Total	3	6	0	0	9	0	0	0	0	0	0	2	1	0	3	0	0	1	0	1	13
05:00 PM	1	4	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
05:15 PM	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	5
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2
Total	2	9	0	0	11	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	13
Grand Total	5	15	0	0	20	0	0	0	0	0	0	2	1	0	3	1	0	2	0	3	26
Apprch %	25	75	0	0		0	0	0	0		0	66.7	33.3	0		33.3	0	66.7	0		
Total %	19.2	57.7	0	0	76.9	0	0	0	0	0	0	7.7	3.8	0	11.5	3.8	0	7.7	0	11.5	

	CHILCO ST Southbound				Westbound				CHILCO ST Northbound				TERMINAL AVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
04:30 PM	**1**	3	0	4	0	0	0	0	0	0	**1**	1	0	0	0	0	**5**
04:45 PM	0	1	0	1	0	0	0	0	0	**2**	0	**2**	0	0	**1**	**1**	4
05:00 PM	1	**4**	0	**5**	0	0	0	0	0	0	0	0	0	0	0	0	5
Total Volume	2	9	0	11	0	0	0	0	0	2	1	3	0	0	1	1	15
% App. Total	18.2	81.8	0		0	0	0		0	66.7	33.3		0	0	100		
PHF	.500	.563	.000	.550	.000	.000	.000	.000	.000	.250	.250	.375	.000	.000	.250	.250	.750

Traffic Data Service

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File Name : 13PM FINAL
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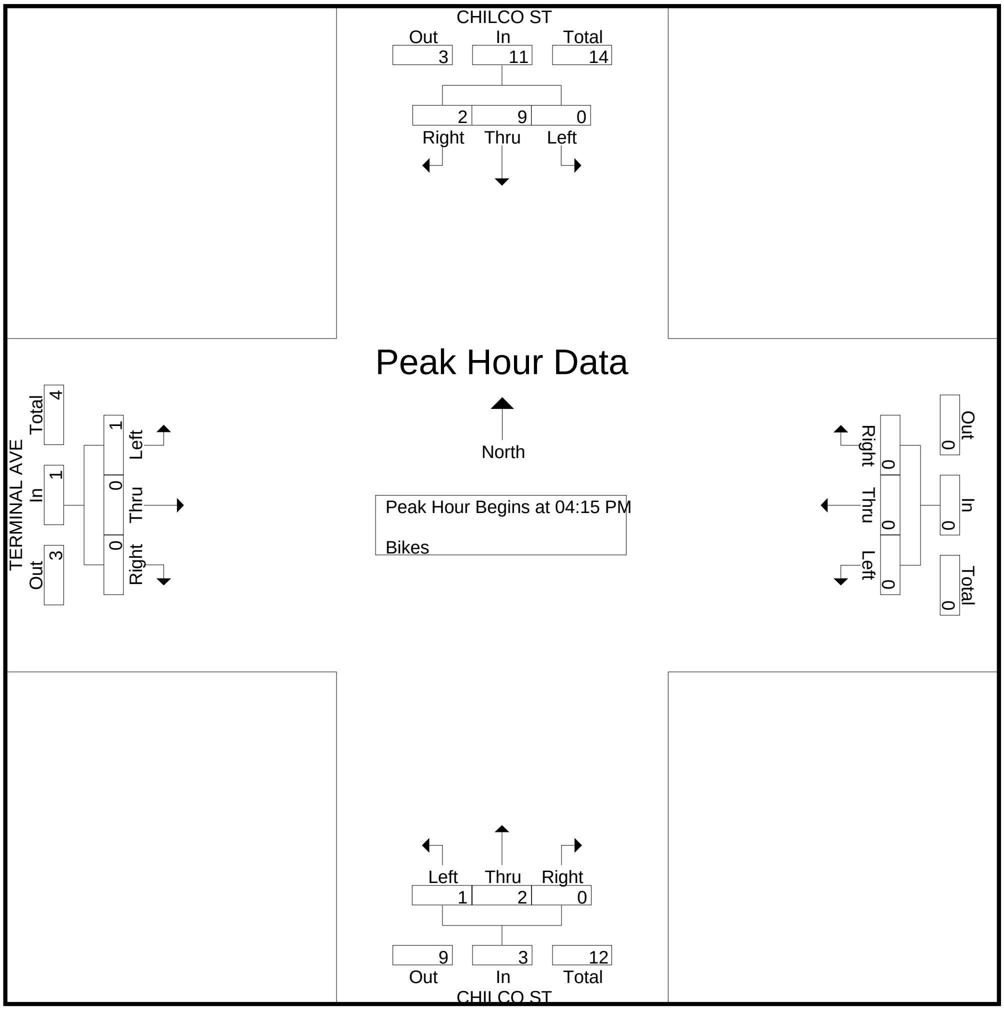

Traffic Data Service

Campbell, CA
(408) 377-2988
tdsbay@cs.com

File Name : 14AM FINAL
Site Code : 00000014
Start Date : 5/6/2015
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Groups Printed- Vehicles

	CHILCO ST Southbound						IVY DR Westbound						CHILCO ST Northbound						IVY DR Eastbound						HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
07:00 AM	0	16	6	0	0	22	1	4	0	0	0	5	2	1	10	2	1	16	0	0	0	1	2	3	1	0	4	2	1	8	54
07:15 AM	0	10	9	0	0	19	1	8	1	1	0	11	0	0	8	4	1	13	3	0	0	1	0	4	0	0	3	2	0	5	52
07:30 AM	3	12	12	0	7	34	3	14	8	2	0	27	2	0	10	10	2	24	8	4	0	4	1	17	2	0	7	3	4	16	118
07:45 AM	6	9	6	0	18	39	3	11	12	0	3	29	2	0	13	9	0	24	1	13	0	1	0	15	2	0	5	3	6	16	123
Total	9	47	33	0	25	114	8	37	21	3	3	72	6	1	41	25	4	77	12	17	0	7	3	39	5	0	19	10	11	45	347
08:00 AM	5	7	10	0	31	53	5	9	17	2	1	34	2	0	12	13	5	32	9	10	0	8	5	32	0	1	0	1	17	19	170
08:15 AM	3	16	9	0	38	66	8	11	21	0	2	42	3	0	15	11	14	43	8	24	0	5	9	46	1	0	0	2	26	29	226
08:30 AM	6	22	16	0	13	57	3	8	6	0	1	18	5	0	4	9	11	29	7	9	0	3	11	30	0	1	3	1	10	15	149
08:45 AM	0	11	10	0	14	35	1	8	4	1	0	14	1	0	8	5	4	18	3	5	0	5	13	26	1	0	5	0	12	18	111
Total	14	56	45	0	96	211	17	36	48	3	4	108	11	0	39	38	34	122	27	48	0	21	38	134	2	2	8	4	65	81	656
Grand Total	23	103	78	0	121	325	25	73	69	6	7	180	17	1	80	63	38	199	39	65	0	28	41	173	7	2	27	14	76	126	1003
Apprch %	7.1	31.7	24	0	37.2		13.9	40.6	38.3	3.3	3.9		8.5	0.5	40.2	31.7	19.1		22.5	37.6	0	16.2	23.7		5.6	1.6	21.4	11.1	60.3		
Total %	2.3	10.3	7.8	0	12.1	32.4	2.5	7.3	6.9	0.6	0.7	17.9	1.7	0.1	8	6.3	3.8	19.8	3.9	6.5	0	2.8	4.1	17.2	0.7	0.2	2.7	1.4	7.6	12.6	

	CHILCO ST Southbound					IVY DR Westbound					CHILCO ST Northbound					IVY DR Eastbound					HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 07:45 AM																											
07:45 AM	**6**	9	6	0	21	3	**11**	12	0	26	2	0	13	9	24	1	13	0	1	15	**2**	0	**5**	**3**	6	16	102
08:00 AM	5	7	10	0	22	5	9	17	**2**	33	2	0	12	**13**	27	**9**	10	0	**8**	27	0	**1**	0	1	17	19	128
08:15 AM	3	16	9	0	28	**8**	11	**21**	0	**40**	3	0	**15**	11	**29**	8	**24**	0	5	**37**	1	0	0	2	**26**	**29**	**163**
08:30 AM	6	**22**	**16**	0	**44**	3	8	6	0	17	**5**	0	4	9	18	7	9	0	3	19	0	1	3	1	10	15	113
Total Volume	20	54	41	0	115	19	39	56	2	116	12	0	44	42	98	25	56	0	17	98	3	2	8	7	59	79	506
% App. Total	17.4	47	35.7	0		16.4	33.6	48.3	1.7		12.2	0	44.9	42.9		25.5	57.1	0	17.3		3.8	2.5	10.1	8.9	74.7		
PHF	.833	.614	.641	.000	.653	.594	.886	.667	.250	.725	.600	.000	.733	.808	.845	.694	.583	.000	.531	.662	.375	.500	.400	.583	.567	.681	.776

Traffic Data Service

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File Name : 14AM FINAL
Site Code : 00000014
Start Date : 5/6/2015
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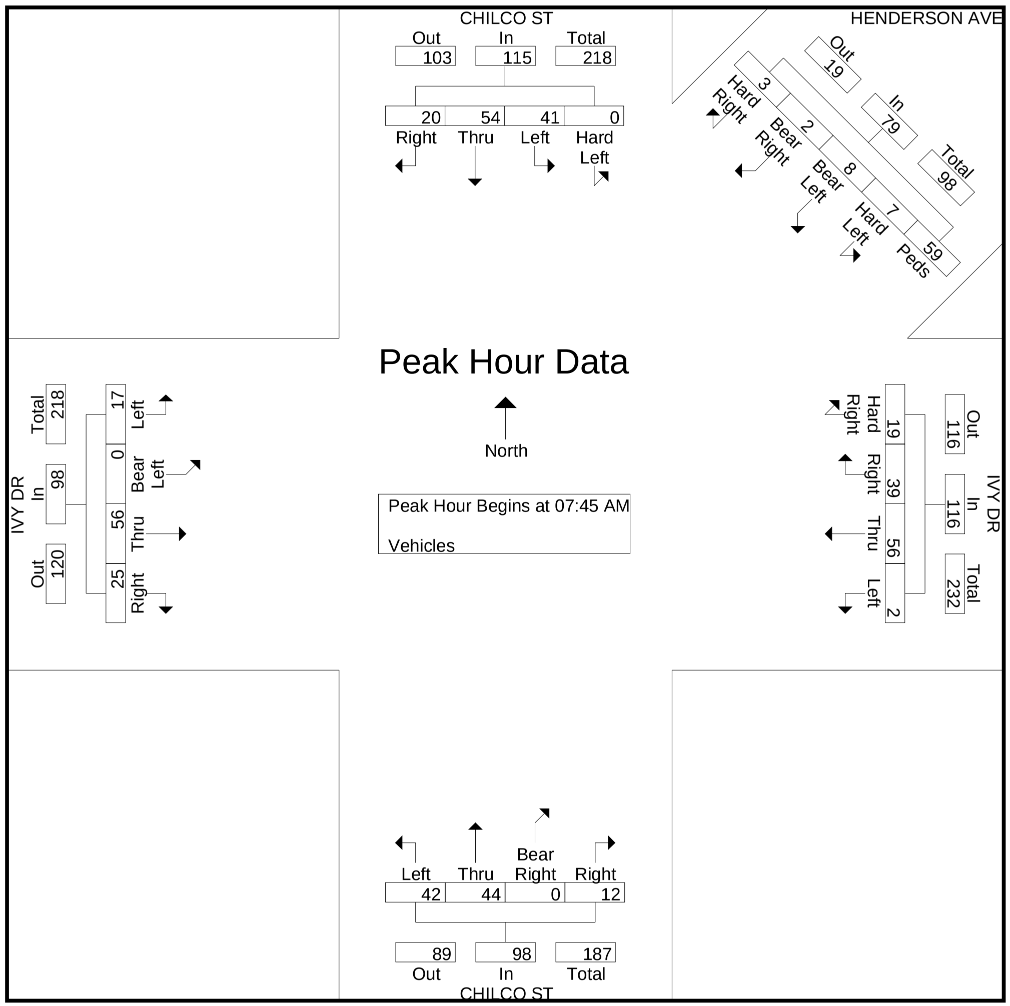

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Campbell, CA
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tdsbay@cs.com

File Name : 14AM FINAL
Site Code : 00000014
Start Date : 5/6/2015
Page No : 1

Groups Printed- Bikes

	CHILCO ST Southbound						IVY DR Westbound						CHILCO ST Northbound						IVY DR Eastbound						HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
07:00 AM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
07:15 AM	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
07:30 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
07:45 AM	0	3	0	0	0	3	0	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6
Total	0	5	1	0	0	6	0	0	3	0	0	3	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	11
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	1	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	4
08:30 AM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
08:45 AM	0	0	1	0	0	1	0	0	1	0	0	1	0	0	4	0	0	4	0	2	0	1	0	3	0	0	0	0	0	0	9
Total	0	1	1	0	0	2	0	0	3	0	0	3	0	0	4	1	0	5	1	3	0	1	0	5	0	0	0	0	0	0	15
Grand Total	0	6	2	0	0	8	0	0	6	0	0	6	1	0	5	1	0	7	1	3	0	1	0	5	0	0	0	0	0	0	26
Apprch %	0	75	25	0	0		0	0	100	0	0		14.3	0	71.4	14.3	0		20	60	0	20	0		0	0	0	0	0		
Total %	0	23.1	7.7	0	0	30.8	0	0	23.1	0	0	23.1	3.8	0	19.2	3.8	0	26.9	3.8	11.5	0	3.8	0	19.2	0	0	0	0	0	0	

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 08:00 AM

	CHILCO ST Southbound					IVY DR Westbound					CHILCO ST Northbound					IVY DR Eastbound					HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
08:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	**1**	0	0	**1**	0	0	**1**	0	**1**	0	0	0	**1**	1	**1**	0	0	0	1	0	0	0	0	0	0	4
08:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2
08:45 AM	0	0	**1**	0	1	0	0	1	0	1	0	0	**4**	0	**4**	0	**2**	0	**1**	**3**	0	0	0	0	0	0	**9**
Total Volume	0	1	1	0	2	0	0	3	0	3	0	0	4	1	5	1	3	0	1	5	0	0	0	0	0	0	15
% App. Total	0	50	50	0		0	0	100	0		0	0	80	20		20	60	0	20		0	0	0	0	0		
PHF	.000	.250	.250	.000	.500	.000	.000	.750	.000	.750	.000	.000	.250	.250	.313	.250	.375	.000	.250	.417	.000	.000	.000	.000	.000	.000	.417

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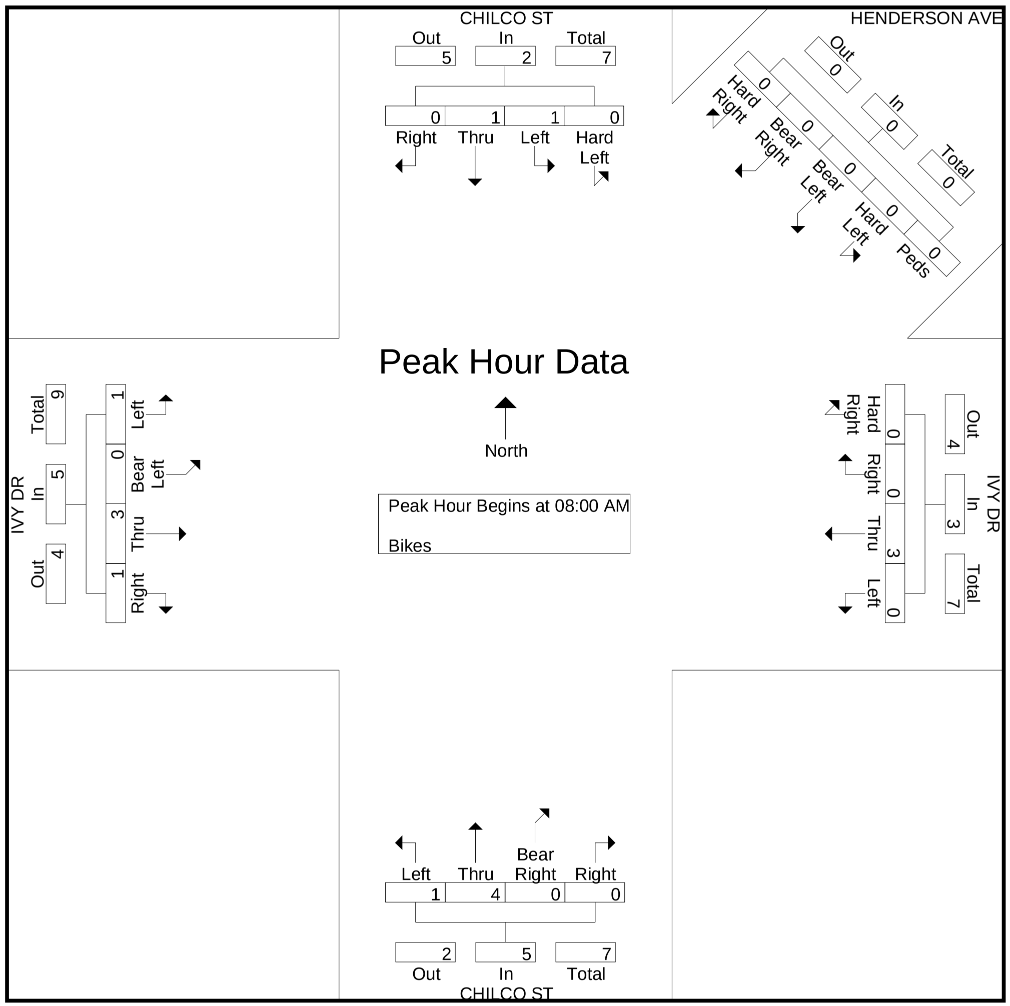

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Groups Printed- Vehicles

	CHILCO ST Southbound						IVY DR Westbound						CHILCO ST Northbound						IVY DR Eastbound						HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
04:00 PM	1	19	18	1	4	43	3	6	1	1	1	12	1	1	11	2	4	19	3	5	1	1	1	11	2	0	0	0	4	6	91
04:15 PM	4	29	22	0	3	58	6	1	1	1	2	11	1	1	9	1	4	16	1	3	0	1	3	8	0	0	5	0	3	8	101
04:30 PM	1	34	22	0	9	66	7	6	0	0	4	17	3	0	13	6	2	24	2	3	0	3	6	14	0	0	1	1	8	10	131
04:45 PM	1	38	35	1	1	76	5	6	1	1	1	14	1	0	10	1	0	12	3	5	0	1	3	12	1	0	1	0	1	3	117
Total	7	120	97	2	17	243	21	19	3	3	8	54	6	2	43	10	10	71	9	16	1	6	13	45	3	0	7	1	16	27	440
05:00 PM	5	40	41	1	3	90	4	6	0	0	0	10	2	0	11	1	2	16	1	3	0	0	0	4	1	2	4	0	4	11	131
05:15 PM	2	55	54	1	4	116	5	9	1	1	0	16	3	0	13	5	1	22	1	6	0	2	0	9	0	2	2	3	5	12	175
05:30 PM	2	56	58	0	0	116	8	6	2	1	0	17	3	1	22	4	0	30	3	3	0	2	0	8	1	0	4	1	1	7	178
05:45 PM	5	67	36	1	4	113	3	5	4	2	0	14	1	1	16	17	0	35	7	4	0	0	17	28	1	0	1	2	6	10	200
Total	14	218	189	3	11	435	20	26	7	4	0	57	9	2	62	27	3	103	12	16	0	4	17	49	3	4	11	6	16	40	684
Grand Total	21	338	286	5	28	678	41	45	10	7	8	111	15	4	105	37	13	174	21	32	1	10	30	94	6	4	18	7	32	67	1124
Apprch %	3.1	49.9	42.2	0.7	4.1		36.9	40.5	9	6.3	7.2		8.6	2.3	60.3	21.3	7.5		22.3	34	1.1	10.6	31.9		9	6	26.9	10.4	47.8		
Total %	1.9	30.1	25.4	0.4	2.5	60.3	3.6	4	0.9	0.6	0.7	9.9	1.3	0.4	9.3	3.3	1.2	15.5	1.9	2.8	0.1	0.9	2.7	8.4	0.5	0.4	1.6	0.6	2.8	6	

	CHILCO ST Southbound					IVY DR Westbound					CHILCO ST Northbound					IVY DR Eastbound					HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 05:00 PM																											
05:00 PM	**5**	40	41	**1**	87	4	6	0	0	10	2	0	11	1	14	1	3	0	0	4	**1**	**2**	**4**	0	4	11	126
05:15 PM	2	55	54	1	112	5	**9**	1	1	16	**3**	0	13	5	21	1	**6**	0	**2**	9	0	2	2	**3**	5	**12**	170
05:30 PM	2	56	**58**	0	**116**	**8**	6	2	1	**17**	3	**1**	**22**	4	30	3	3	0	2	8	1	0	4	1	1	7	178
05:45 PM	5	**67**	36	1	109	3	5	**4**	**2**	14	1	1	16	**17**	**35**	**7**	4	0	0	**11**	1	0	1	2	**6**	10	**179**
Total Volume	14	218	189	3	424	20	26	7	4	57	9	2	62	27	100	12	16	0	4	32	3	4	11	6	16	40	653
% App. Total	3.3	51.4	44.6	0.7		35.1	45.6	12.3	7		9	2	62	27		37.5	50	0	12.5		7.5	10	27.5	15	40		
PHF	.700	.813	.815	.750	.914	.625	.722	.438	.500	.838	.750	.500	.705	.397	.714	.429	.667	.000	.500	.727	.750	.500	.688	.500	.667	.833	.912

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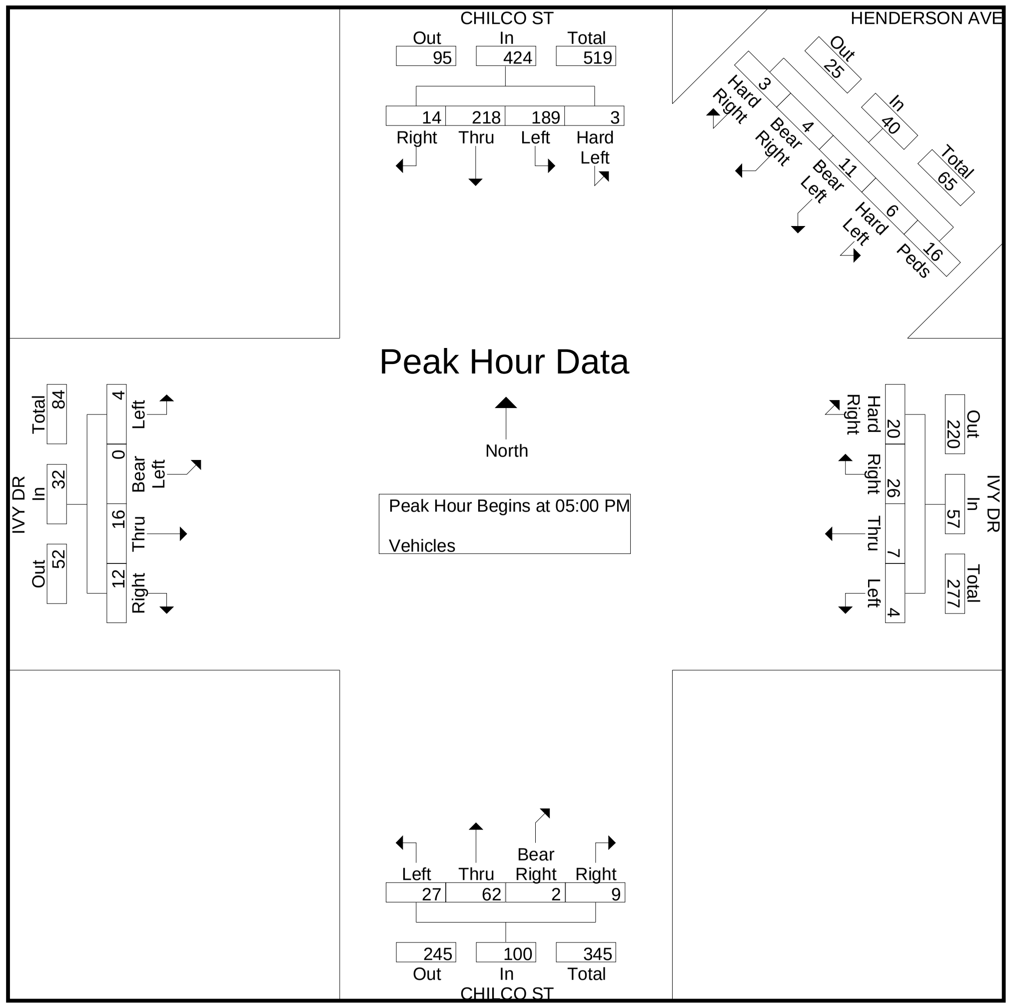

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File Name : 14PM FINAL
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Groups Printed- Bikes

	CHILCO ST Southbound						IVY DR Westbound						CHILCO ST Northbound						IVY DR Eastbound						HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	Peds	App. Total	Hard Right	Right	Thru	Left	Peds	App. Total	Right	Bear Right	Thru	Left	Peds	App. Total	Right	Thru	Bear Left	Left	Peds	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
04:00 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	1	0	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	3
04:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:45 PM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	0	1	1	0	0	2	1	1	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	6
05:00 PM	0	0	1	0	0	1	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:15 PM	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
05:45 PM	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3
Total	0	4	1	1	0	6	1	1	2	0	0	4	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	11
Grand Total	0	5	2	1	0	8	2	2	3	0	0	7	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1	17
Apprch %	0	62.5	25	12.5	0		28.6	28.6	42.9	0	0		0	0	0	0	0		0	100	0	0	0		0	100	0	0	0		
Total %	0	29.4	11.8	5.9	0	47.1	11.8	11.8	17.6	0	0	41.2	0	0	0	0	0	0	0	5.9	0	0	0	5.9	0	5.9	0	0	0	5.9	

	CHILCO ST Southbound					IVY DR Westbound					CHILCO ST Northbound					IVY DR Eastbound					HENDERSON AVE Southwestbound						
Start Time	Right	Thru	Left	Hard Left	App. Total	Hard Right	Right	Thru	Left	App. Total	Right	Bear Right	Thru	Left	App. Total	Right	Thru	Bear Left	Left	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																											
Peak Hour for Entire Intersection Begins at 05:00 PM																											
05:00 PM	0	0	**1**	0	1	0	**1**	**1**	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
05:15 PM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
05:30 PM	0	**4**	0	0	**4**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**4**
05:45 PM	0	0	0	**1**	1	**1**	0	0	0	1	0	0	0	0	0	0	**1**	0	0	**1**	0	0	0	0	0	0	3
Total Volume	0	4	1	1	6	1	1	2	0	4	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	11
% App. Total	0	66.7	16.7	16.7		25	25	50	0		0	0	0	0		0	100	0	0		0	0	0	0	0		
PHF	.000	.250	.250	.250	.375	.250	.250	.500	.000	.500	.000	.000	.000	.000	.000	.000	.250	.000	.000	.250	.000	.000	.000	.000	.000	.000	.688

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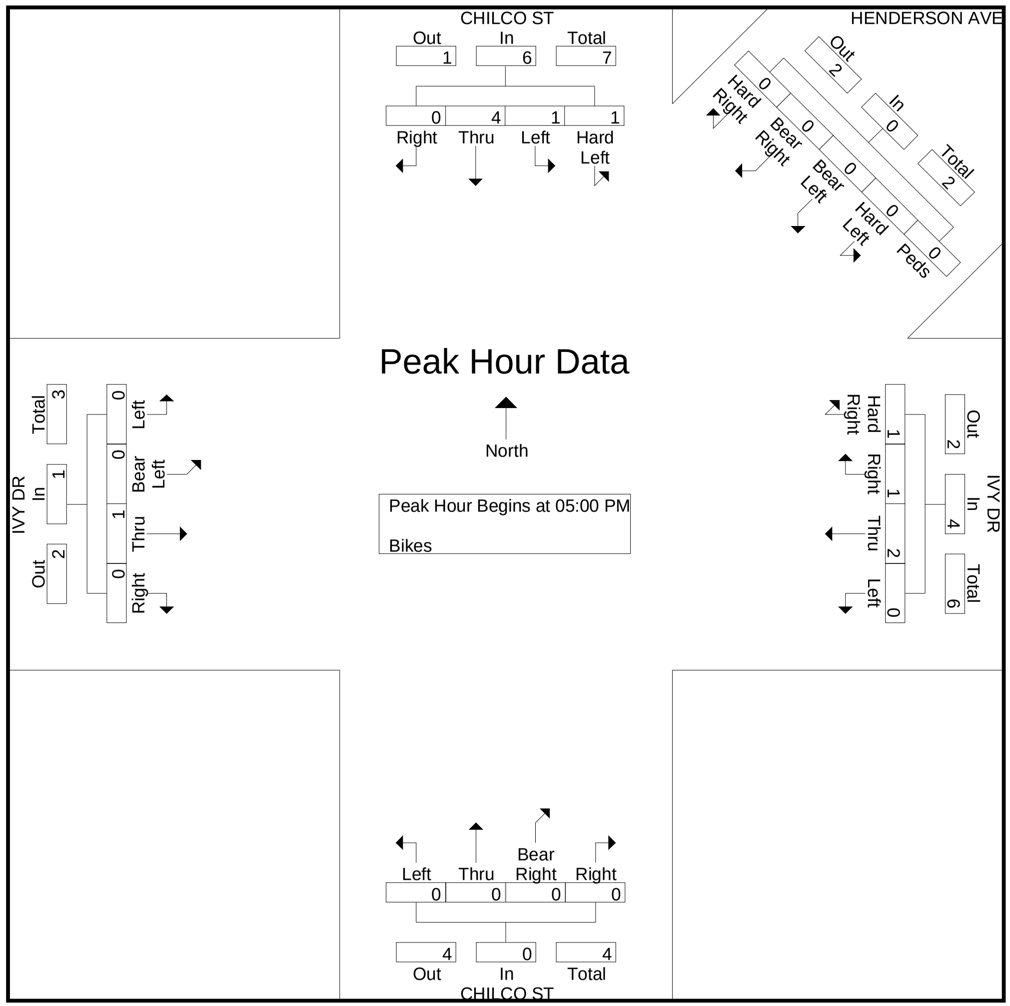

Traffic Data Service

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File Name : 15AM FINAL
Site Code : 00000015
Start Date : 5/7/2015
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Groups Printed- Vehicles

	CHILCO ST Southbound					NEWBRIDGE ST Westbound					WINDERMERE AVE Northbound					NEWBRIDGE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	4	1	16	0	21	7	14	1	0	22	3	3	0	2	8	0	49	2	0	51	102
07:15 AM	1	2	14	0	17	13	9	1	0	23	1	1	1	3	6	0	41	1	0	42	88
07:30 AM	1	3	20	0	24	16	17	2	0	35	2	4	1	2	9	1	36	1	1	39	107
07:45 AM	2	1	19	2	24	18	21	4	0	43	4	2	2	0	8	1	26	0	0	27	102
Total	8	7	69	2	86	54	61	8	0	123	10	10	4	7	31	2	152	4	1	159	399
08:00 AM	1	0	25	3	29	26	42	3	0	71	2	4	0	0	6	0	34	1	0	35	141
08:15 AM	1	3	21	7	32	25	38	3	0	66	1	6	0	3	10	1	23	2	8	34	142
08:30 AM	5	1	28	3	37	16	26	3	0	45	5	3	0	3	11	0	35	1	5	41	134
08:45 AM	2	4	6	0	12	11	16	1	0	28	2	1	1	8	12	0	22	1	3	26	78
Total	9	8	80	13	110	78	122	10	0	210	10	14	1	14	39	1	114	5	16	136	495
Grand Total	17	15	149	15	196	132	183	18	0	333	20	24	5	21	70	3	266	9	17	295	894
Apprch %	8.7	7.7	76	7.7		39.6	55	5.4	0		28.6	34.3	7.1	30		1	90.2	3.1	5.8		
Total %	1.9	1.7	16.7	1.7	21.9	14.8	20.5	2	0	37.2	2.2	2.7	0.6	2.3	7.8	0.3	29.8	1	1.9	33	

	CHILCO ST Southbound				NEWBRIDGE ST Westbound				WINDERMERE AVE Northbound				NEWBRIDGE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	2	1	19	22	18	21	**4**	43	4	2	**2**	**8**	**1**	26	0	27	100
08:00 AM	1	0	25	26	**26**	**42**	3	**71**	2	4	0	6	0	34	1	35	**138**
08:15 AM	1	**3**	21	25	25	38	3	66	1	**6**	0	7	1	23	**2**	26	124
08:30 AM	**5**	1	**28**	**34**	16	26	3	45	**5**	3	0	8	0	**35**	1	**36**	123
Total Volume	9	5	93	107	85	127	13	225	12	15	2	29	2	118	4	124	485
% App. Total	8.4	4.7	86.9		37.8	56.4	5.8		41.4	51.7	6.9		1.6	95.2	3.2		
PHF	.450	.417	.830	.787	.817	.756	.813	.792	.600	.625	.250	.906	.500	.843	.500	.861	.879

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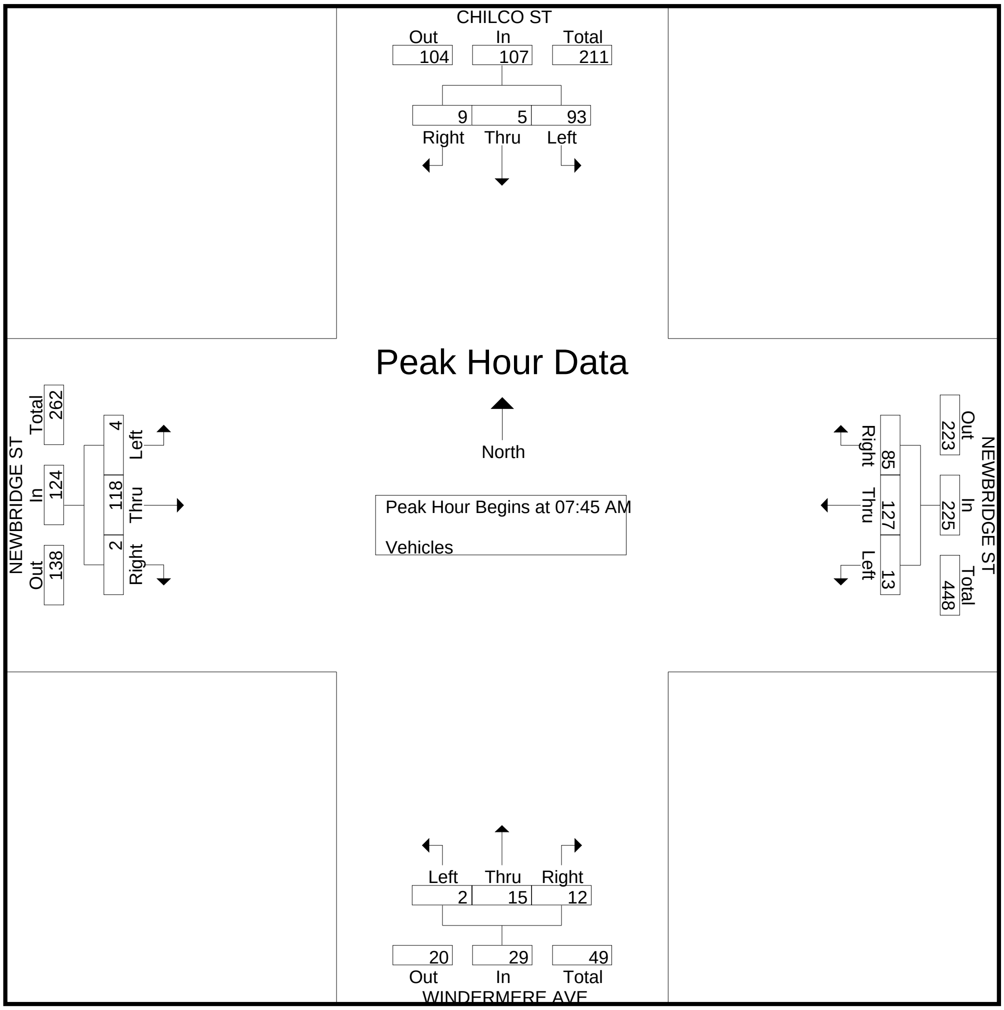

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File Name : 15AM FINAL
Site Code : 00000015
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Groups Printed- Bikes

	CHILCO ST Southbound					NEWBRIDGE ST Westbound					WINDERMERE AVE Northbound					NEWBRIDGE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	2
07:15 AM	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	3
07:30 AM	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	2
07:45 AM	0	0	3	0	3	0	3	1	0	4	0	0	0	0	0	0	0	0	0	0	7
Total	0	0	4	0	4	0	7	1	0	8	0	0	0	0	0	0	2	0	0	2	14
08:00 AM	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	3	1	0	4	6
08:15 AM	1	1	0	0	2	1	2	0	0	3	0	1	0	0	1	0	0	0	0	0	6
08:30 AM	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	0	1	0	0	1	4
08:45 AM	0	0	0	0	0	3	1	0	0	4	0	0	0	0	0	0	4	0	0	4	8
Total	1	1	1	0	3	6	5	0	0	11	0	1	0	0	1	0	8	1	0	9	24
Grand Total	1	1	5	0	7	6	12	1	0	19	0	1	0	0	1	0	10	1	0	11	38
Apprch %	14.3	14.3	71.4	0		31.6	63.2	5.3	0		0	100	0	0		0	90.9	9.1	0		
Total %	2.6	2.6	13.2	0	18.4	15.8	31.6	2.6	0	50	0	2.6	0	0	2.6	0	26.3	2.6	0	28.9	

	CHILCO ST Southbound				NEWBRIDGE ST Westbound				WINDERMERE AVE Northbound				NEWBRIDGE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	0	**1**	1	1	0	0	1	0	0	0	0	0	3	**1**	**4**	6
08:15 AM	**1**	**1**	0	**2**	1	**2**	0	3	0	**1**	0	**1**	0	0	0	0	6
08:30 AM	0	0	0	0	1	2	0	3	0	0	0	0	0	1	0	1	4
08:45 AM	0	0	0	0	**3**	1	0	**4**	0	0	0	0	0	**4**	0	4	**8**
Total Volume	1	1	1	3	6	5	0	11	0	1	0	1	0	8	1	9	24
% App. Total	33.3	33.3	33.3		54.5	45.5	0		0	100	0		0	88.9	11.1		
PHF	.250	.250	.250	.375	.500	.625	.000	.688	.000	.250	.000	.250	.000	.500	.250	.563	.750

Traffic Data Service

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File Name : 15AM FINAL
Site Code : 00000015
Start Date : 5/7/2015
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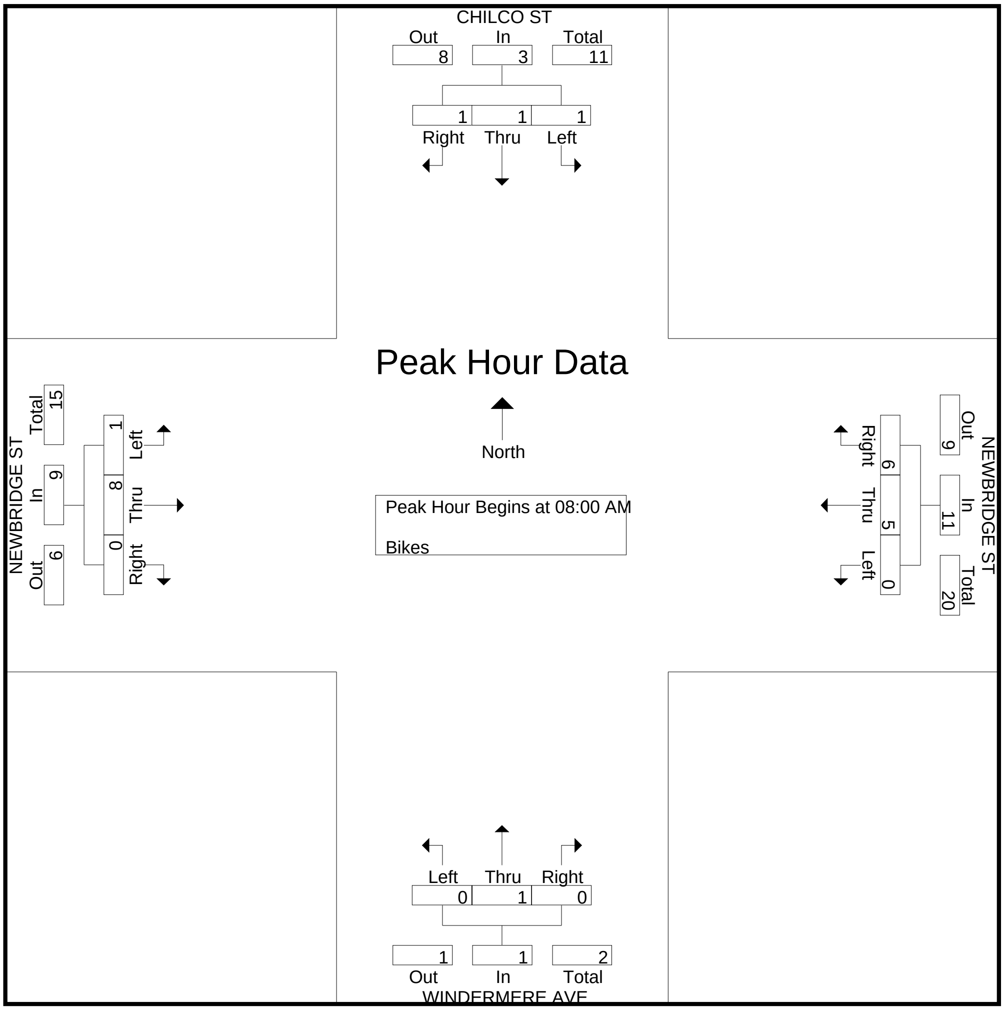

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File Name : 15PM FINAL
Site Code : 00000015
Start Date : 5/7/2015
Page No : 1

Groups Printed- Vehicles

	CHILCO ST Southbound					NEWBRIDGE ST Westbound					WINDERMERE AVE Northbound					NEWBRIDGE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	4	2	22	4	32	20	42	1	3	66	1	2	0	7	10	0	32	1	2	35	143
04:15 PM	4	2	23	2	31	18	32	2	2	54	2	1	0	1	4	1	29	1	2	33	122
04:30 PM	3	2	28	2	35	20	27	4	0	51	3	2	0	4	9	0	33	2	0	35	130
04:45 PM	4	6	32	4	46	9	29	3	1	42	1	1	0	3	5	0	32	1	2	35	128
Total	15	12	105	12	144	67	130	10	6	213	7	6	0	15	28	1	126	5	6	138	523
05:00 PM	1	4	44	5	54	17	24	5	0	46	0	1	0	2	3	0	35	0	0	35	138
05:15 PM	5	2	34	2	43	13	26	3	0	42	1	3	0	2	6	1	29	0	1	31	122
05:30 PM	4	7	39	0	50	14	34	2	0	50	2	0	0	0	2	1	40	3	0	44	146
05:45 PM	4	3	51	0	58	20	49	2	0	71	2	1	1	3	7	0	35	2	4	41	177
Total	14	16	168	7	205	64	133	12	0	209	5	5	1	7	18	2	139	5	5	151	583
Grand Total	29	28	273	19	349	131	263	22	6	422	12	11	1	22	46	3	265	10	11	289	1106
Apprch %	8.3	8	78.2	5.4		31	62.3	5.2	1.4		26.1	23.9	2.2	47.8		1	91.7	3.5	3.8		
Total %	2.6	2.5	24.7	1.7	31.6	11.8	23.8	2	0.5	38.2	1.1	1	0.1	2	4.2	0.3	24	0.9	1	26.1	

	CHILCO ST Southbound				NEWBRIDGE ST Westbound				WINDERMERE AVE Northbound				NEWBRIDGE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	1	4	44	49	17	24	**5**	46	0	1	0	1	0	35	0	35	131
05:15 PM	**5**	2	34	41	13	26	3	42	1	**3**	0	**4**	**1**	29	0	30	117
05:30 PM	4	**7**	39	50	14	34	2	50	**2**	0	0	2	1	**40**	**3**	**44**	146
05:45 PM	4	3	**51**	**58**	**20**	**49**	2	**71**	2	1	**1**	4	0	35	2	37	**170**
Total Volume	14	16	168	198	64	133	12	209	5	5	1	11	2	139	5	146	564
% App. Total	7.1	8.1	84.8		30.6	63.6	5.7		45.5	45.5	9.1		1.4	95.2	3.4		
PHF	.700	.571	.824	.853	.800	.679	.600	.736	.625	.417	.250	.688	.500	.869	.417	.830	.829

Traffic Data Service

Campbell, CA

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Site Code : 00000015
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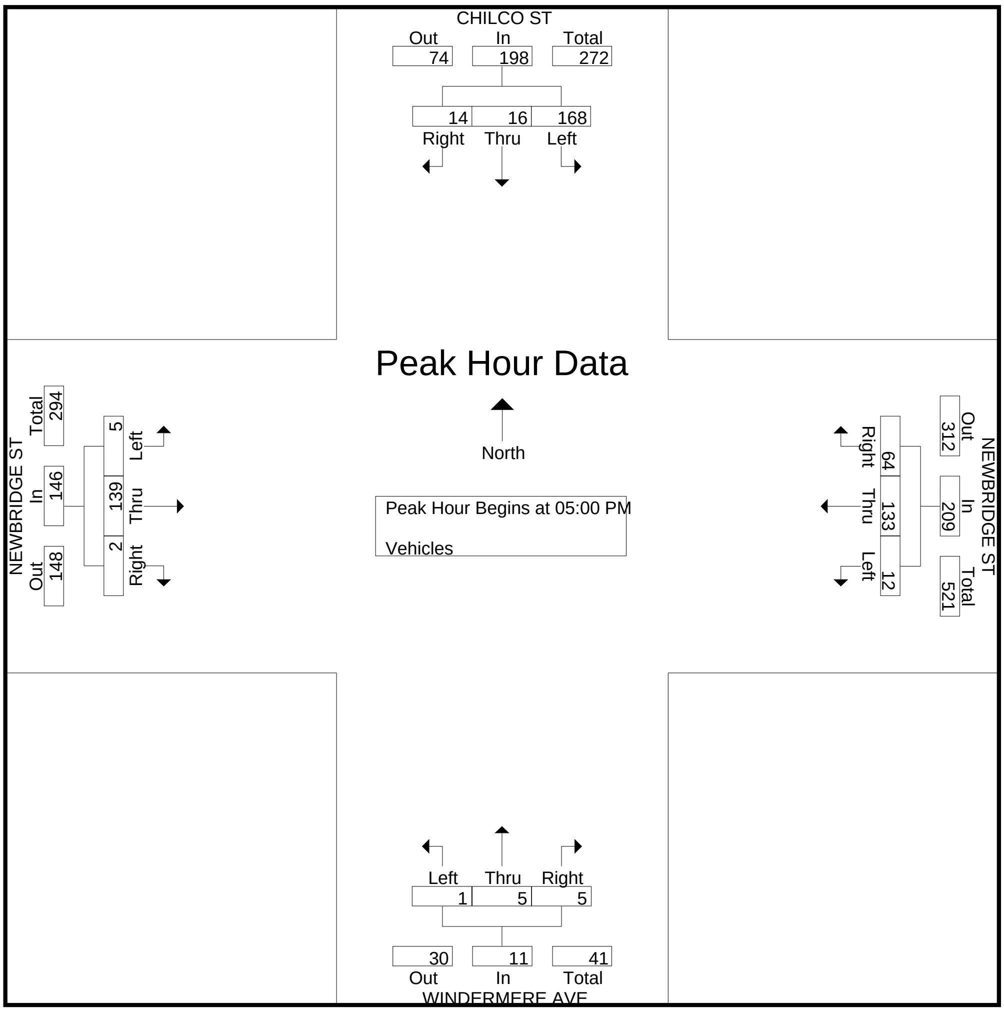

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File Name : 15PM FINAL
Site Code : 00000015
Start Date : 5/7/2015
Page No : 1

Groups Printed- Bikes

	CHILCO ST Southbound					NEWBRIDGE ST Westbound					WINDERMERE AVE Northbound					NEWBRIDGE ST Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
04:30 PM	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	5
04:45 PM	0	0	0	0	0	0	1	0	0	1	1	0	0	0	1	0	3	0	0	3	5
Total	0	1	0	0	1	0	4	0	0	4	1	0	0	0	1	0	6	0	0	6	12
05:00 PM	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	3
05:15 PM	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	5
05:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	2
Total	0	0	2	0	2	2	3	0	0	5	0	0	0	0	0	0	3	0	0	3	10
Grand Total	0	1	2	0	3	2	7	0	0	9	1	0	0	0	1	0	9	0	0	9	22
Apprch %	0	33.3	66.7	0		22.2	77.8	0	0		100	0	0	0		0	100	0	0		
Total %	0	4.5	9.1	0	13.6	9.1	31.8	0	0	40.9	4.5	0	0	0	4.5	0	40.9	0	0	40.9	

	CHILCO ST Southbound				NEWBRIDGE ST Westbound				WINDERMERE AVE Northbound				NEWBRIDGE ST Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:30 PM																	
04:30 PM	0	0	0	0	0	**3**	0	**3**	0	0	0	0	0	2	0	2	**5**
04:45 PM	0	0	0	0	0	1	0	1	**1**	0	0	**1**	0	**3**	0	**3**	5
05:00 PM	0	0	**1**	**1**	**1**	0	0	1	0	0	0	0	0	1	0	1	3
05:15 PM	0	0	1	1	0	3	0	3	0	0	0	0	0	1	0	1	5
Total Volume	0	0	2	2	1	7	0	8	1	0	0	1	0	7	0	7	18
% App. Total	0	0	100		12.5	87.5	0		100	0	0		0	100	0		
PHF	.000	.000	.500	.500	.250	.583	.000	.667	.250	.000	.000	.250	.000	.583	.000	.583	.900

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File Name : 15PM FINAL
Site Code : 00000015
Start Date : 5/7/2015
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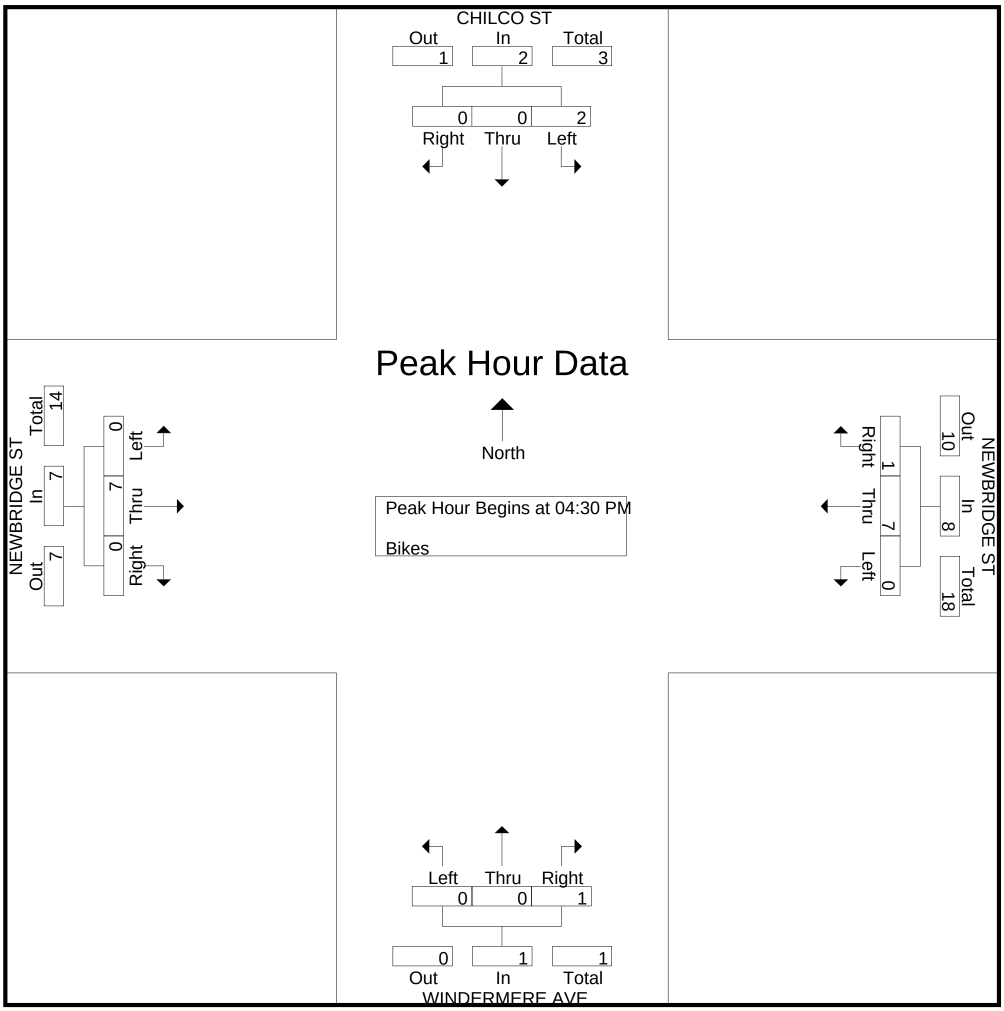
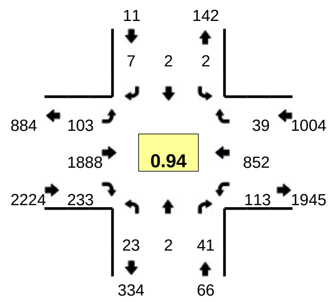
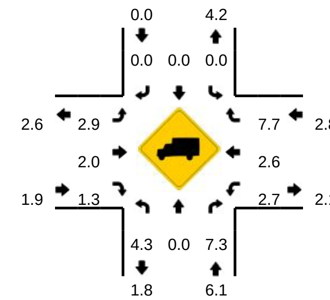


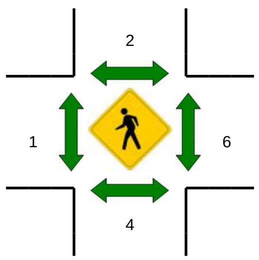
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

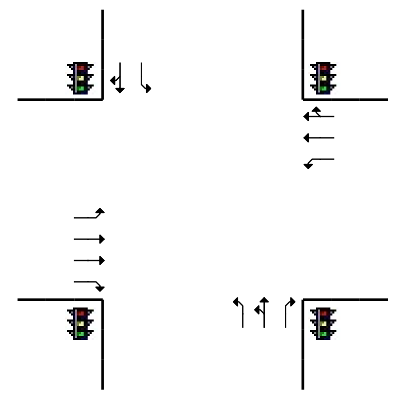
LOCATION: Addison-Wesley -- Sand Hill Rd | **QC JOB #:** 12899501
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

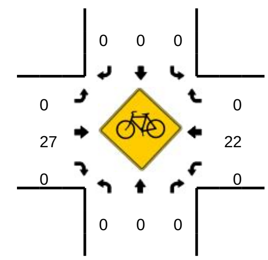


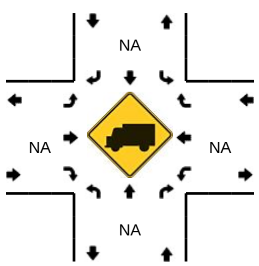
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:05 AM -- 8:20 AM

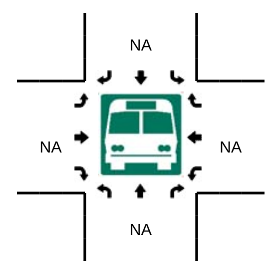












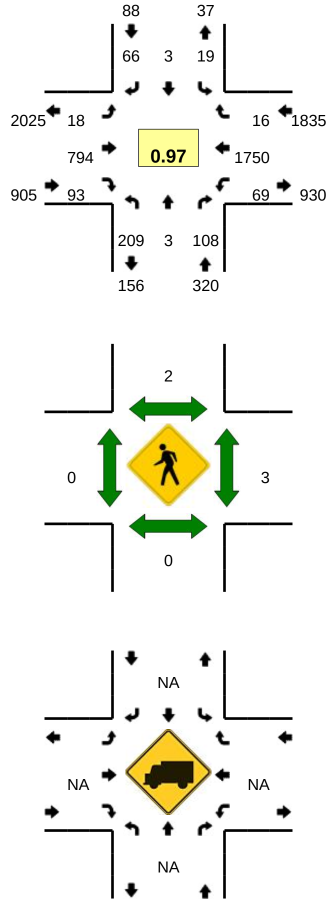
5-Min Count Period Beginning At	Addison-Wesley (Northbound) Left	Thru	Right	U	Addison-Wesley (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	1	0	0	0	0	0	0	0	4	102	10	0	4	24	0	1	146	
7:05 AM	1	0	1	0	0	1	3	0	4	107	8	0	2	33	1	0	161	
7:10 AM	0	0	2	0	0	0	0	0	5	96	10	0	7	31	0	1	152	
7:15 AM	2	0	0	0	0	0	1	0	4	134	9	0	5	37	1	0	193	
7:20 AM	3	0	1	0	0	0	1	0	2	127	8	0	2	55	3	0	202	
7:25 AM	1	0	1	0	1	0	0	0	6	141	11	0	4	58	3	1	227	
7:30 AM	5	0	1	0	1	0	1	0	8	126	9	0	7	55	4	0	217	
7:35 AM	1	0	2	0	0	0	1	0	6	168	23	0	3	55	0	0	259	
7:40 AM	1	0	3	0	0	0	1	0	2	162	18	0	8	78	1	0	274	
7:45 AM	5	1	2	0	1	0	0	0	14	171	12	0	9	57	6	2	280	
7:50 AM	1	0	5	0	0	1	2	0	9	141	23	1	9	75	6	1	274	
7:55 AM	2	0	3	0	1	1	0	0	8	151	19	0	9	78	6	0	278	2663
8:00 AM	1	0	5	0	0	0	0	0	12	162	25	1	4	68	5	0	283	2800
8:05 AM	1	0	1	0	0	0	0	0	8	172	17	0	14	77	2	1	293	2932
8:10 AM	1	0	3	0	0	0	2	0	3	172	28	0	3	71	1	2	286	3066
8:15 AM	5	0	5	0	0	0	0	0	10	180	17	0	9	70	5	2	303	3176
8:20 AM	3	0	2	0	0	0	0	0	9	155	17	0	6	87	1	1	281	3255
8:25 AM	2	0	3	0	0	0	1	0	9	115	14	0	11	69	3	4	231	3259
8:30 AM	0	1	7	0	0	0	0	0	11	139	20	0	14	67	3	1	263	3305
8:35 AM	1	0	1	0	2	1	1	0	8	145	17	0	4	52	1	1	234	3280
8:40 AM	0	0	3	0	0	0	2	0	8	189	18	1	11	65	2	0	299	3305
8:45 AM	3	0	0	0	2	0	1	0	9	157	24	2	2	58	1	1	260	3285
8:50 AM	4	0	4	0	2	0	0	0	9	156	27	0	12	58	4	1	277	3288
8:55 AM	4	1	5	0	1	0	1	0	8	155	26	0	7	66	2	0	276	3286

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	28	0	36	0	0	0	8	0	84	2096	248	0	104	872	32	20	3528
Heavy Trucks	4	0	8		0	0	0		4	48	4		0	24	0		92
Pedestrians		0				4				0				4			8
Bicycles	0	0	0		0	0	0		0	4	0		0	10	0		14
Railroad																	
Stopped Buses																	

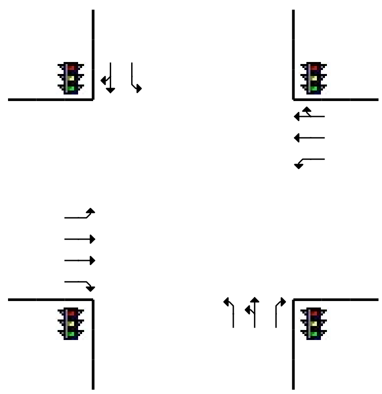
Comments: none

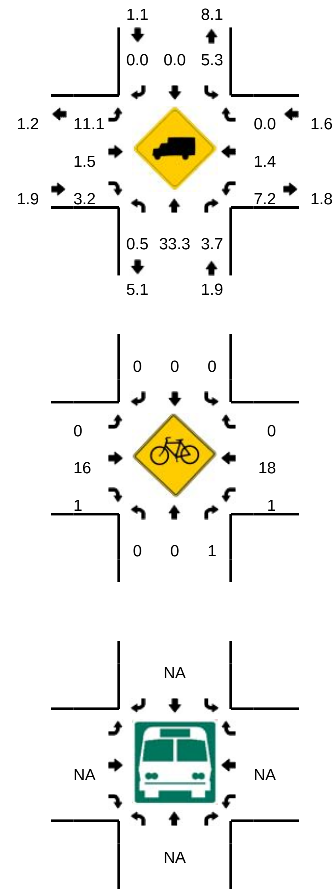
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Addison-Wesley -- Sand Hill Rd | **QC JOB #:** 12899502
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014



Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:40 PM -- 4:55 PM





5-Min Count Period Beginning At	Addison-Wesley (Northbound) Left	Thru	Right	U	Addison-Wesley (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	14	1	7	0	3	0	12	0	2	65	13	0	3	118	0	0	238	
4:05 PM	24	0	8	0	3	1	7	0	1	49	8	0	2	149	3	0	255	
4:10 PM	13	1	5	0	3	0	2	0	2	80	4	0	7	175	4	0	296	
4:15 PM	21	0	9	0	2	0	5	0	4	56	13	0	0	129	0	0	239	
4:20 PM	11	0	8	0	1	0	8	0	2	68	8	0	3	163	0	0	272	
4:25 PM	9	0	5	0	2	1	5	0	1	70	6	0	2	158	0	0	259	
4:30 PM	20	0	12	0	1	0	7	0	1	77	10	0	6	142	2	1	279	
4:35 PM	30	0	13	0	2	0	5	0	1	53	3	0	7	133	0	1	248	
4:40 PM	12	1	9	0	1	0	4	0	0	67	10	0	4	156	3	1	268	
4:45 PM	14	0	9	0	1	0	6	0	4	70	13	0	3	148	1	1	270	
4:50 PM	22	0	7	0	1	0	4	0	0	72	4	0	5	157	0	2	274	
4:55 PM	9	0	9	0	0	0	5	0	1	59	8	0	8	146	2	2	249	3147
5:00 PM	24	1	14	0	2	1	8	0	1	73	6	0	13	94	1	1	239	3148
5:05 PM	26	0	12	0	2	0	11	0	0	57	8	1	5	95	2	3	222	3115
5:10 PM	20	0	13	0	0	0	6	0	0	81	7	1	3	135	1	0	267	3086
5:15 PM	11	0	6	0	4	0	5	0	0	84	4	0	3	147	1	0	265	3112
5:20 PM	17	0	6	0	3	0	5	0	2	67	8	0	4	103	1	0	216	3056
5:25 PM	8	0	4	0	1	0	2	0	0	88	12	0	7	132	1	2	257	3054
5:30 PM	16	0	8	0	4	0	4	0	0	90	9	0	5	120	0	1	257	3032
5:35 PM	11	0	6	0	4	2	5	0	1	71	6	0	1	113	0	0	220	3004
5:40 PM	7	0	8	0	1	0	4	0	3	74	3	0	13	139	1	0	253	2989
5:45 PM	13	0	8	0	3	0	11	0	0	85	7	0	5	127	0	0	259	2978
5:50 PM	14	0	12	0	3	0	4	0	0	73	3	0	2	131	1	0	243	2947
5:55 PM	11	1	7	0	4	2	8	0	3	68	5	0	3	97	1	1	211	2909

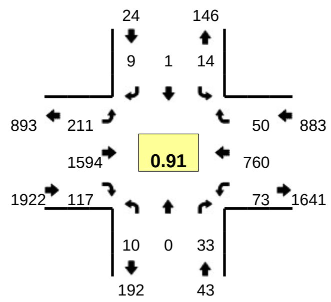
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	192	4	100	0	12	0	56	0	16	836	108	0	48	1844	16	16	3248
Heavy Trucks	0	0	4		0	0	0		4	8	0		4	16	0		36
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	6	0		0	4	0		10
Railroad																	
Stopped Buses																	

Comments: none

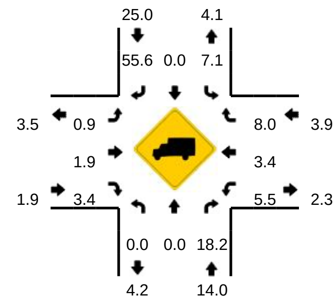
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

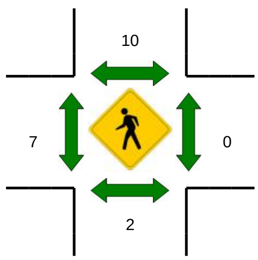
LOCATION: Saga Ln -- Sand Hill Rd — **QC JOB #:** 12899503

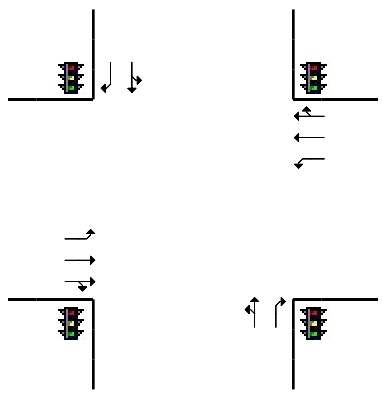
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

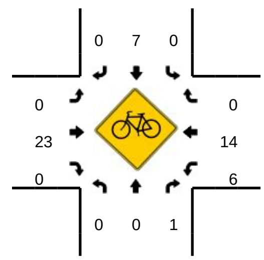


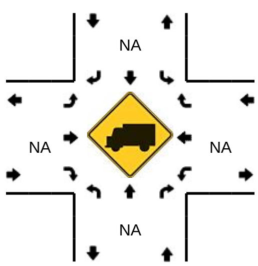
Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 8:05 AM -- 8:20 AM

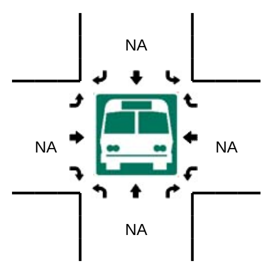












5-Min Count Period Beginning At	Saga Ln (Northbound) Left	Thru	Right	U	Saga Ln (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	1	0	1	0	0	0	1	0	4	66	11	5	4	22	1	0	116	
7:05 AM	2	0	0	0	1	0	0	0	1	96	10	7	4	23	1	0	145	
7:10 AM	1	0	0	0	0	0	1	0	2	75	4	7	6	29	1	0	126	
7:15 AM	1	0	3	0	0	0	0	0	6	103	13	6	0	28	2	0	162	
7:20 AM	0	0	2	0	0	0	0	0	4	116	11	5	5	50	2	0	195	
7:25 AM	2	0	4	0	0	0	0	0	2	118	14	6	2	47	1	0	196	
7:30 AM	2	0	4	0	0	0	0	0	8	95	12	11	7	48	2	1	190	
7:35 AM	1	0	2	0	1	0	0	0	1	142	10	6	4	56	0	0	223	
7:40 AM	1	0	1	0	2	0	1	0	10	128	9	9	9	63	1	0	234	
7:45 AM	1	0	3	1	0	0	2	0	2	139	7	11	5	58	0	0	229	
7:50 AM	1	0	2	0	1	0	0	0	6	142	11	4	1	67	5	0	240	
7:55 AM	1	0	1	0	1	0	1	0	12	130	10	13	7	68	4	0	248	2304
8:00 AM	1	0	5	0	0	0	0	0	11	111	9	14	2	50	4	0	207	2395
8:05 AM	0	0	2	0	3	0	0	0	6	141	7	15	7	89	4	0	274	2524
8:10 AM	3	0	7	0	0	0	0	0	3	153	12	17	4	62	7	0	268	2666
8:15 AM	0	0	2	0	0	0	0	0	6	143	12	9	7	70	2	0	251	2755
8:20 AM	0	0	3	0	1	0	0	0	9	138	12	6	5	67	6	0	247	2807
8:25 AM	0	0	4	0	0	1	0	0	11	119	13	6	8	74	3	0	239	2850
8:30 AM	1	0	2	0	2	0	3	0	10	100	7	5	15	46	7	0	198	2858
8:35 AM	0	0	1	0	4	0	2	0	10	150	8	6	3	46	7	0	237	2872
8:40 AM	2	0	2	0	0	0	2	0	9	119	9	5	5	54	2	0	209	2847
8:45 AM	2	0	2	0	0	0	1	0	8	156	10	3	8	54	2	0	246	2864
8:50 AM	2	0	5	0	1	0	1	0	8	143	11	8	7	54	6	0	246	2870
8:55 AM	1	0	2	0	0	0	0	0	10	133	17	3	9	55	6	0	236	2858

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	12	0	44	0	12	0	0	0	60	1748	124	164	72	884	52	0	3172
Heavy Trucks	0	0	4		0	0	0		0	44	0		8	28	0		84
Pedestrians		4				12				12				0			28
Bicycles	0	0	0		0	0	0		0	4	0		2	12	0		18
Railroad																	
Stopped Buses																	

Comments: none

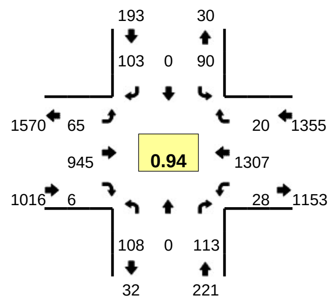
Report generated on 11/4/2014 9:43 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

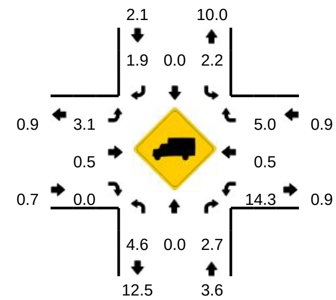
LOCATION: Saga Ln -- Sand Hill Rd — **QC JOB #:** 12899504

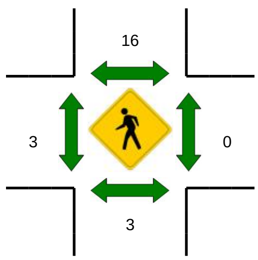
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

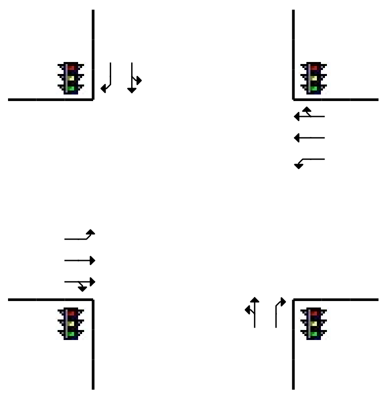


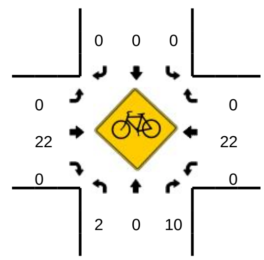
Peak-Hour: 4:40 PM -- 5:40 PM

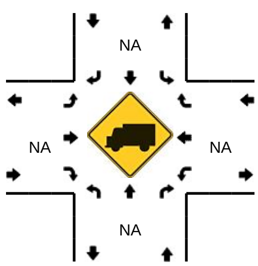
Peak 15-Min: 4:40 PM -- 4:55 PM

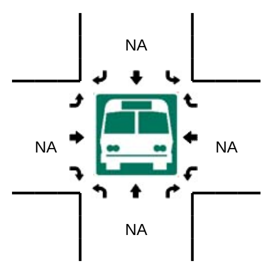












5-Min Count Period Beginning At	Saga Ln (Northbound) Left	Thru	Right	U	Saga Ln (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	12	0	8	0	9	0	5	0	1	69	1	4	2	99	1	0	211	
4:05 PM	12	0	6	0	6	0	7	0	1	64	0	4	5	117	2	0	224	
4:10 PM	9	0	10	0	1	0	3	0	3	82	0	6	1	146	2	1	264	
4:15 PM	6	0	5	1	3	0	14	0	3	51	2	4	4	110	2	0	205	
4:20 PM	12	1	2	0	4	0	8	0	1	63	1	9	3	103	1	1	209	
4:25 PM	6	0	3	0	0	0	7	0	0	65	1	6	5	119	2	0	214	
4:30 PM	6	0	7	0	4	0	6	0	3	77	0	7	3	122	5	0	240	
4:35 PM	13	0	9	0	3	0	6	0	4	58	1	3	2	105	0	0	204	
4:40 PM	9	0	8	0	6	0	4	0	2	81	1	3	1	137	4	0	256	
4:45 PM	5	0	8	0	3	0	11	0	2	71	1	2	2	124	3	1	233	
4:50 PM	12	0	9	0	9	0	12	0	1	70	1	5	7	118	4	0	248	
4:55 PM	10	0	5	1	10	0	10	0	1	86	1	3	0	99	1	0	227	2735
5:00 PM	4	0	8	0	5	0	12	0	1	65	0	3	1	116	1	1	217	2741
5:05 PM	8	0	11	0	10	0	14	0	0	74	0	6	0	82	1	0	206	2723
5:10 PM	7	0	10	0	3	0	5	0	0	91	0	2	2	110	1	0	231	2690
5:15 PM	11	0	17	0	11	0	6	0	0	82	1	4	2	115	1	0	250	2735
5:20 PM	9	0	11	0	3	0	6	0	0	84	0	7	0	100	1	2	223	2749
5:25 PM	5	0	7	0	7	0	9	0	0	78	0	9	2	85	2	1	205	2740
5:30 PM	6	0	12	0	9	0	6	0	3	89	1	7	3	127	0	0	263	2763
5:35 PM	19	0	7	2	14	0	8	0	0	74	0	4	3	94	1	0	226	2785
5:40 PM	2	0	10	0	7	0	3	0	2	91	4	3	1	94	0	2	219	2748
5:45 PM	6	0	11	0	6	0	8	0	0	80	0	2	0	103	1	0	217	2732
5:50 PM	6	0	7	0	12	0	4	0	0	87	3	5	0	103	2	0	229	2713
5:55 PM	6	0	11	0	0	0	3	0	3	85	0	2	2	77	0	0	189	2675

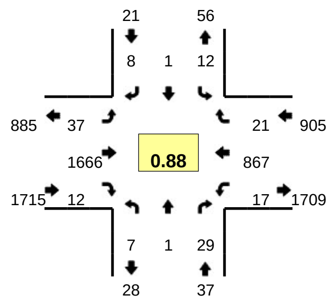
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	104	0	100	0	72	0	108	0	20	888	12	40	40	1516	44	4	2948
Heavy Trucks	4	0	4		4	0	4		8	4	0		4	8	4		44
Pedestrians		4				12				4				0			20
Bicycles	0	0	1		0	0	0		0	9	0		0	9	0		19
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

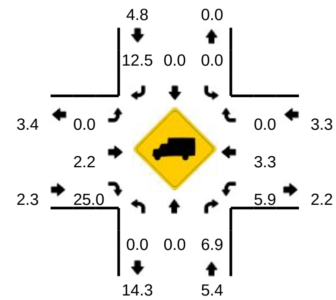
LOCATION: Branner Dr -- Sand Hill Rd — **QC JOB #:** 12899505

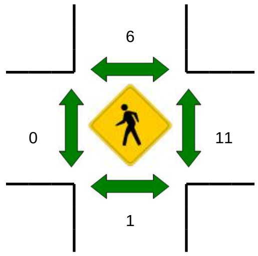
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

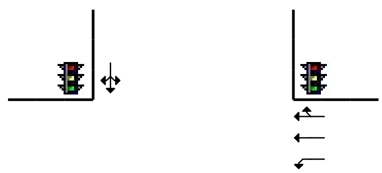


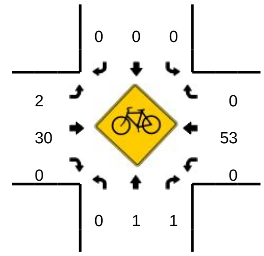
Peak-Hour: 8:00 AM -- 9:00 AM

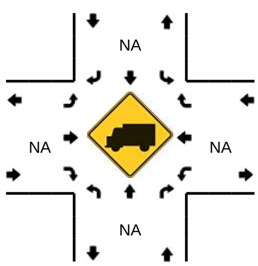
Peak 15-Min: 8:10 AM -- 8:25 AM

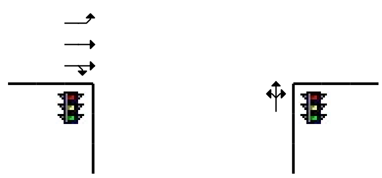


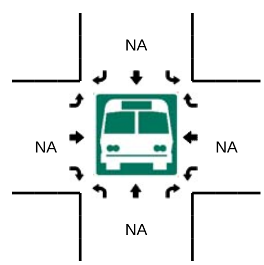










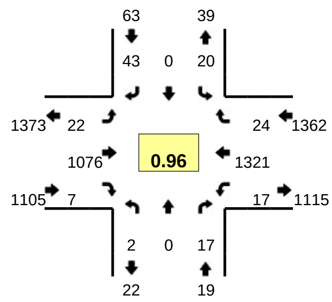


5-Min Count Period Beginning At	Branner Dr (Northbound) Left	Thru	Right	U	Branner Dr (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	0	0	0	0	0	66	3	0	1	27	0	0	97	
7:05 AM	0	0	1	0	0	0	0	0	2	96	1	0	0	39	1	0	140	
7:10 AM	0	0	1	0	1	0	0	0	0	77	0	0	1	31	2	0	113	
7:15 AM	1	0	4	0	0	0	1	0	0	98	1	0	6	36	1	0	148	
7:20 AM	1	0	1	0	0	0	1	0	2	119	1	0	1	57	3	0	186	
7:25 AM	3	0	2	0	0	0	2	0	1	122	0	0	1	45	1	0	177	
7:30 AM	2	0	6	0	0	0	1	0	2	99	0	0	1	59	3	1	174	
7:35 AM	1	0	4	0	0	0	0	0	2	145	2	0	1	66	1	0	222	
7:40 AM	0	0	1	0	0	0	0	0	1	125	1	0	2	60	3	0	193	
7:45 AM	3	0	2	0	1	0	1	0	1	137	0	0	0	65	1	0	211	
7:50 AM	0	1	2	0	0	0	1	0	1	147	1	0	1	70	1	0	225	
7:55 AM	0	0	7	0	0	0	0	0	0	115	1	0	1	69	0	0	193	2079
8:00 AM	0	0	0	0	1	0	0	0	2	140	1	1	1	87	0	0	233	2215
8:05 AM	1	0	5	0	1	0	0	0	2	118	1	1	3	69	2	0	203	2278
8:10 AM	0	0	3	0	0	0	0	0	6	179	2	1	3	91	1	0	286	2451
8:15 AM	0	1	4	0	2	1	1	0	2	123	3	0	1	60	1	0	199	2502
8:20 AM	1	0	3	0	1	0	1	0	4	166	1	0	1	100	2	0	280	2596
8:25 AM	2	0	0	0	0	0	0	0	4	120	0	0	1	57	0	0	184	2603
8:30 AM	0	0	2	0	2	0	0	0	1	100	1	0	1	83	0	0	190	2619
8:35 AM	0	0	2	0	1	0	0	0	3	156	0	0	1	58	3	0	224	2621
8:40 AM	0	0	2	0	1	0	2	0	1	119	1	0	0	60	6	1	193	2621
8:45 AM	2	0	3	0	3	0	1	0	3	140	0	0	1	51	3	0	207	2617
8:50 AM	0	0	2	0	0	0	2	0	5	168	0	0	1	85	1	1	265	2657
8:55 AM	1	0	3	0	0	0	1	0	1	137	2	0	1	66	2	0	214	2678

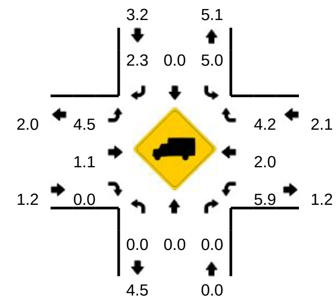
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	4	4	40	0	12	4	8	0	48	1872	24	4	20	1004	16	0	3060
Heavy Trucks	0	0	4		0	0	0		0	48	8		0	24	0		84
Pedestrians		0				4				0				8			12
Bicycles	0	0	0		0	0	0		0	5	0		0	20	0		25
Railroad																	
Stopped Buses																	

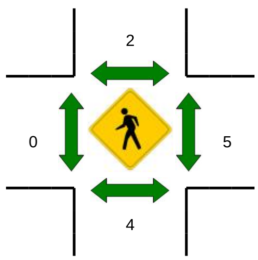
Comments: none

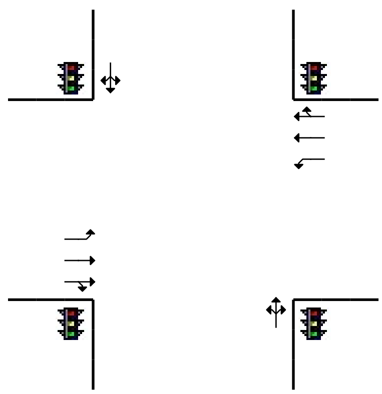
LOCATION: Branner Dr -- Sand Hill Rd **QC JOB #:** 12899506
CITY/STATE: Menlo Park, CA **DATE:** Tue, Sep 30 2014

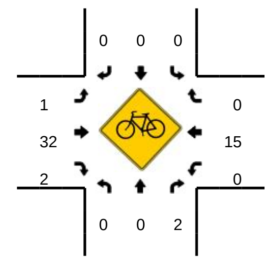


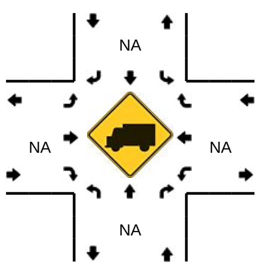
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

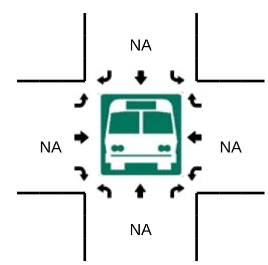












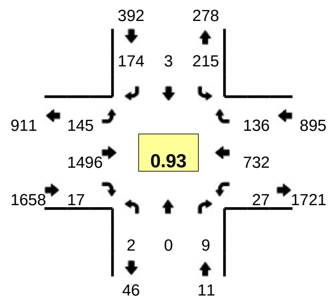
5-Min Count Period Beginning At	Branner Dr (Northbound)				Branner Dr (Southbound)				Sand Hill Rd (Eastbound)				Sand Hill Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	1	0	1	0	1	0	0	88	0	0	3	113	1	0	208	
4:05 PM	4	0	2	0	2	1	2	0	0	72	0	0	1	118	4	0	206	
4:10 PM	5	0	2	0	0	0	3	0	0	89	2	0	3	113	1	0	218	
4:15 PM	1	0	4	0	0	0	1	0	3	55	1	1	0	108	2	0	176	
4:20 PM	0	0	3	0	2	0	1	0	2	77	0	0	1	122	2	0	210	
4:25 PM	1	0	2	0	0	0	4	0	0	60	0	0	2	125	1	0	195	
4:30 PM	0	0	1	0	0	0	3	0	1	91	0	2	1	131	2	1	233	
4:35 PM	0	0	2	0	0	0	2	0	1	68	0	0	0	114	4	0	191	
4:40 PM	0	0	3	0	0	0	4	0	1	79	2	0	2	137	1	0	229	
4:45 PM	0	0	0	0	4	0	4	0	1	95	1	1	1	111	2	0	220	
4:50 PM	0	0	1	0	1	0	4	0	5	81	0	0	4	114	4	0	214	
4:55 PM	0	0	1	0	7	0	3	0	0	89	1	1	1	102	0	0	205	2505
5:00 PM	0	0	2	0	1	0	8	0	0	88	0	0	0	105	1	0	205	2502
5:05 PM	0	0	2	0	2	0	5	0	3	92	1	0	1	96	1	0	203	2499
5:10 PM	1	0	0	0	2	0	2	0	1	92	1	1	1	109	3	0	213	2494
5:15 PM	0	0	1	0	0	0	2	0	0	87	0	2	2	95	0	1	190	2508
5:20 PM	1	0	1	0	3	0	3	0	0	119	0	0	0	97	4	0	228	2526
5:25 PM	0	0	3	0	0	0	3	0	2	95	1	0	2	110	2	0	218	2549
5:30 PM	0	0	1	0	1	0	2	0	0	115	1	0	1	104	1	0	226	2542
5:35 PM	1	0	3	0	1	0	1	0	0	88	1	0	1	101	1	0	198	2549
5:40 PM	0	0	1	0	0	0	0	0	0	111	0	0	3	98	0	1	214	2534
5:45 PM	0	0	2	0	1	0	2	0	0	109	1	0	4	104	0	1	224	2538
5:50 PM	1	0	1	0	4	1	3	0	1	84	2	0	2	97	0	0	196	2520
5:55 PM	1	0	1	0	3	0	3	0	1	90	4	0	2	95	2	1	203	2518

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	16	0	20	0	48	0	28	1020	12	4	28	1448	28	0	2652
Heavy Trucks	0	0	0		0	0	4		4	0	0		0	40	4		52
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		1	10	0		0	4	0		15
Railroad																	
Stopped Buses																	

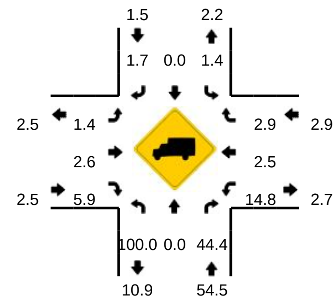
Comments: none

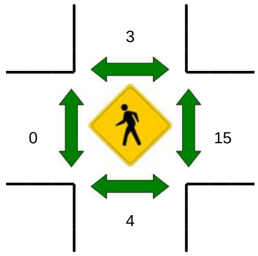
Type of peak hour being reported: Intersection Peak Method for determining peak hour: Total Entering Volume

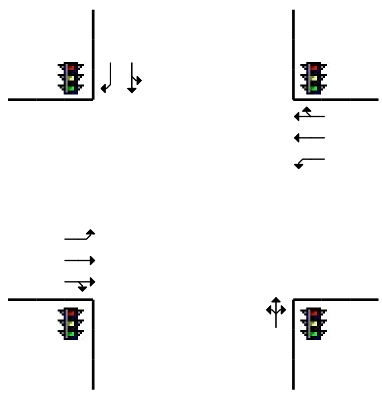
LOCATION: Sharon Park Dr -- Sand Hill Rd **QC JOB #:** 12899507
CITY/STATE: Menlo Park, CA **DATE:** Tue, Sep 30 2014

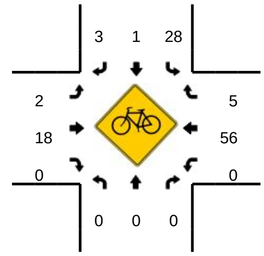


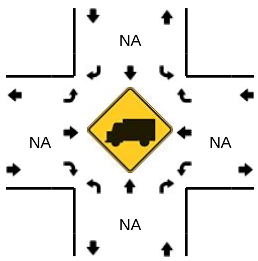
Peak-Hour: 7:55 AM -- 8:55 AM
Peak 15-Min: 8:10 AM -- 8:25 AM

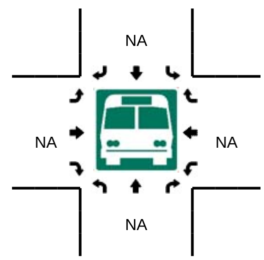












5-Min Count Period Beginning At	Sharon Park Dr (Northbound) Left	Thru	Right	U	Sharon Park Dr (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	8	0	5	0	5	62	0	0	1	28	6	0	115	
7:05 AM	0	0	0	0	6	0	5	1	13	82	1	0	2	30	12	0	152	
7:10 AM	0	0	1	0	15	0	10	0	9	68	1	0	0	27	7	0	138	
7:15 AM	0	1	0	0	11	0	7	0	7	87	1	0	2	33	9	1	159	
7:20 AM	0	0	0	0	14	0	9	0	14	113	1	0	3	51	11	0	216	
7:25 AM	0	0	0	0	6	0	12	0	6	115	1	0	3	40	8	0	191	
7:30 AM	0	0	1	0	12	1	14	0	12	85	1	0	3	49	9	0	187	
7:35 AM	0	0	1	0	16	2	10	0	23	125	3	1	0	57	11	0	249	
7:40 AM	0	0	0	0	15	0	13	0	10	132	2	0	0	53	6	0	231	
7:45 AM	0	0	0	0	21	0	10	0	11	128	1	0	0	74	7	0	252	
7:50 AM	0	0	1	0	19	0	18	0	24	118	0	0	0	37	13	0	230	
7:55 AM	0	0	3	0	15	0	10	0	15	115	0	1	2	80	16	0	257	2377
8:00 AM	0	0	0	0	14	0	21	0	6	127	0	0	4	69	17	0	258	2520
8:05 AM	1	0	0	0	32	0	16	0	12	111	1	0	0	44	10	0	227	2595
8:10 AM	1	0	2	0	13	0	16	0	14	127	3	1	1	71	12	1	262	2719
8:15 AM	0	0	2	0	18	0	16	0	11	132	3	0	2	66	4	0	254	2814
8:20 AM	0	0	0	0	18	1	9	0	13	137	0	0	5	85	10	0	278	2876
8:25 AM	0	0	0	0	20	1	11	0	12	118	0	0	1	61	14	0	238	2923
8:30 AM	0	0	1	0	20	0	14	0	14	103	2	0	1	46	9	0	210	2946
8:35 AM	0	0	0	0	13	0	17	0	9	127	2	0	3	40	9	0	220	2917
8:40 AM	0	0	0	0	17	0	14	0	10	107	0	1	4	55	16	0	224	2910
8:45 AM	0	0	1	0	19	0	9	0	11	142	5	0	1	56	13	0	257	2915
8:50 AM	0	0	0	0	16	1	21	0	15	150	1	0	2	59	6	0	271	2956
8:55 AM	0	0	1	0	8	0	11	0	12	120	1	0	0	52	11	2	218	2917

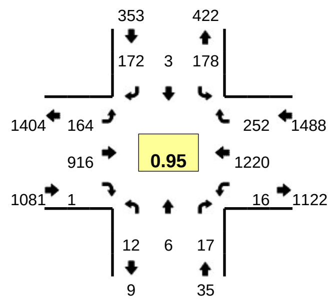
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	4	0	16	0	196	4	164	0	152	1584	24	4	32	888	104	4	3176
Heavy Trucks	4	0	8		4	0	0		0	60	0		4	20	4		104
Pedestrians		0				8				0				24			32
Bicycles	0	0	0		8	0	1		0	5	0		0	10	1		25
Railroad																	
Stopped Buses																	

Comments: none

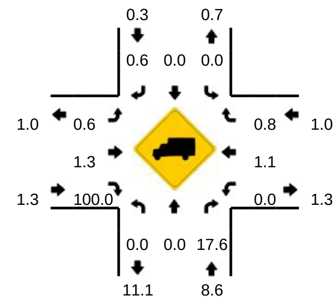
Report generated on 11/4/2014 9:43 AM SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

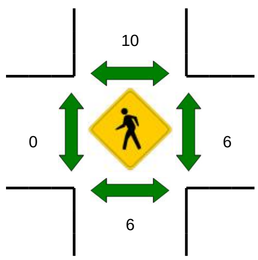
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

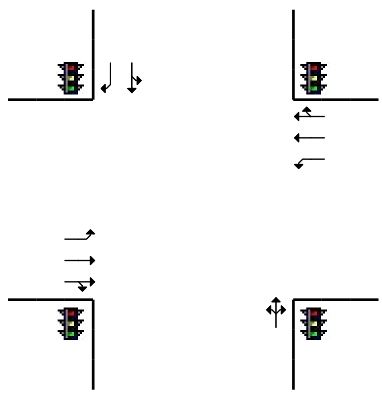
LOCATION: Sharon Park Dr -- Sand Hill Rd | **QC JOB #:** 12899508
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

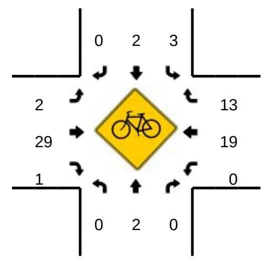


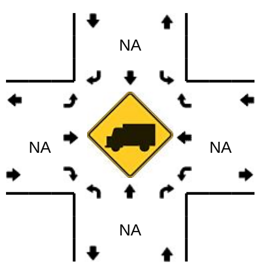
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

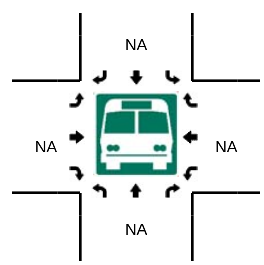












5-Min Count Period Beginning At	Sharon Park Dr (Northbound) Left	Thru	Right	U	Sharon Park Dr (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	1	0	6	0	14	0	11	85	0	0	1	135	18	1	272	
4:05 PM	1	0	0	0	15	0	16	0	18	63	0	0	1	90	16	1	221	
4:10 PM	0	0	0	0	11	0	16	0	13	78	0	0	0	118	24	0	260	
4:15 PM	1	0	1	0	20	0	8	0	9	45	0	0	2	105	28	1	220	
4:20 PM	0	0	2	0	20	0	19	0	11	67	0	0	0	96	15	0	230	
4:25 PM	0	0	0	0	20	0	15	0	9	48	0	0	0	96	25	3	216	
4:30 PM	1	0	0	0	17	0	12	0	20	75	0	0	0	132	24	0	281	
4:35 PM	3	0	0	0	17	0	19	0	14	59	0	0	0	102	22	0	236	
4:40 PM	2	0	4	0	18	0	25	0	12	61	0	0	1	109	15	0	247	
4:45 PM	1	0	1	0	11	0	10	0	9	87	0	0	2	126	14	2	263	
4:50 PM	2	0	1	0	11	0	7	0	11	70	0	0	0	106	22	1	231	
4:55 PM	0	1	4	0	17	0	6	0	9	80	1	0	0	100	20	0	238	2915
5:00 PM	0	1	0	0	16	3	20	0	17	58	0	0	0	86	31	2	234	2877
5:05 PM	1	2	3	0	16	0	16	0	12	90	0	0	0	71	21	1	233	2889
5:10 PM	1	1	1	0	17	0	15	0	13	61	0	0	1	80	25	0	215	2844
5:15 PM	0	0	2	0	14	0	17	0	18	82	0	0	1	112	18	2	266	2890
5:20 PM	1	1	1	0	11	0	11	0	14	105	0	0	0	100	24	1	269	2929
5:25 PM	0	0	0	0	13	0	14	0	15	88	0	0	0	96	16	2	244	2957
5:30 PM	0	1	2	0	16	0	14	0	13	89	0	0	0	88	20	0	243	2919
5:35 PM	1	0	0	0	22	0	17	0	17	76	0	0	1	86	20	1	241	2924
5:40 PM	3	0	1	0	18	0	12	0	21	100	0	0	0	80	25	0	260	2937
5:45 PM	0	0	2	0	13	0	15	0	15	86	0	0	0	83	27	0	241	2915
5:50 PM	2	0	0	0	10	0	11	0	12	78	0	1	0	85	12	0	211	2895
5:55 PM	0	0	0	0	20	0	15	0	14	75	0	0	0	79	19	1	223	2880

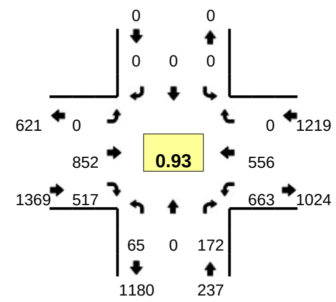
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	4	4	12	0	152	0	168	0	188	1100	0	0	4	1232	232	20	3116
Heavy Trucks	0	0	0		0	0	4		0	20	0		0	12	0		36
Pedestrians		8				12				0				8			28
Bicycles	0	1	0		0	0	0		0	11	0		0	7	4		23
Railroad																	
Stopped Buses																	

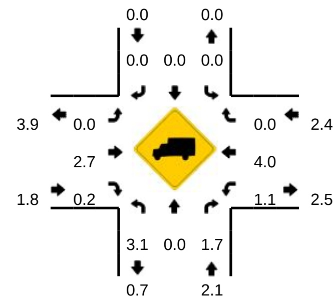
Comments: none

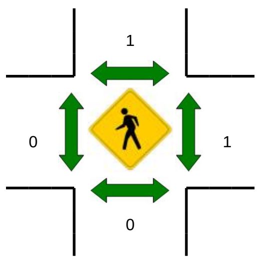
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

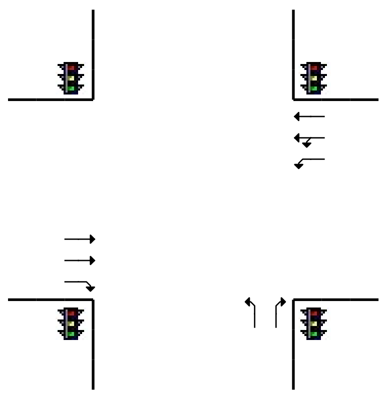
LOCATION: Junipero Serra Blvd -- Santa Cruz Ave/Alpine Rd | **QC JOB #:** 12899509
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

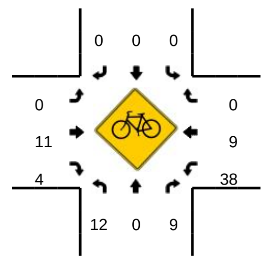
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:05 AM -- 8:20 AM

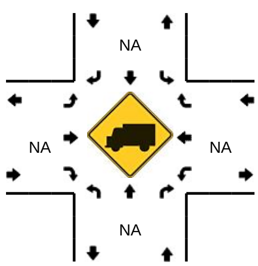


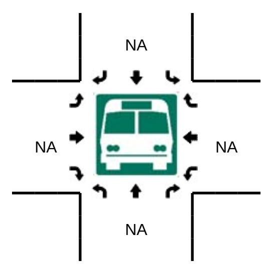












5-Min Count Period Beginning At	Junipero Serra Blvd (Northbound) Left	Thru	Right	U	Junipero Serra Blvd (Southbound) Left	Thru	Right	U	Santa Cruz Ave/Alpine Rd (Eastbound) Left	Thru	Right	U	Santa Cruz Ave/Alpine Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	2	0	6	0	0	0	0	0	0	56	22	0	18	15	0	0	119	
7:05 AM	3	0	11	0	0	0	0	0	0	57	25	0	21	30	0	0	147	
7:10 AM	9	0	6	0	0	0	0	0	0	66	29	0	31	38	0	0	179	
7:15 AM	3	0	11	0	0	0	0	0	0	71	38	0	21	28	0	0	172	
7:20 AM	3	0	10	0	0	0	0	0	0	67	23	0	31	31	0	0	165	
7:25 AM	5	0	13	0	0	0	0	0	0	75	25	0	32	30	0	0	180	
7:30 AM	2	0	11	0	0	0	0	0	0	72	38	0	37	37	0	0	197	
7:35 AM	6	0	11	0	0	0	0	0	0	98	43	0	35	37	0	0	230	
7:40 AM	4	0	5	0	0	0	0	0	0	77	41	0	51	44	0	0	222	
7:45 AM	3	0	10	0	0	0	0	0	0	69	36	0	57	35	0	0	210	
7:50 AM	7	0	20	0	0	0	0	0	0	55	30	0	49	41	0	0	202	
7:55 AM	5	0	23	0	0	0	0	0	0	58	38	0	59	55	0	0	238	2261
8:00 AM	4	0	13	0	0	0	0	0	0	78	53	0	49	36	0	0	233	2375
8:05 AM	8	0	17	0	0	0	0	0	0	77	46	0	71	58	0	0	277	2505
8:10 AM	8	0	7	0	0	0	0	0	0	75	47	0	58	50	0	0	245	2571
8:15 AM	5	0	12	0	0	0	0	0	0	67	48	0	58	49	0	0	239	2638
8:20 AM	6	0	21	0	0	0	0	0	0	70	50	0	39	50	0	0	236	2709
8:25 AM	4	0	17	0	0	0	0	0	0	63	45	0	74	53	0	0	256	2785
8:30 AM	5	0	16	0	0	0	0	0	0	65	40	0	63	48	0	0	237	2825
8:35 AM	6	0	18	0	0	0	0	0	0	54	45	0	46	32	0	0	201	2796
8:40 AM	5	0	12	0	0	0	0	0	0	63	46	0	37	35	0	0	198	2772
8:45 AM	3	0	18	0	0	0	0	0	0	54	45	0	48	34	0	0	202	2764
8:50 AM	6	0	24	0	0	0	0	0	0	76	44	0	45	46	0	0	241	2803
8:55 AM	5	0	15	0	0	0	0	0	0	71	46	0	33	31	0	0	201	2766

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	84	0	144	0	0	0	0	0	0	876	564	0	748	628	0	0	3044
Heavy Trucks	0	0	0		0	0	0		0	8	0		4	12	0		24
Pedestrians		0				0				0				0			0
Bicycles	5	0	5		0	0	0		0	2	0		4	5	0		21
Railroad																	
Stopped Buses																	

Comments: none

Report generated on 11/4/2014 9:43 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

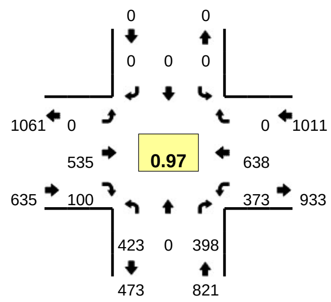
Method for determining peak hour: Total Entering Volume

LOCATION: Junipero Serra Blvd -- Santa Cruz Ave/Alpine Rd

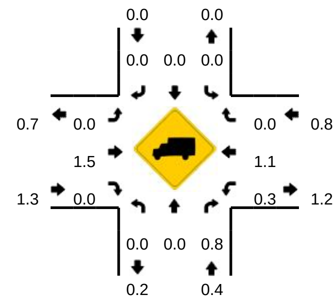
CITY/STATE: Menlo Park, CA

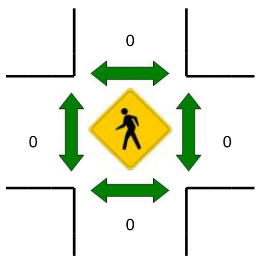
QC JOB #: 12899510

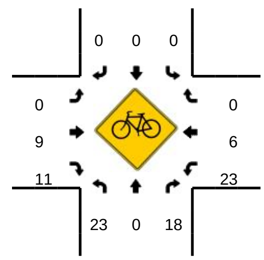
DATE: Thu, Oct 09 2014

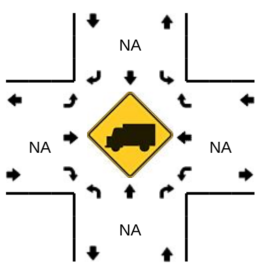


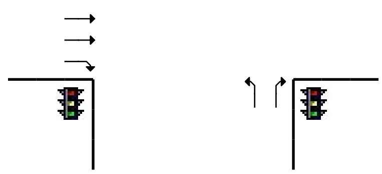
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

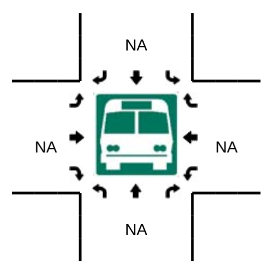












5-Min Count Period Beginning At	Junipero Serra Blvd (Northbound) Left	Thru	Right	U	Junipero Serra Blvd (Southbound) Left	Thru	Right	U	Santa Cruz Ave/Alpine Rd (Eastbound) Left	Thru	Right	U	Santa Cruz Ave/Alpine Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	20	0	30	0	0	0	0	0	0	48	13	0	27	51	0	0	189	
4:05 PM	21	0	30	0	0	0	0	0	0	54	9	0	30	69	0	0	213	
4:10 PM	34	0	21	0	0	0	0	0	0	54	8	0	28	50	0	0	195	
4:15 PM	26	0	27	0	0	0	0	0	0	59	6	0	28	67	0	0	213	
4:20 PM	24	0	49	0	0	0	0	0	0	39	10	0	29	47	0	0	198	
4:25 PM	35	0	38	0	0	0	0	0	0	38	10	0	26	59	0	0	206	
4:30 PM	25	0	34	0	0	0	0	0	0	61	12	0	31	46	0	0	209	
4:35 PM	41	0	27	0	0	0	0	0	0	34	5	0	33	47	0	0	187	
4:40 PM	30	0	32	0	0	0	0	0	0	46	8	0	42	65	0	0	223	
4:45 PM	24	0	36	0	0	0	0	0	0	41	9	0	35	59	0	0	204	
4:50 PM	48	0	32	0	0	0	0	0	0	42	9	0	33	48	0	0	212	
4:55 PM	45	0	23	0	0	0	0	0	0	48	7	0	26	40	0	0	189	2438
5:00 PM	30	0	38	0	0	0	0	0	0	39	6	0	21	70	0	0	204	2453
5:05 PM	26	0	29	0	0	0	0	0	0	49	9	0	35	51	0	0	199	2439
5:10 PM	33	0	39	0	0	0	0	0	0	54	8	0	28	46	0	0	208	2452
5:15 PM	47	0	46	0	0	0	0	0	0	36	7	0	34	54	0	0	224	2463
5:20 PM	39	0	24	0	0	0	0	0	0	47	10	0	29	53	0	0	202	2467
5:25 PM	26	0	28	0	0	0	0	0	0	41	9	0	31	52	0	0	187	2448
5:30 PM	41	0	35	0	0	0	0	0	0	51	6	0	15	44	0	0	192	2431
5:35 PM	35	0	24	0	0	0	0	0	0	37	9	0	30	51	0	0	186	2430
5:40 PM	26	0	21	0	0	0	0	0	0	44	6	0	38	34	0	0	169	2376
5:45 PM	29	0	41	0	0	0	0	0	0	41	8	0	32	52	0	0	203	2375
5:50 PM	28	0	27	0	0	0	0	0	0	49	15	0	30	52	0	0	201	2364
5:55 PM	22	0	13	0	0	0	0	0	0	70	12	0	15	26	0	0	158	2333

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	408	0	400	0	0	0	0	0	0	516	104	0	440	688	0	0	2556
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	0	0		8
Pedestrians		0				0				0				0			0
Bicycles	3	0	4		0	0	0		0	3	2		5	2	0		19
Railroad																	
Stopped Buses																	

Comments: none

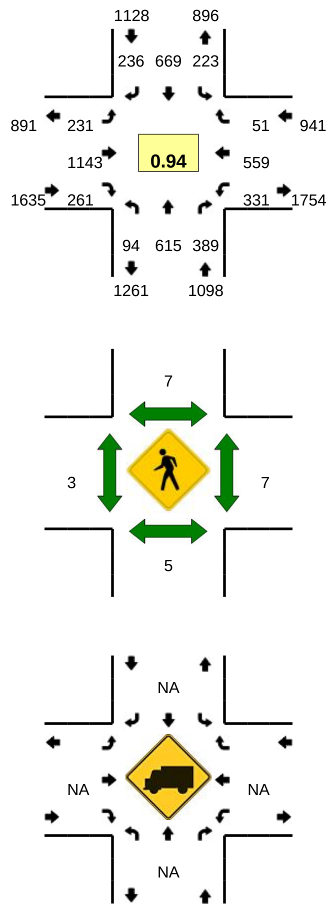
Report generated on 11/4/2014 9:43 AM

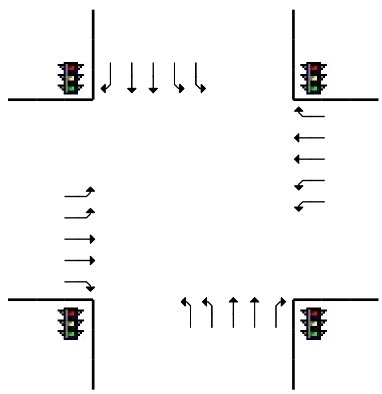
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

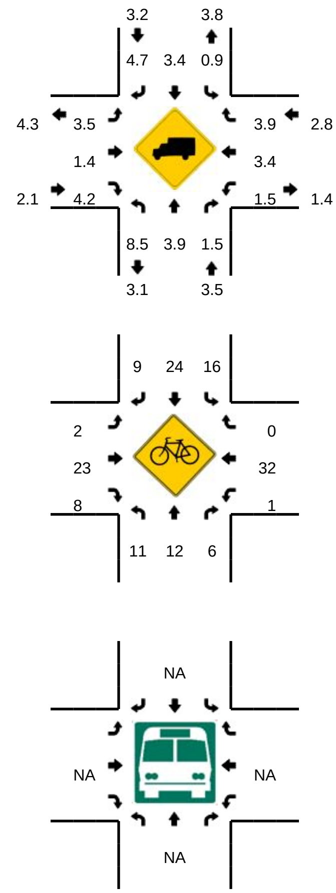
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Santa Cruz Ave -- Sand Hill Rd | **QC JOB #:** 12899511
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:05 AM -- 8:20 AM







5-Min Count Period Beginning At	Santa Cruz Ave (Northbound) Left	Thru	Right	U	Santa Cruz Ave (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	2	43	29	0	2	17	5	0	5	54	7	1	13	23	2	0	203	
7:05 AM	14	29	23	0	6	25	12	0	10	62	13	0	12	24	1	1	232	
7:10 AM	3	44	33	0	7	33	15	0	17	51	10	0	18	16	1	0	248	
7:15 AM	13	30	22	0	14	23	18	0	17	61	15	0	12	28	2	0	255	
7:20 AM	4	65	34	0	6	45	16	0	9	92	17	0	11	30	4	0	333	
7:25 AM	11	53	21	0	11	28	9	0	22	58	14	0	13	24	4	0	268	
7:30 AM	6	49	26	0	16	38	12	0	30	81	10	0	24	45	3	0	340	
7:35 AM	6	62	25	0	16	40	19	1	14	97	19	0	27	48	2	0	376	
7:40 AM	1	65	31	0	18	55	22	0	16	92	23	0	28	40	1	0	392	
7:45 AM	7	55	26	0	17	50	16	0	20	92	18	0	31	45	0	0	377	
7:50 AM	11	55	23	0	15	51	19	0	17	96	16	0	22	51	3	0	379	
7:55 AM	12	51	23	0	12	51	24	0	17	104	27	0	28	43	3	0	395	3798
8:00 AM	6	49	33	0	17	65	15	0	12	83	20	0	20	54	5	0	379	3974
8:05 AM	8	57	38	0	30	53	23	0	17	87	29	0	25	47	13	0	427	4169
8:10 AM	8	56	43	0	21	66	21	0	28	81	19	0	38	39	8	0	428	4349
8:15 AM	11	36	32	0	21	47	29	0	20	118	22	0	34	50	4	0	424	4518
8:20 AM	8	38	39	0	13	57	17	0	22	111	16	1	31	60	2	0	415	4600
8:25 AM	8	50	40	0	19	68	15	0	21	96	29	0	24	44	4	0	418	4750
8:30 AM	8	41	36	0	23	66	16	0	25	86	23	1	23	38	6	0	392	4802
8:35 AM	11	38	27	0	18	50	19	0	21	74	16	1	20	31	2	0	328	4754
8:40 AM	11	41	37	0	12	47	23	0	14	98	17	3	23	34	2	0	362	4724
8:45 AM	7	38	32	0	14	41	22	0	25	105	30	1	15	40	7	1	378	4725
8:50 AM	11	55	43	0	15	36	16	0	35	76	21	0	33	39	6	0	386	4732
8:55 AM	8	42	35	0	15	40	18	0	21	125	18	1	14	38	1	0	376	4713

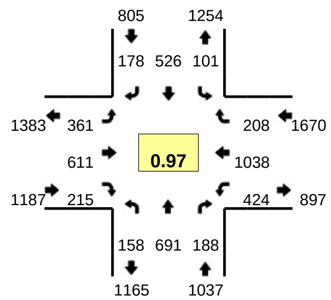
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	108	596	452	0	288	664	292	0	260	1144	280	0	388	544	100	0	5116
Heavy Trucks	16	4	4		4	40	8		12	16	8		0	12	0		124
Pedestrians		12				4				0				8			24
Bicycles	4	1	2		4	2	1		0	11	0		0	18	0		43
Railroad																	
Stopped Buses																	

Comments: none

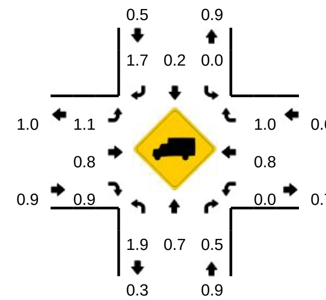
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

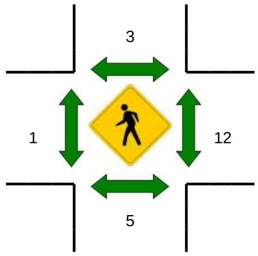
LOCATION: Santa Cruz Ave -- Sand Hill Rd — **QC JOB #:** 12899512

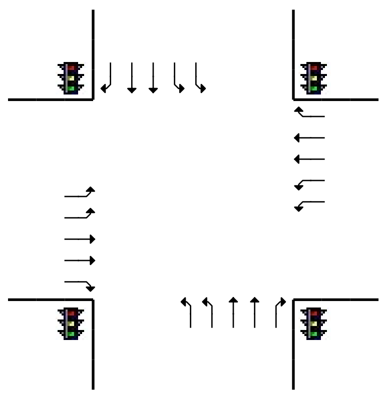
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

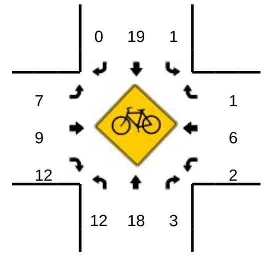


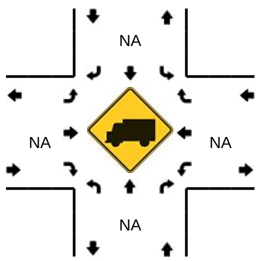
Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

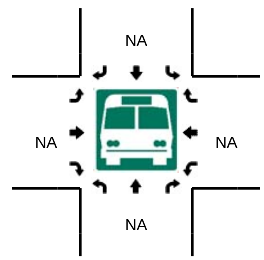












5-Min Count Period Beginning At	Santa Cruz Ave (Northbound) Left	Thru	Right	U	Santa Cruz Ave (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	9	50	22	0	2	29	30	0	20	55	11	0	40	97	14	0	379	
4:05 PM	19	46	14	0	12	56	24	0	23	46	17	0	24	90	9	0	380	
4:10 PM	8	45	23	0	3	43	21	0	21	48	17	0	31	100	8	0	368	
4:15 PM	23	47	25	0	7	50	13	0	19	38	15	0	25	96	7	0	365	
4:20 PM	6	55	22	0	2	53	23	0	25	48	17	1	28	91	18	0	389	
4:25 PM	27	55	10	0	8	40	13	0	19	37	18	0	35	97	9	0	368	
4:30 PM	26	47	21	0	14	47	11	0	21	54	16	0	30	98	8	0	393	
4:35 PM	12	45	17	0	6	49	7	0	24	48	11	0	38	88	17	0	362	
4:40 PM	9	54	19	0	8	42	24	0	21	50	24	0	37	98	18	0	404	
4:45 PM	16	56	16	0	8	53	21	0	23	60	16	0	36	86	23	0	414	
4:50 PM	14	45	10	0	19	50	11	0	26	48	11	0	32	81	12	0	359	
4:55 PM	17	64	14	0	4	42	23	0	29	50	20	0	30	94	13	0	400	4581
5:00 PM	8	67	13	0	6	49	12	1	22	43	11	1	33	75	20	0	361	4563
5:05 PM	15	52	15	0	9	42	12	0	37	49	25	0	34	93	10	0	393	4576
5:10 PM	14	66	21	0	9	46	16	0	27	44	16	4	42	82	14	0	401	4609
5:15 PM	14	59	20	0	12	39	6	0	37	51	23	2	39	88	24	0	414	4658
5:20 PM	13	44	11	0	5	41	15	0	36	62	19	0	36	85	23	0	390	4659
5:25 PM	10	61	19	0	4	46	12	0	34	46	12	1	39	88	14	0	386	4677
5:30 PM	14	64	19	0	4	42	14	1	35	52	15	0	36	92	9	0	397	4681
5:35 PM	14	59	11	0	10	34	12	1	25	56	23	1	30	76	28	0	380	4699
5:40 PM	14	60	23	0	9	39	1	0	39	58	21	1	29	77	12	0	383	4678
5:45 PM	17	56	13	1	14	42	2	0	26	48	20	0	38	95	20	0	392	4656
5:50 PM	3	57	26	0	5	37	0	0	49	47	19	0	51	53	15	0	362	4659
5:55 PM	6	54	16	0	7	36	0	0	25	44	13	0	26	90	25	0	342	4601

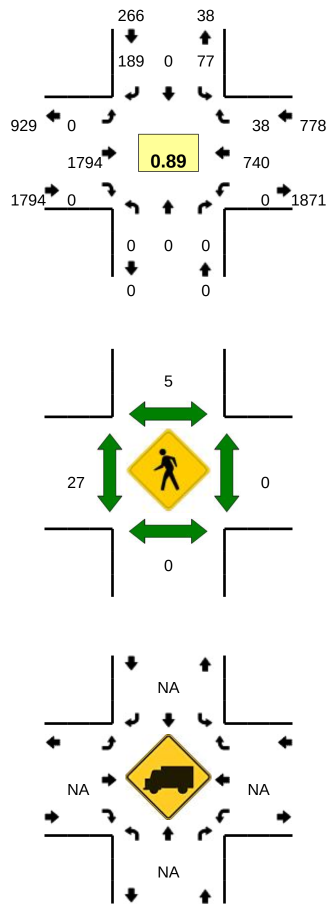
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	172	708	224	0	120	508	136	0	404	576	256	24	460	1052	192	0	4832
Heavy Trucks	8	4	0		0	0	4		4	8	4		0	8	4		44
Pedestrians		0				8				0				12			20
Bicycles	4	2	0		1	12	0		0	4	3		0	2	0		28
Railroad																	
Stopped Buses																	

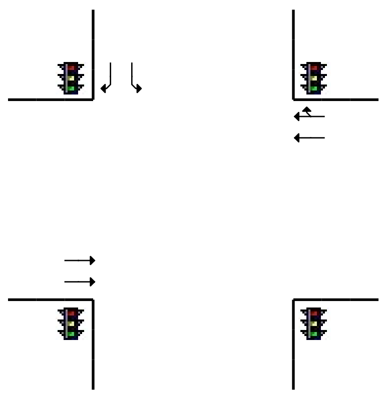
Comments: none

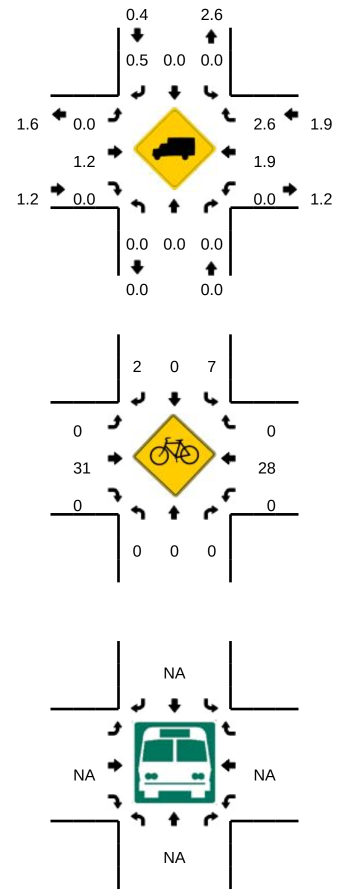
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Oak Ave/Vine Rd -- Sand Hill Rd | **QC JOB #:** 12899513
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:15 AM -- 8:30 AM







5-Min Count Period Beginning At	Oak Ave/Vine Rd (Northbound) Left	Thru	Right	U	Oak Ave/Vine Rd (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	3	0	7	0	0	85	0	0	0	37	1	0	133	
7:05 AM	0	0	0	0	1	0	4	0	0	92	0	0	0	33	0	0	130	
7:10 AM	0	0	0	0	2	0	13	0	0	97	0	0	0	21	1	0	134	
7:15 AM	0	0	0	0	3	0	11	0	0	101	0	0	0	34	1	0	150	
7:20 AM	0	0	0	0	2	0	6	0	0	132	0	0	0	48	1	0	189	
7:25 AM	0	0	0	0	4	0	5	0	0	96	0	0	0	38	2	0	145	
7:30 AM	0	0	0	0	1	0	12	0	0	114	0	0	0	50	2	0	179	
7:35 AM	0	0	0	0	4	0	17	0	0	142	0	0	0	56	1	0	220	
7:40 AM	0	0	0	0	7	0	9	0	0	141	0	0	0	73	6	0	236	
7:45 AM	0	0	0	0	3	0	4	0	0	154	0	0	0	75	7	0	243	
7:50 AM	0	0	0	0	10	0	15	0	0	129	0	0	0	54	3	0	211	
7:55 AM	0	0	0	0	7	0	14	0	0	144	0	0	0	58	5	0	228	2198
8:00 AM	0	0	0	0	3	0	16	0	0	136	0	0	0	64	3	0	222	2287
8:05 AM	0	0	0	0	4	0	22	0	0	158	0	0	0	73	1	0	258	2415
8:10 AM	0	0	0	0	9	0	27	0	0	133	0	0	0	49	0	0	218	2499
8:15 AM	0	0	0	0	7	0	20	0	0	178	0	0	0	77	4	0	286	2635
8:20 AM	0	0	0	0	11	0	13	0	0	175	0	0	0	56	6	0	261	2707
8:25 AM	0	0	0	0	8	0	17	0	0	164	0	0	0	63	2	0	254	2816
8:30 AM	0	0	0	0	4	0	15	0	0	140	0	0	0	42	0	0	201	2838
8:35 AM	0	0	0	0	7	0	10	0	0	128	0	0	0	53	2	0	200	2818
8:40 AM	0	0	0	0	6	0	5	0	0	143	0	0	0	43	0	0	197	2779
8:45 AM	0	0	0	0	8	0	18	0	0	143	0	0	0	52	1	0	222	2758
8:50 AM	0	0	0	0	8	0	16	0	0	151	0	0	0	44	4	0	223	2770
8:55 AM	0	0	0	0	3	0	11	0	0	175	0	0	0	33	8	0	230	2772

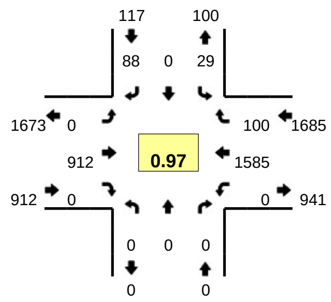
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	104	0	200	0	0	2068	0	0	0	784	48	0	3204
Heavy Trucks	0	0	0		0	0	4		0	28	0		0	16	4		52
Pedestrians		0				12				20				0			32
Bicycles	0	0	0		3	0	1		0	7	0		0	5	0		16
Railroad																	
Stopped Buses																	

Comments: none

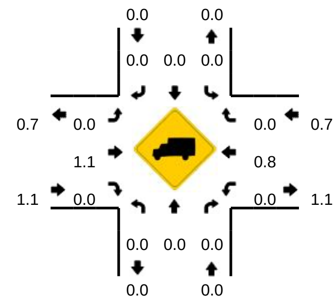
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

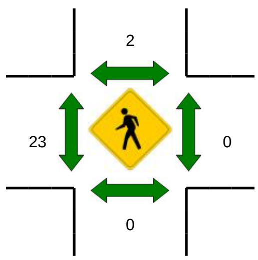
LOCATION: Oak Ave/Vine Rd -- Sand Hill Rd | **QC JOB #:** 12899514

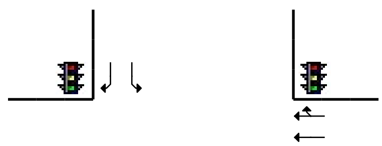
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

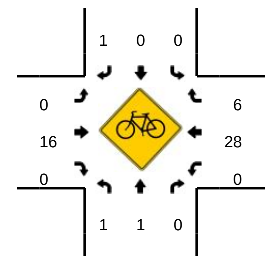


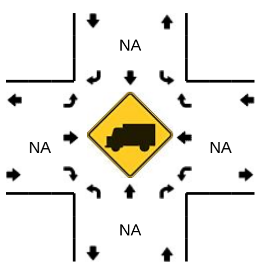
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

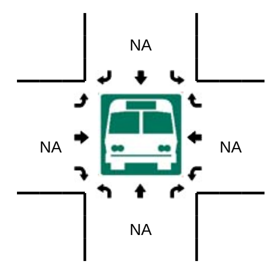












5-Min Count Period Beginning At	Oak Ave/Vine Rd (Northbound) Left	Thru	Right	U	Oak Ave/Vine Rd (Southbound) Left	Thru	Right	U	Sand Hill Rd (Eastbound) Left	Thru	Right	U	Sand Hill Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	3	0	16	0	0	70	0	0	0	126	3	0	218	
4:05 PM	0	0	0	0	4	0	8	0	0	77	0	0	0	119	5	0	213	
4:10 PM	0	0	0	0	1	0	11	0	0	69	0	0	0	114	5	0	200	
4:15 PM	0	0	0	0	4	0	10	0	0	76	0	0	0	124	7	0	221	
4:20 PM	0	0	0	0	2	0	10	0	0	74	0	0	0	135	8	0	229	
4:25 PM	0	0	0	0	5	0	7	0	0	54	0	0	0	128	9	0	203	
4:30 PM	0	0	0	0	3	0	5	0	0	93	0	0	0	131	10	0	242	
4:35 PM	0	0	0	0	1	0	13	0	0	70	0	0	0	130	5	0	219	
4:40 PM	0	0	0	0	5	0	15	0	0	73	0	0	0	129	6	0	228	
4:45 PM	0	0	0	0	4	0	7	0	0	65	0	0	0	125	6	0	207	
4:50 PM	0	0	0	0	3	0	5	0	0	97	0	0	0	152	8	0	265	
4:55 PM	0	0	0	0	2	0	9	0	0	73	0	0	0	122	8	0	214	2659
5:00 PM	0	0	0	0	2	0	9	0	0	66	0	0	0	134	8	0	219	2660
5:05 PM	0	0	0	0	1	0	5	0	0	75	0	0	0	123	6	0	210	2657
5:10 PM	0	0	0	0	1	0	9	0	0	70	0	0	0	141	7	0	228	2685
5:15 PM	0	0	0	0	5	0	1	0	0	87	0	0	0	143	10	0	246	2710
5:20 PM	0	0	0	0	0	0	7	0	0	74	0	0	0	133	13	0	227	2708
5:25 PM	0	0	0	0	2	0	3	0	0	69	0	0	0	122	13	0	209	2714
5:30 PM	0	0	0	0	4	0	10	0	0	74	0	0	0	114	7	0	209	2681
5:35 PM	0	0	0	0	2	0	8	0	0	75	0	0	0	136	10	0	231	2693
5:40 PM	0	0	0	0	3	0	10	0	0	91	0	0	0	134	4	0	242	2707
5:45 PM	0	0	0	0	3	0	5	0	0	74	0	0	0	116	9	0	207	2707
5:50 PM	0	0	0	0	2	0	6	0	0	74	0	0	0	103	8	0	193	2635
5:55 PM	0	0	0	0	5	0	10	0	0	66	0	0	0	120	9	0	210	2631

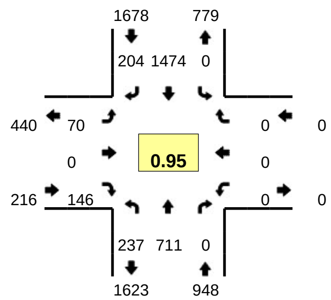
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	24	0	68	0	0	924	0	0	0	1668	120	0	2804
Heavy Trucks	0	0	0		0	0	0		0	8	0		0	0	0		8
Pedestrians		0				0				24				0			24
Bicycles	0	0	0		0	0	0		0	4	0		0	9	3		16
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

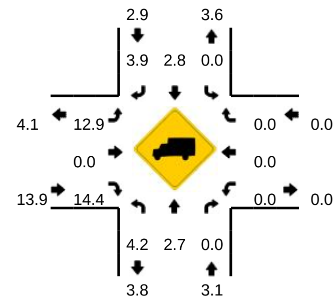
LOCATION: El Camino Real -- Quarry Rd — **QC JOB #:** 12899515

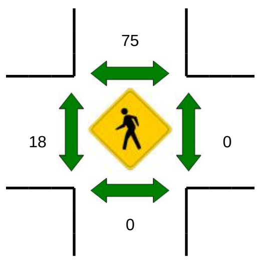
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

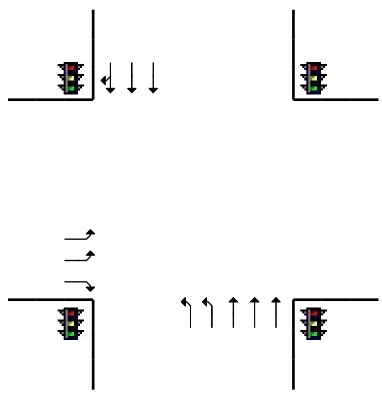


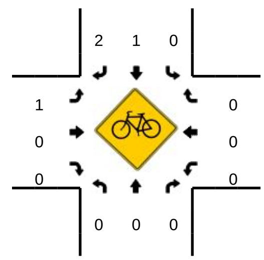
Peak-Hour: 7:55 AM -- 8:55 AM

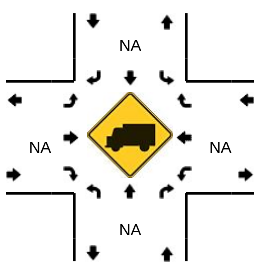
Peak 15-Min: 8:35 AM -- 8:50 AM

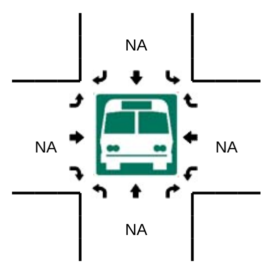












5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Quarry Rd (Eastbound) Left	Thru	Right	U	Quarry Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	14	34	0	0	0	34	11	0	1	0	2	0	0	0	0	0	96	
7:05 AM	12	32	0	0	0	40	6	0	3	0	3	0	0	0	0	0	96	
7:10 AM	19	35	0	0	0	58	15	0	6	0	5	0	0	0	0	0	138	
7:15 AM	11	50	0	0	0	70	7	0	2	0	7	0	0	0	0	0	147	
7:20 AM	21	33	0	0	0	54	8	0	6	0	10	0	0	0	0	0	132	
7:25 AM	16	32	0	0	0	86	19	0	1	0	6	0	0	0	0	0	160	
7:30 AM	17	49	0	0	0	63	8	0	4	0	13	0	0	0	0	0	154	
7:35 AM	12	85	0	0	0	108	7	0	5	0	12	0	0	0	0	0	229	
7:40 AM	17	38	0	0	0	113	19	0	8	0	8	0	0	0	0	0	203	
7:45 AM	20	53	0	1	0	112	23	0	5	0	13	0	0	0	0	0	227	
7:50 AM	26	49	0	0	0	108	11	0	3	0	5	1	0	0	0	0	203	
7:55 AM	15	64	0	0	0	138	22	0	0	0	6	0	0	0	0	0	245	2030
8:00 AM	25	46	0	0	0	104	16	0	4	0	12	0	0	0	0	0	207	2141
8:05 AM	13	52	0	0	0	132	20	0	4	0	17	1	0	0	0	0	239	2284
8:10 AM	15	55	0	1	0	124	21	0	8	0	15	0	0	0	0	0	239	2385
8:15 AM	13	56	0	0	0	138	16	0	4	0	9	0	0	0	0	0	236	2474
8:20 AM	21	57	0	0	0	95	20	0	11	0	15	0	0	0	0	0	219	2561
8:25 AM	12	64	0	0	0	149	18	0	4	0	14	0	0	0	0	0	261	2662
8:30 AM	28	54	0	0	0	96	14	0	8	0	14	1	0	0	0	0	215	2723
8:35 AM	28	66	0	0	0	142	12	0	5	0	13	0	0	0	0	0	266	2760
8:40 AM	20	62	0	1	0	104	16	0	8	0	10	0	0	0	0	0	221	2778
8:45 AM	20	73	0	1	0	135	17	0	6	0	10	0	0	0	0	0	262	2813
8:50 AM	24	62	0	0	0	117	12	0	6	0	11	0	0	0	0	0	232	2842
8:55 AM	19	70	0	0	0	119	18	0	7	0	11	0	0	0	0	0	244	2841

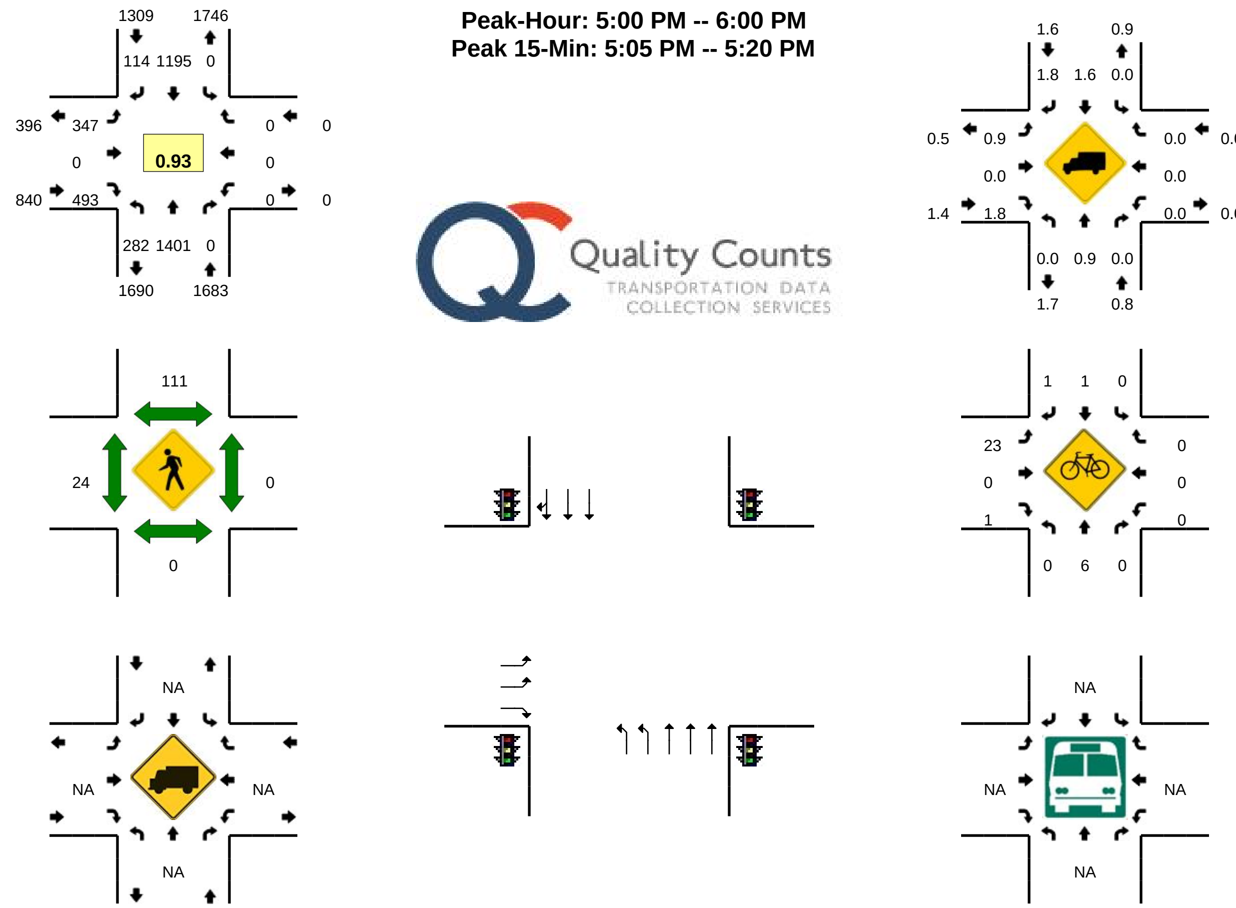
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	272	804	0	8	0	1524	180	0	76	0	132	0	0	0	0	0	2996
Heavy Trucks	8	16	0		0	24	12		8	0	32		0	0	0		100
Pedestrians		0				44				12				0			56
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak   Method for determining peak hour: Total Entering Volume

LOCATION: El Camino Real -- Quarry Rd   **QC JOB #:** 12899516
CITY/STATE: Menlo Park, CA   **DATE:** Tue, Sep 30 2014

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:05 PM -- 5:20 PM



5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Quarry Rd (Eastbound) Left	Thru	Right	U	Quarry Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	10	95	0	0	0	72	9	0	30	0	50	0	0	0	0	0	266	
4:05 PM	30	97	0	0	0	76	7	0	36	0	32	0	0	0	0	0	278	
4:10 PM	23	100	0	1	0	80	10	0	25	0	30	0	0	0	0	0	269	
4:15 PM	10	124	0	1	0	103	11	0	28	0	38	0	0	0	0	0	315	
4:20 PM	15	101	0	2	0	77	14	0	36	0	46	1	0	0	0	0	292	
4:25 PM	38	104	0	1	0	80	11	0	38	0	27	0	0	0	0	0	299	
4:30 PM	21	115	0	1	0	118	18	0	21	0	36	0	0	0	0	0	330	
4:35 PM	24	114	0	0	0	89	4	0	30	0	51	0	0	0	0	0	312	
4:40 PM	27	89	0	1	0	87	9	0	43	0	42	0	0	0	0	0	298	
4:45 PM	24	121	0	0	0	84	10	0	28	0	30	0	0	0	0	0	297	
4:50 PM	17	122	0	1	0	81	9	0	22	0	34	0	0	0	0	0	286	
4:55 PM	20	93	0	0	0	91	8	0	38	0	54	0	0	0	0	0	304	3546
5:00 PM	34	122	0	0	0	58	8	0	35	0	38	0	0	0	0	0	295	3575
5:05 PM	26	131	0	0	0	119	5	0	28	0	60	0	0	0	0	0	369	3666
5:10 PM	12	100	0	1	0	107	7	0	43	0	48	0	0	0	0	0	318	3715
5:15 PM	23	128	0	0	0	105	9	0	26	0	52	0	0	0	0	0	343	3743
5:20 PM	18	115	0	0	0	109	7	0	21	0	48	0	0	0	0	0	318	3769
5:25 PM	21	104	0	0	0	99	18	0	48	0	35	0	0	0	0	0	325	3795
5:30 PM	28	94	0	0	0	78	9	0	25	0	46	1	0	0	0	0	281	3746
5:35 PM	20	141	0	0	0	118	7	0	22	0	32	0	0	0	0	0	340	3774
5:40 PM	29	96	0	0	0	117	17	0	28	0	24	1	0	0	0	0	312	3788
5:45 PM	24	122	0	0	0	68	7	0	18	0	45	0	0	0	0	0	284	3775
5:50 PM	21	124	0	0	0	117	12	0	19	0	33	0	0	0	0	0	326	3815
5:55 PM	24	124	0	1	0	100	8	0	32	0	32	0	0	0	0	0	321	3832

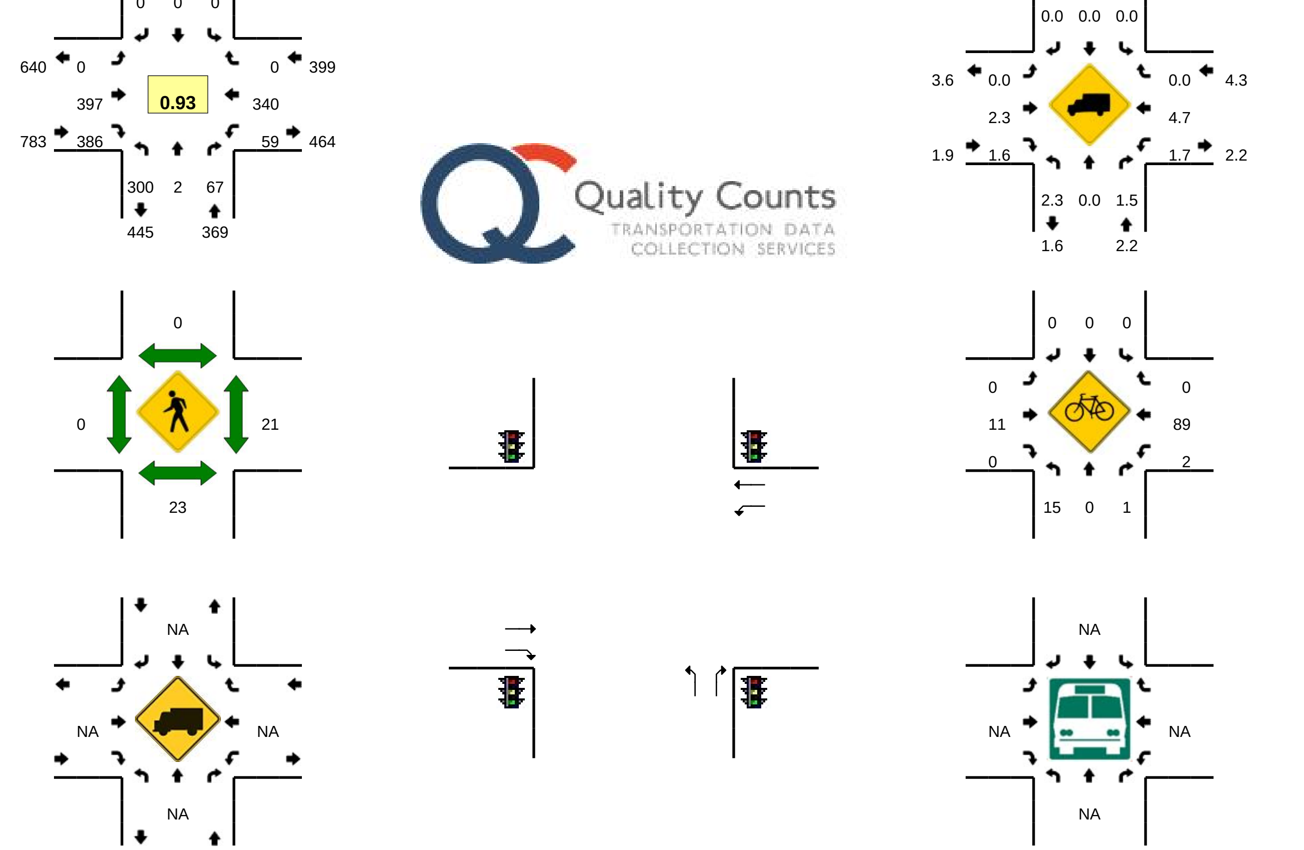
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	244	1436	0	4	0	1324	84	0	388	0	640	0	0	0	0	0	4120
Heavy Trucks	0	12	0		0	12	0		0	0	4		0	0	0		28
Pedestrians		0				136				28				0			164
Bicycles	0	3	0		0	1	0		11	0	1		0	0	0		16
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak Method for determining peak hour: Total Entering Volume

LOCATION: University Dr S -- Santa Cruz Ave **QC JOB #:** 12899521
CITY/STATE: Menlo Park, CA **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:45 AM -- 8:00 AM



5-Min Count Period Beginning At	University Dr S (Northbound) Left	Thru	Right	U	University Dr S (Southbound) Left	Thru	Right	U	Santa Cruz Ave (Eastbound) Left	Thru	Right	U	Santa Cruz Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	11	0	3	0	0	0	0	0	0	11	6	0	1	8	0	0	40	
7:05 AM	12	0	1	0	0	0	0	0	0	13	6	0	1	9	0	0	42	
7:10 AM	9	0	4	0	0	0	0	0	0	10	11	0	2	11	0	0	47	
7:15 AM	13	0	3	0	0	0	0	0	0	19	15	0	1	7	0	0	58	
7:20 AM	8	0	0	0	0	0	0	0	0	25	18	0	1	5	0	0	57	
7:25 AM	16	0	5	0	0	0	0	0	0	29	22	0	1	20	0	0	93	
7:30 AM	15	0	5	0	0	0	0	0	0	39	25	0	4	14	0	0	102	
7:35 AM	28	0	6	0	0	0	0	0	0	31	26	0	1	21	0	0	113	
7:40 AM	18	0	4	0	0	0	0	0	0	41	20	0	2	28	0	0	113	
7:45 AM	36	1	3	0	0	0	0	0	0	21	29	0	8	37	0	0	135	
7:50 AM	31	0	11	0	0	0	0	0	0	32	31	0	4	32	0	0	141	
7:55 AM	24	0	3	0	0	0	0	0	0	32	34	0	1	49	0	0	143	1084
8:00 AM	27	1	3	0	0	0	0	0	0	30	37	0	5	28	0	0	131	1175
8:05 AM	33	0	1	0	0	0	0	0	0	33	34	0	10	28	0	0	139	1272
8:10 AM	28	0	10	0	0	0	0	0	0	37	31	0	3	28	0	0	137	1362
8:15 AM	21	0	9	0	0	0	0	0	0	27	33	0	7	33	0	0	130	1434
8:20 AM	18	0	8	0	0	0	0	0	0	42	42	0	4	24	0	0	138	1515
8:25 AM	16	0	5	0	0	0	0	0	0	33	32	0	10	15	0	0	111	1533
8:30 AM	20	0	4	0	0	0	0	0	0	38	37	0	4	17	0	0	120	1551
8:35 AM	7	0	8	0	0	0	0	0	0	27	30	0	7	28	0	0	107	1545
8:40 AM	11	0	5	0	0	0	0	0	0	40	35	0	8	13	0	0	112	1544
8:45 AM	13	0	5	0	0	0	0	0	0	24	33	0	4	18	0	0	97	1506
8:50 AM	16	0	3	0	0	0	0	0	0	31	34	0	13	17	0	0	114	1479
8:55 AM	13	0	3	0	0	0	0	0	0	19	19	0	9	19	0	0	82	1418

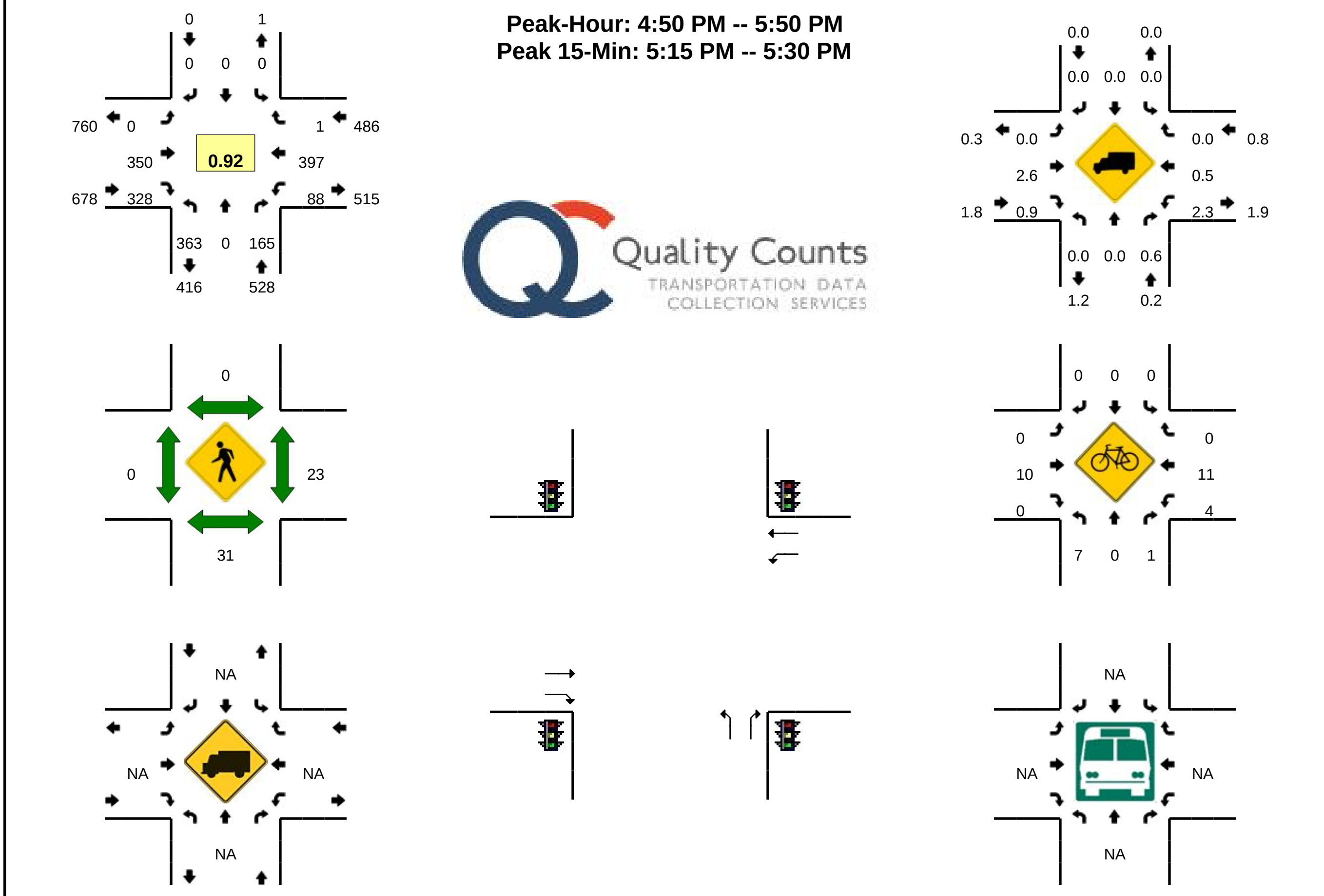
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	364	4	68	0	0	0	0	0	0	340	376	0	52	472	0	0	1676
Heavy Trucks	24	0	4		0	0	0		0	8	4		0	4	0		44
Pedestrians		12				0				0				24			36
Bicycles	8	0	0		0	0	0		0	5	0		0	28	0		41
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: University Dr S -- Santa Cruz Ave | **QC JOB #:** 12899522
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 4:50 PM -- 5:50 PM
Peak 15-Min: 5:15 PM -- 5:30 PM



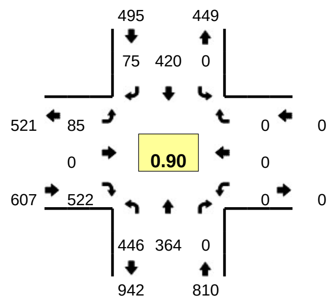
5-Min Count Period Beginning At	University Dr S (Northbound) Left	Thru	Right	U	University Dr S (Southbound) Left	Thru	Right	U	Santa Cruz Ave (Eastbound) Left	Thru	Right	U	Santa Cruz Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	21	0	6	0	0	0	0	0	0	29	20	0	12	26	0	0	114	
4:05 PM	29	0	10	0	0	0	0	0	0	32	26	0	3	22	0	0	122	
4:10 PM	26	0	12	0	0	0	0	0	0	38	24	0	10	33	0	0	143	
4:15 PM	31	0	15	0	0	0	0	0	0	28	31	0	5	29	0	0	139	
4:20 PM	24	0	8	0	0	0	0	0	0	29	21	0	6	30	0	0	118	
4:25 PM	26	0	12	0	0	0	0	0	0	30	29	0	6	31	0	0	134	
4:30 PM	28	0	9	0	0	0	0	0	0	29	23	0	6	34	0	0	129	
4:35 PM	30	0	10	0	0	0	0	0	0	23	18	0	6	26	0	0	113	
4:40 PM	23	0	12	0	0	0	0	0	0	29	29	0	2	33	0	0	128	
4:45 PM	23	0	10	0	0	0	0	0	0	30	25	0	7	19	0	0	114	
4:50 PM	23	0	15	0	0	0	0	0	0	35	25	0	8	34	0	0	140	
4:55 PM	32	0	9	0	0	0	0	0	0	32	23	0	6	31	0	0	133	1527
5:00 PM	21	0	13	0	0	0	0	0	0	24	27	0	5	33	1	0	124	1537
5:05 PM	34	0	12	0	0	0	0	0	0	22	36	0	11	41	0	0	156	1571
5:10 PM	38	0	7	0	0	0	0	0	0	28	31	0	7	36	0	0	147	1575
5:15 PM	29	0	16	0	0	0	0	0	0	33	34	0	6	36	0	0	154	1590
5:20 PM	31	0	12	0	0	0	0	0	0	36	27	0	5	32	0	0	143	1615
5:25 PM	40	0	11	0	0	0	0	0	0	36	28	0	13	36	0	0	164	1645
5:30 PM	24	0	22	0	0	0	0	0	0	28	25	0	4	33	0	0	136	1652
5:35 PM	27	0	15	0	0	0	0	0	0	26	24	0	4	29	0	0	125	1664
5:40 PM	32	0	19	0	0	0	0	0	0	24	19	0	10	29	0	0	133	1669
5:45 PM	32	0	14	0	0	0	0	0	0	26	29	0	9	27	0	0	137	1692
5:50 PM	30	0	11	0	0	0	0	0	0	30	28	0	5	33	0	0	137	1689
5:55 PM	26	0	12	0	0	0	0	0	0	22	27	0	5	33	0	0	125	1681

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	400	0	156	0	0	0	0	0	0	420	356	0	96	416	0	0	1844
Heavy Trucks	0	0	0		0	0	0		0	0	8		4	0	0		12
Pedestrians		8				0				0				24			32
Bicycles	1	0	0		0	0	0		0	4	0		1	2	0		8
Railroad																	
Stopped Buses																	

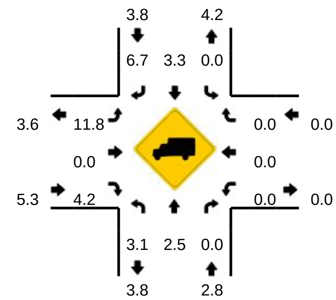
Comments: none

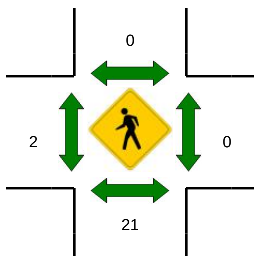
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

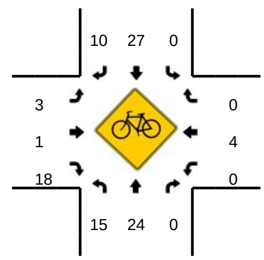
LOCATION: Middlefield Rd -- Ravenswood Ave | **QC JOB #:** 12899527
CITY/STATE: Menlo Park, CA | **DATE:** Thu, Oct 09 2014

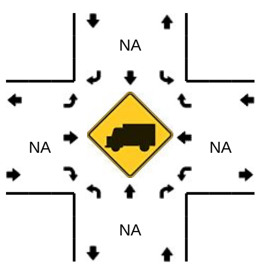


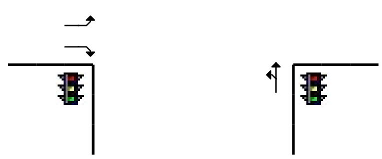
Peak-Hour: 7:50 AM -- 8:50 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

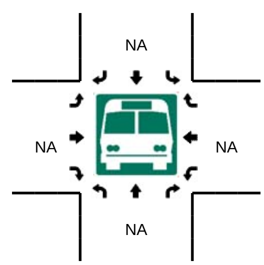












5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Ravenswood Ave (Eastbound) Left	Thru	Right	U	Ravenswood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	19	18	0	0	0	13	8	0	0	0	21	0	0	0	0	0	79	
7:05 AM	32	17	0	0	0	13	7	0	1	0	12	0	0	0	0	0	82	
7:10 AM	27	11	0	0	0	12	5	0	7	0	26	0	0	0	0	0	88	
7:15 AM	36	21	0	0	0	11	14	0	1	0	27	0	0	0	0	0	110	
7:20 AM	43	30	0	0	0	17	10	0	11	0	26	0	0	0	0	0	137	
7:25 AM	41	40	0	0	0	17	6	0	4	0	18	0	0	0	0	0	126	
7:30 AM	44	39	0	0	0	19	8	0	5	0	21	0	0	0	0	0	136	
7:35 AM	41	38	0	0	0	24	6	0	8	0	34	0	0	0	0	0	151	
7:40 AM	43	36	0	0	0	33	8	0	7	0	30	0	0	0	0	0	157	
7:45 AM	52	28	0	0	0	20	2	0	6	0	19	0	0	0	0	0	127	
7:50 AM	51	49	0	0	0	32	9	0	4	0	39	0	0	0	0	0	184	
7:55 AM	29	43	0	0	0	40	5	0	11	0	48	0	0	0	0	0	176	1553
8:00 AM	40	41	0	0	0	40	4	0	4	0	41	0	0	0	0	0	170	1644
8:05 AM	48	48	0	0	0	22	5	0	6	0	45	0	0	0	0	0	174	1736
8:10 AM	49	15	0	0	0	34	4	0	4	0	41	0	0	0	0	0	147	1795
8:15 AM	18	22	0	0	0	40	8	0	7	0	47	0	0	0	0	0	142	1827
8:20 AM	24	17	0	0	0	43	7	0	10	0	42	0	0	0	0	0	143	1833
8:25 AM	34	24	0	0	0	34	9	0	5	0	27	0	0	0	0	0	133	1840
8:30 AM	48	25	0	0	0	32	8	0	3	0	42	0	0	0	0	0	158	1862
8:35 AM	46	28	0	0	0	37	6	0	12	0	49	0	0	0	0	0	178	1889
8:40 AM	30	23	0	0	0	22	9	0	12	0	51	0	0	0	0	0	147	1879
8:45 AM	29	29	0	0	0	44	1	0	7	0	50	0	0	0	0	0	160	1912
8:50 AM	33	23	0	0	0	26	9	0	9	0	33	0	0	0	0	0	133	1861
8:55 AM	31	29	0	0	0	50	10	0	4	0	49	0	0	0	0	0	173	1858

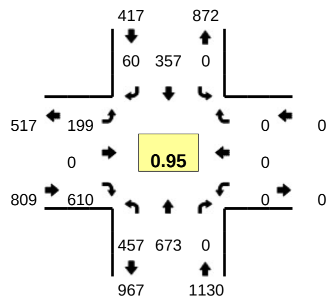
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	480	532	0	0	0	448	72	0	76	0	512	0	0	0	0	0	2120
Heavy Trucks	20	12	0		0	8	4		12	0	36		0	0	0		92
Pedestrians		36				0				4				0			40
Bicycles	7	14	0		0	6	1		2	0	3		0	4	0		37
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak　　Method for determining peak hour: Total Entering Volume

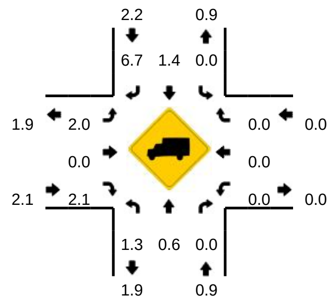
LOCATION: Middlefield Rd -- Ravenswood Ave　　**QC JOB #:** 12899528

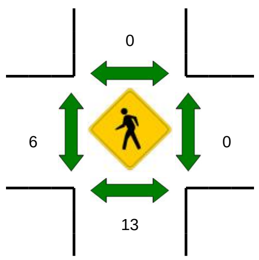
CITY/STATE: Menlo Park, CA　　**DATE:** Thu, Oct 09 2014

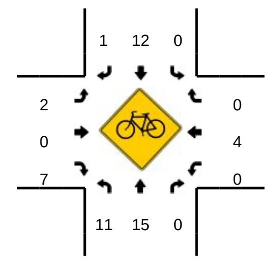


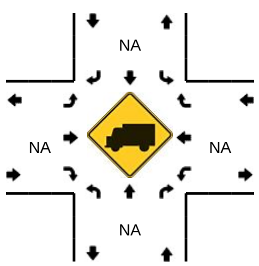
Peak-Hour: 4:50 PM -- 5:50 PM

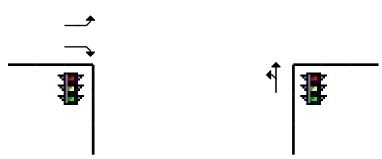
Peak 15-Min: 5:35 PM -- 5:50 PM

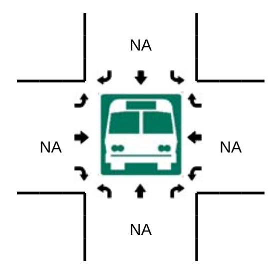












5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Ravenswood Ave (Eastbound) Left	Thru	Right	U	Ravenswood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	34	40	0	0	0	24	11	0	19	0	41	0	0	0	0	0	169	
4:05 PM	23	56	0	0	0	29	9	0	8	0	41	0	0	0	0	0	166	
4:10 PM	36	47	0	0	0	34	6	0	18	0	60	0	0	0	0	0	201	
4:15 PM	42	48	0	0	0	16	3	0	6	0	61	0	0	0	0	0	176	
4:20 PM	18	40	0	0	0	28	7	0	12	0	48	0	0	0	0	0	153	
4:25 PM	30	36	0	0	0	36	7	0	7	0	50	0	0	0	0	0	166	
4:30 PM	30	42	0	0	0	23	6	0	12	0	55	0	0	0	0	0	168	
4:35 PM	21	37	0	0	0	32	14	0	18	0	40	0	0	0	0	0	162	
4:40 PM	40	46	0	0	0	24	8	0	8	0	41	0	0	0	0	0	167	
4:45 PM	40	30	0	0	0	27	7	0	18	0	46	0	0	0	0	0	168	
4:50 PM	34	57	0	0	0	33	8	0	10	0	54	0	0	0	0	0	196	
4:55 PM	46	39	0	0	0	20	7	0	19	0	56	0	0	0	0	0	187	2079
5:00 PM	38	63	0	0	0	41	6	0	15	0	46	0	0	0	0	0	209	2119
5:05 PM	54	48	0	0	0	22	2	0	17	0	43	0	0	0	0	0	186	2139
5:10 PM	14	53	0	0	0	43	7	0	23	0	47	0	0	0	0	0	187	2125
5:15 PM	46	57	0	0	0	23	2	0	18	0	51	0	0	0	0	0	197	2146
5:20 PM	28	60	0	0	0	30	4	0	17	0	44	0	0	0	0	0	183	2176
5:25 PM	55	61	0	0	0	15	2	0	16	0	65	0	0	0	0	0	214	2224
5:30 PM	20	57	0	0	0	24	4	0	18	0	53	0	0	0	0	0	176	2232
5:35 PM	44	63	0	0	0	33	6	0	11	0	53	0	0	0	0	0	210	2280
5:40 PM	39	52	0	0	0	31	6	0	23	0	58	0	0	0	0	0	209	2322
5:45 PM	39	63	0	0	0	42	6	0	12	0	40	0	0	0	0	0	202	2356
5:50 PM	37	42	0	0	0	26	0	0	19	0	39	0	0	0	0	0	163	2323
5:55 PM	20	40	0	0	0	38	7	0	20	0	51	0	0	0	0	0	176	2312

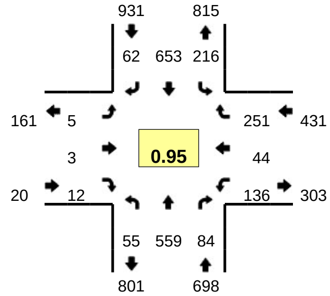
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	488	712	0	0	0	424	72	0	184	0	604	0	0	0	0	0	2484
Heavy Trucks	8	0	0		0	12	8		0	0	16		0	0	0		44
Pedestrians		8				0				0				0			8
Bicycles	0	4	0		0	4	0		0	0	4		0	1	0		13
Railroad																	
Stopped Buses																	

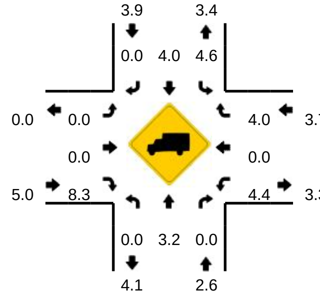
Comments: none

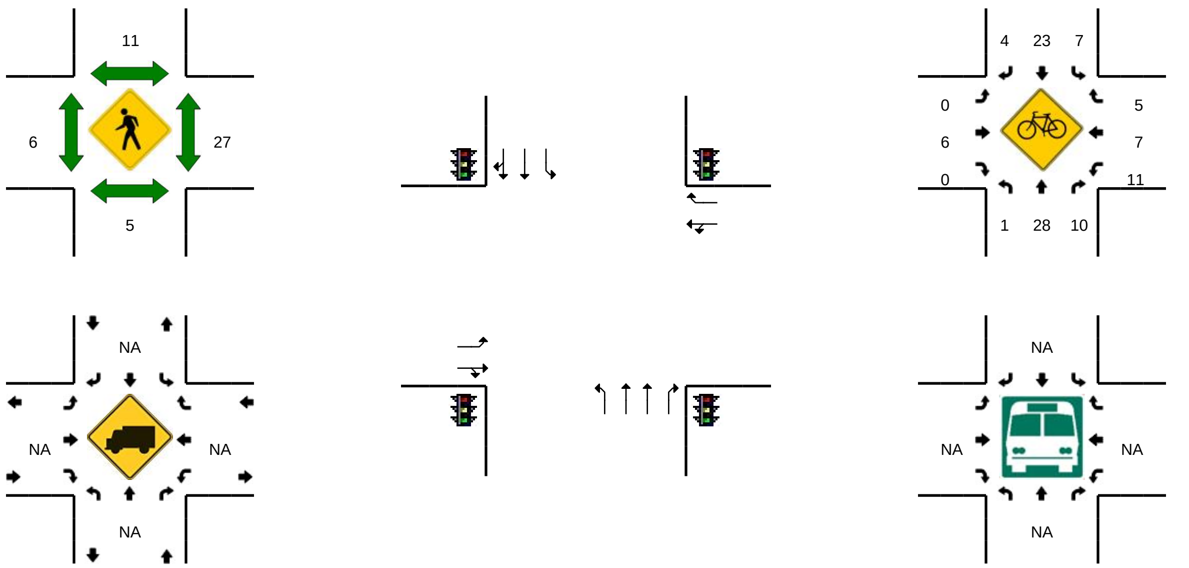
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Middlefield Rd -- Ringwood Ave | **QC JOB #:** 12899529
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:55 AM -- 8:55 AM
Peak 15-Min: 8:40 AM -- 8:55 AM







5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Ringwood Ave (Eastbound) Left	Thru	Right	U	Ringwood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	2	24	0	0	4	20	2	0	0	0	0	0	1	6	7	0	66	
7:05 AM	3	32	2	0	5	23	2	0	0	0	1	0	2	2	13	0	85	
7:10 AM	3	27	2	0	8	25	2	0	2	0	0	0	3	3	15	0	90	
7:15 AM	3	54	6	0	6	41	2	0	0	1	0	0	1	4	21	0	139	
7:20 AM	4	51	2	0	6	35	1	0	0	0	0	0	2	3	25	0	129	
7:25 AM	2	62	3	0	4	40	4	0	0	0	1	0	4	0	18	0	138	
7:30 AM	5	43	10	0	6	36	4	0	0	0	0	0	10	6	26	0	146	
7:35 AM	1	47	12	0	9	27	2	0	2	0	0	0	13	3	27	0	143	
7:40 AM	1	61	10	0	14	53	1	0	0	0	0	0	10	3	28	0	181	
7:45 AM	3	46	11	0	10	51	4	0	1	0	0	0	12	2	29	0	169	
7:50 AM	3	51	2	0	16	45	2	0	0	0	1	0	9	2	11	0	142	
7:55 AM	5	82	5	0	6	67	2	0	0	0	0	0	10	3	28	0	208	1636
8:00 AM	2	34	6	0	16	41	5	0	1	0	2	0	11	2	26	0	146	1716
8:05 AM	4	53	5	0	11	70	3	0	0	0	1	0	10	1	21	0	179	1810
8:10 AM	5	48	13	0	7	70	6	0	0	0	0	0	7	3	14	0	173	1893
8:15 AM	4	30	3	0	17	64	6	0	0	0	0	0	10	3	16	0	153	1907
8:20 AM	5	39	6	0	20	45	9	0	2	0	2	0	12	4	16	0	160	1938
8:25 AM	6	22	10	0	38	49	4	0	1	1	4	0	14	6	16	0	171	1971
8:30 AM	7	63	15	0	23	41	3	0	0	0	2	0	7	1	19	0	181	2006
8:35 AM	6	54	10	0	27	22	4	0	0	1	1	0	13	3	22	0	163	2026
8:40 AM	3	34	5	0	26	72	9	0	0	0	0	0	15	2	34	0	200	2045
8:45 AM	4	50	2	0	6	43	7	0	1	1	0	0	19	11	27	0	171	2047
8:50 AM	4	50	4	0	19	69	4	0	0	0	0	0	8	5	12	0	175	2080
8:55 AM	5	31	4	0	14	67	9	0	3	1	1	0	2	3	23	0	163	2035

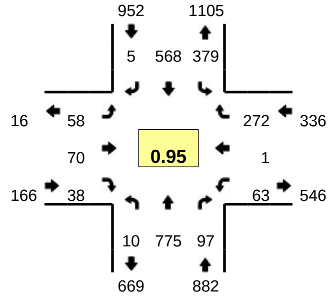
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	44	536	44	0	204	736	80	0	4	4	0	0	168	72	292	0	2184
Heavy Trucks	0	20	0		8	24	0		0	0	0		20	0	20		92
Pedestrians		12				0				4				0			16
Bicycles	0	1	2		4	1	1		0	1	0		2	1	1		14
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

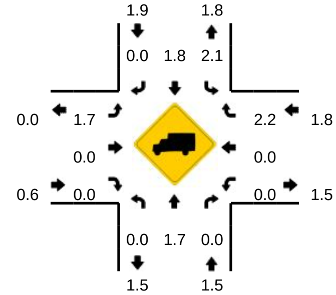
LOCATION: Middlefield Rd -- Ringwood Ave | **QC JOB #:** 12899530

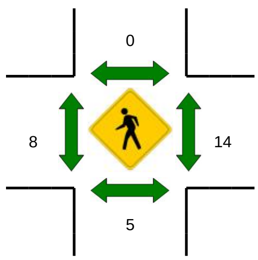
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

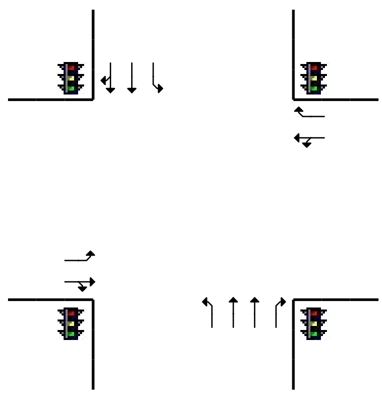


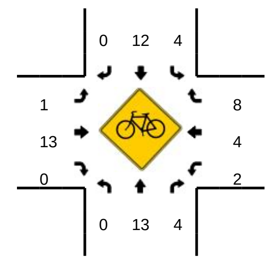
Peak-Hour: 5:00 PM -- 6:00 PM

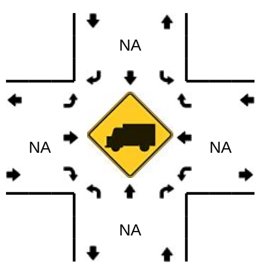
Peak 15-Min: 5:15 PM -- 5:30 PM

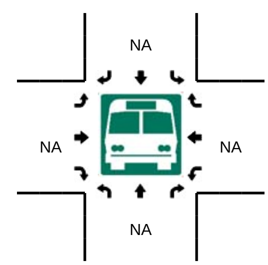












5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Ringwood Ave (Eastbound) Left	Thru	Right	U	Ringwood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	41	9	0	28	48	0	0	7	10	5	0	4	0	18	0	170	
4:05 PM	0	65	9	0	17	46	0	0	2	3	4	0	6	0	11	0	163	
4:10 PM	0	47	11	0	35	41	0	0	3	9	10	0	6	0	8	0	170	
4:15 PM	1	46	3	0	34	41	0	0	3	4	0	0	4	0	15	0	151	
4:20 PM	0	70	4	0	20	59	0	0	1	7	1	0	3	0	14	0	179	
4:25 PM	1	72	8	0	16	41	2	0	5	5	2	0	4	0	13	0	169	
4:30 PM	0	36	7	0	35	50	2	0	5	11	1	0	3	0	17	0	167	
4:35 PM	0	86	6	0	22	63	0	0	3	3	1	0	1	1	15	0	201	
4:40 PM	2	66	3	0	35	48	2	0	5	3	3	0	5	0	19	0	191	
4:45 PM	0	48	7	0	38	63	1	0	0	3	2	0	3	0	18	0	183	
4:50 PM	0	70	7	0	17	61	1	0	5	2	3	0	2	0	15	0	183	
4:55 PM	0	64	6	0	26	36	0	0	5	8	1	0	7	0	15	0	168	2095
5:00 PM	0	41	4	0	35	53	0	0	5	12	2	0	1	0	20	0	173	2098
5:05 PM	2	68	11	0	22	37	3	0	9	11	7	0	7	0	26	0	203	2138
5:10 PM	0	53	7	0	48	37	1	0	3	6	3	0	7	0	28	0	193	2161
5:15 PM	2	88	6	0	12	43	0	0	5	5	2	0	15	0	19	0	197	2207
5:20 PM	2	59	5	0	46	51	0	0	5	4	5	0	7	0	31	0	215	2243
5:25 PM	0	79	9	0	23	52	0	0	4	5	3	0	3	0	22	0	200	2274
5:30 PM	1	45	13	0	40	35	0	0	8	8	3	0	6	0	22	0	181	2288
5:35 PM	0	88	14	0	17	56	0	0	3	6	3	0	1	0	28	0	216	2303
5:40 PM	1	51	4	0	40	37	1	0	4	3	3	0	2	0	19	0	165	2277
5:45 PM	0	74	8	0	32	68	0	0	4	4	3	0	4	0	14	0	211	2305
5:50 PM	1	68	7	0	26	39	0	0	4	5	3	0	6	1	25	0	185	2307
5:55 PM	1	61	9	0	38	60	0	0	4	1	1	0	4	0	18	0	197	2336

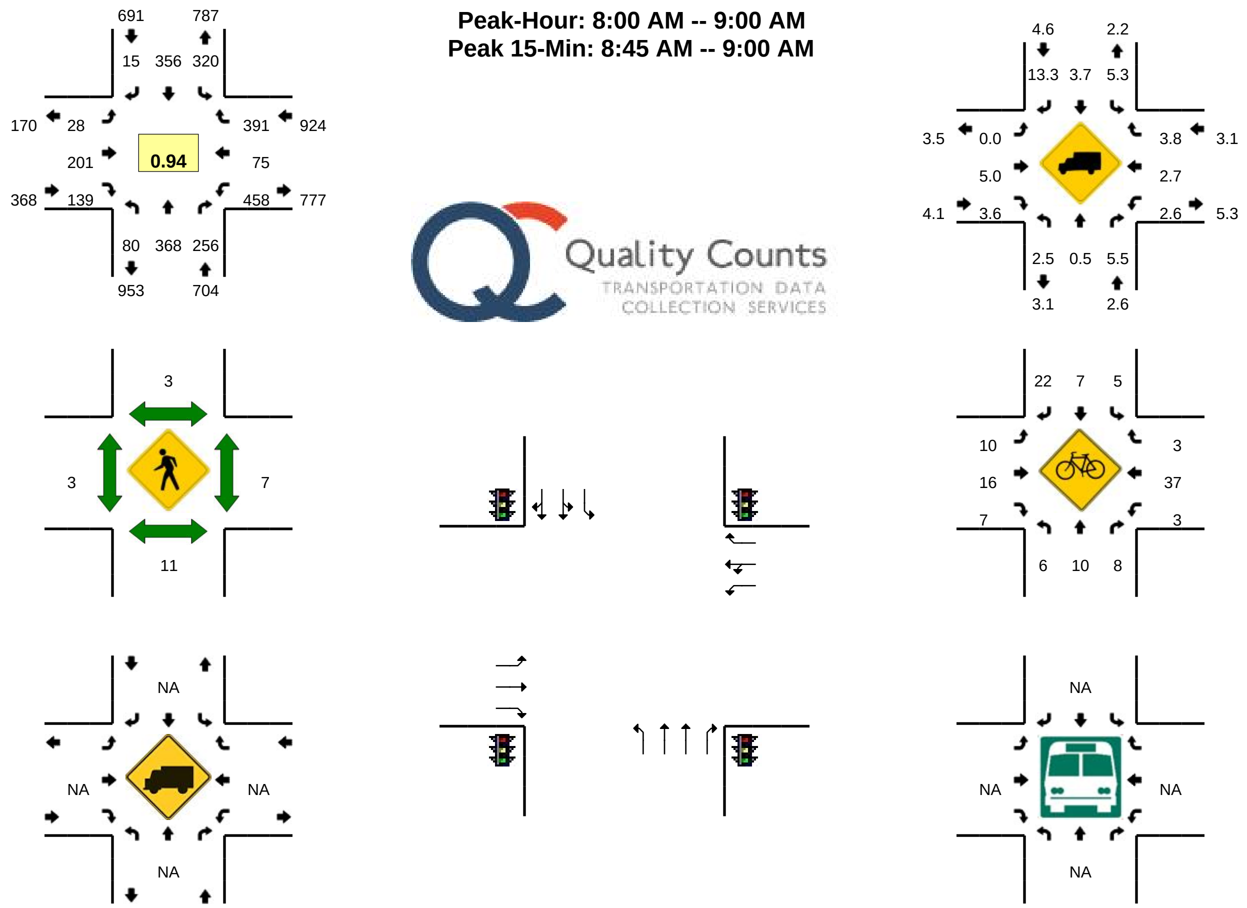
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	16	904	80	0	324	584	0	0	56	56	40	0	100	0	288	0	2448
Heavy Trucks	0	16	0		8	12	0		0	0	0		0	0	12		48
Pedestrians		0				0				12				12			24
Bicycles	0	4	0		1	4	0		0	5	0		1	1	4		20
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Middlefield Rd -- Willow Rd | **QC JOB #:** 12899531
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM



5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	3	11	12	0	8	10	0	0	1	2	5	0	25	2	36	0	115	
7:05 AM	4	13	9	0	16	10	0	0	1	9	0	0	34	4	29	0	129	
7:10 AM	4	21	18	0	15	12	0	0	0	8	8	0	41	4	28	0	159	
7:15 AM	3	18	19	0	23	15	2	0	0	10	4	0	37	7	46	0	184	
7:20 AM	7	27	21	0	19	14	0	0	0	12	4	0	33	4	60	0	201	
7:25 AM	8	31	16	0	23	13	2	0	3	5	4	0	23	9	34	0	171	
7:30 AM	7	23	16	0	22	17	3	0	1	17	4	0	47	6	32	0	195	
7:35 AM	5	33	17	0	12	21	0	0	0	15	11	0	47	4	40	0	205	
7:40 AM	9	37	23	0	35	30	1	0	0	18	4	0	39	10	34	0	240	
7:45 AM	10	24	23	0	29	30	1	0	2	14	10	0	32	5	31	1	212	
7:50 AM	6	30	23	0	37	24	3	0	3	11	6	0	34	4	47	0	228	
7:55 AM	2	14	14	0	36	30	1	0	1	20	11	0	43	6	36	0	214	2253
8:00 AM	10	35	18	0	21	12	2	0	0	22	17	0	44	10	28	0	219	2357
8:05 AM	7	30	18	0	38	35	2	0	1	8	10	0	35	8	35	0	227	2455
8:10 AM	6	29	13	0	44	37	1	0	3	20	14	0	34	3	27	0	231	2527
8:15 AM	6	30	20	0	33	25	2	0	2	17	18	0	21	3	35	0	212	2555
8:20 AM	4	19	25	0	20	27	0	0	3	18	9	0	45	4	28	0	202	2556
8:25 AM	7	40	20	0	22	30	1	0	2	17	12	0	43	3	40	0	237	2622
8:30 AM	9	36	25	0	11	14	0	0	3	14	18	0	31	12	34	0	207	2634
8:35 AM	4	26	9	0	25	31	1	0	1	23	6	0	45	4	35	0	210	2639
8:40 AM	6	31	16	0	31	45	1	0	2	22	7	0	30	7	28	0	226	2625
8:45 AM	12	25	36	0	14	23	2	0	4	17	9	0	55	3	32	0	232	2645
8:50 AM	5	33	25	0	32	38	0	0	5	11	12	0	46	11	34	0	252	2669
8:55 AM	4	34	31	0	29	39	3	0	2	12	7	0	29	7	35	0	232	2687

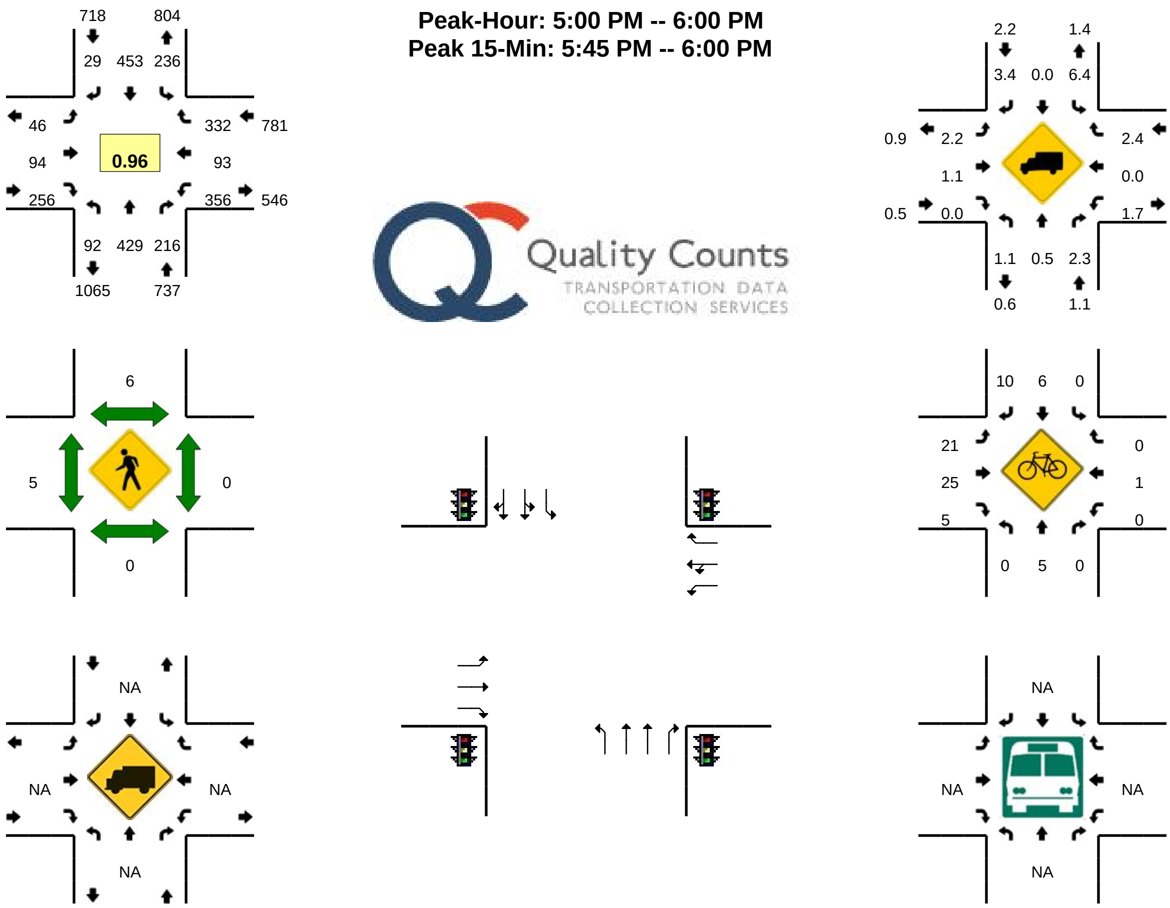
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	84	368	368	0	300	400	20	0	44	160	112	0	520	84	404	0	2864
Heavy Trucks	8	4	8		20	16	0		0	12	4		16	0	8		96
Pedestrians		4				4				4				8			20
Bicycles	1	0	1		0	1	1		1	3	0		0	12	0		20
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Middlefield Rd -- Willow Rd | **QC JOB #:** 12899532
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:45 PM -- 6:00 PM



5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	6	34	27	0	31	16	2	0	3	16	16	0	17	7	25	0	200	
4:05 PM	12	29	13	0	36	28	1	0	4	12	22	0	22	8	21	0	208	
4:10 PM	5	32	31	0	14	28	1	0	2	15	16	0	24	9	26	0	203	
4:15 PM	6	39	28	0	33	31	0	0	2	8	11	0	23	10	22	0	213	
4:20 PM	8	32	23	0	23	28	3	0	1	7	15	0	27	8	33	0	208	
4:25 PM	3	27	25	0	27	33	0	0	2	13	18	0	20	5	18	0	191	
4:30 PM	7	40	24	0	26	24	0	0	6	11	19	0	40	8	23	0	228	
4:35 PM	5	29	23	0	28	34	0	0	1	10	16	2	26	11	22	0	207	
4:40 PM	6	40	26	0	28	45	0	0	3	3	25	0	26	12	30	0	244	
4:45 PM	4	13	8	0	4	32	3	0	4	9	21	0	24	6	18	0	146	
4:50 PM	3	29	20	0	25	40	2	0	5	9	21	0	36	7	34	0	231	
4:55 PM	9	36	23	0	10	30	0	0	2	4	10	0	45	8	30	0	207	2486
5:00 PM	5	30	20	0	33	47	2	0	6	12	22	0	16	2	21	0	216	2502
5:05 PM	6	38	23	0	24	35	1	0	2	11	21	0	23	5	29	0	218	2512
5:10 PM	9	50	28	0	19	39	3	0	1	8	20	0	22	5	34	0	238	2547
5:15 PM	17	40	13	0	22	36	2	0	3	12	18	0	13	4	26	0	206	2540
5:20 PM	2	22	12	0	22	46	2	0	1	5	17	0	46	12	20	0	207	2539
5:25 PM	16	49	16	0	13	29	3	0	7	9	27	0	37	6	28	0	240	2588
5:30 PM	5	42	21	0	23	26	1	0	0	7	22	0	33	7	28	0	215	2575
5:35 PM	7	33	13	0	18	45	2	0	3	1	15	2	33	14	27	0	213	2581
5:40 PM	6	27	18	0	7	40	3	0	7	4	25	0	22	3	31	0	193	2530
5:45 PM	2	20	7	0	6	32	4	0	7	2	21	1	47	11	31	0	191	2575
5:50 PM	7	39	24	0	28	39	3	0	2	9	20	0	36	13	31	0	251	2595
5:55 PM	10	39	21	0	21	39	3	0	4	14	28	0	28	11	26	0	244	2632

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	76	392	208	0	220	440	40	0	52	100	276	4	444	140	352	0	2744
Heavy Trucks	4	0	4		20	0	0		4	0	0		8	0	12		52
Pedestrians		0				4				4				0			8
Bicycles	0	1	0		0	1	2		6	6	3		0	1	0		20
Railroad																	
Stopped Buses																	

Comments: none

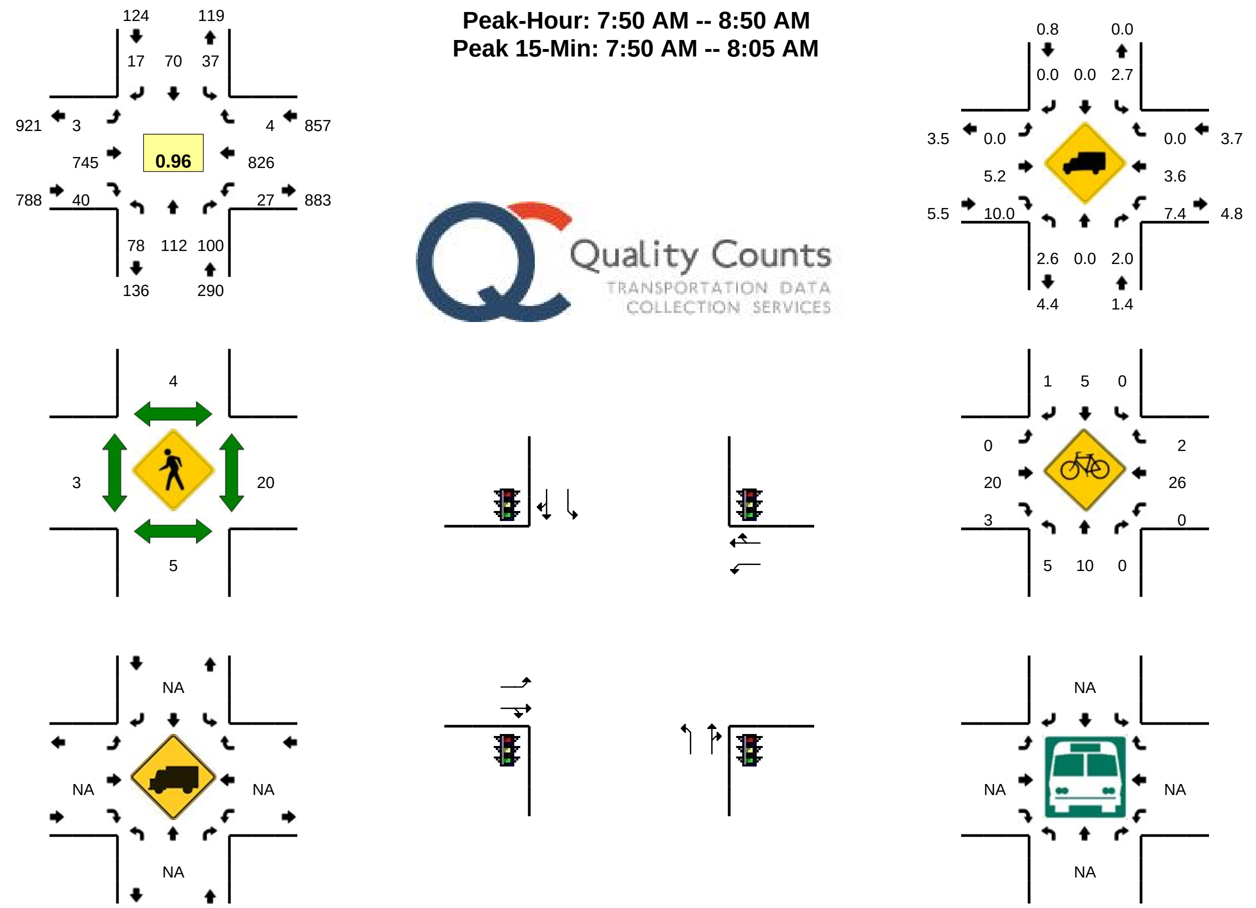
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: Gilbert Ave -- Willow Rd — **QC JOB #:** 12899533

CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:50 AM -- 8:50 AM

Peak 15-Min: 7:50 AM -- 8:05 AM



5-Min Count Period Beginning At	Gilbert Ave (Northbound) Left	Thru	Right	U	Gilbert Ave (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	1	4	0	0	0	0	0	0	29	0	0	1	79	1	0	115	
7:05 AM	1	2	3	0	2	0	1	0	1	32	3	0	2	64	0	0	111	
7:10 AM	5	2	2	0	1	0	0	0	0	36	1	0	3	70	0	0	120	
7:15 AM	4	0	7	0	2	0	3	0	0	49	2	0	1	86	0	0	154	
7:20 AM	7	1	7	0	1	1	0	0	0	59	2	0	0	93	0	0	171	
7:25 AM	5	2	4	0	2	0	1	0	0	37	3	0	2	61	0	0	117	
7:30 AM	6	3	6	0	0	1	0	0	0	53	2	0	0	79	0	1	151	
7:35 AM	9	13	4	0	0	2	0	0	0	53	2	0	1	74	2	0	160	
7:40 AM	10	6	7	0	2	4	3	0	0	58	4	0	7	66	0	0	167	
7:45 AM	5	8	8	0	0	4	1	0	1	59	5	0	1	74	1	0	167	
7:50 AM	10	8	8	0	3	6	0	0	0	59	4	0	2	89	1	0	190	
7:55 AM	8	9	12	0	5	4	1	0	0	77	1	0	2	62	0	0	181	1804
8:00 AM	2	7	6	0	2	4	2	0	2	63	2	0	3	73	1	0	167	1856
8:05 AM	2	7	4	0	4	7	1	0	0	66	5	0	3	62	1	1	163	1908
8:10 AM	10	19	5	0	3	9	2	0	0	64	3	0	3	61	0	0	179	1967
8:15 AM	3	12	7	0	3	5	2	0	0	54	3	0	3	60	1	0	153	1966
8:20 AM	5	11	10	0	4	5	0	0	1	70	6	0	1	67	0	0	180	1975
8:25 AM	15	11	11	0	1	3	2	0	0	56	5	0	2	62	0	0	168	2026
8:30 AM	8	9	11	0	3	9	0	0	0	60	3	0	1	71	0	0	175	2050
8:35 AM	5	8	10	0	2	6	0	0	0	42	1	0	1	63	0	0	138	2028
8:40 AM	3	6	8	0	6	11	5	0	0	52	3	0	3	82	0	0	179	2040
8:45 AM	7	5	8	0	1	1	2	0	0	82	4	0	2	74	0	0	186	2059
8:50 AM	3	5	5	0	3	2	0	0	0	52	6	0	8	64	0	0	148	2017
8:55 AM	5	2	2	0	2	0	0	0	1	71	1	0	4	83	0	1	172	2008

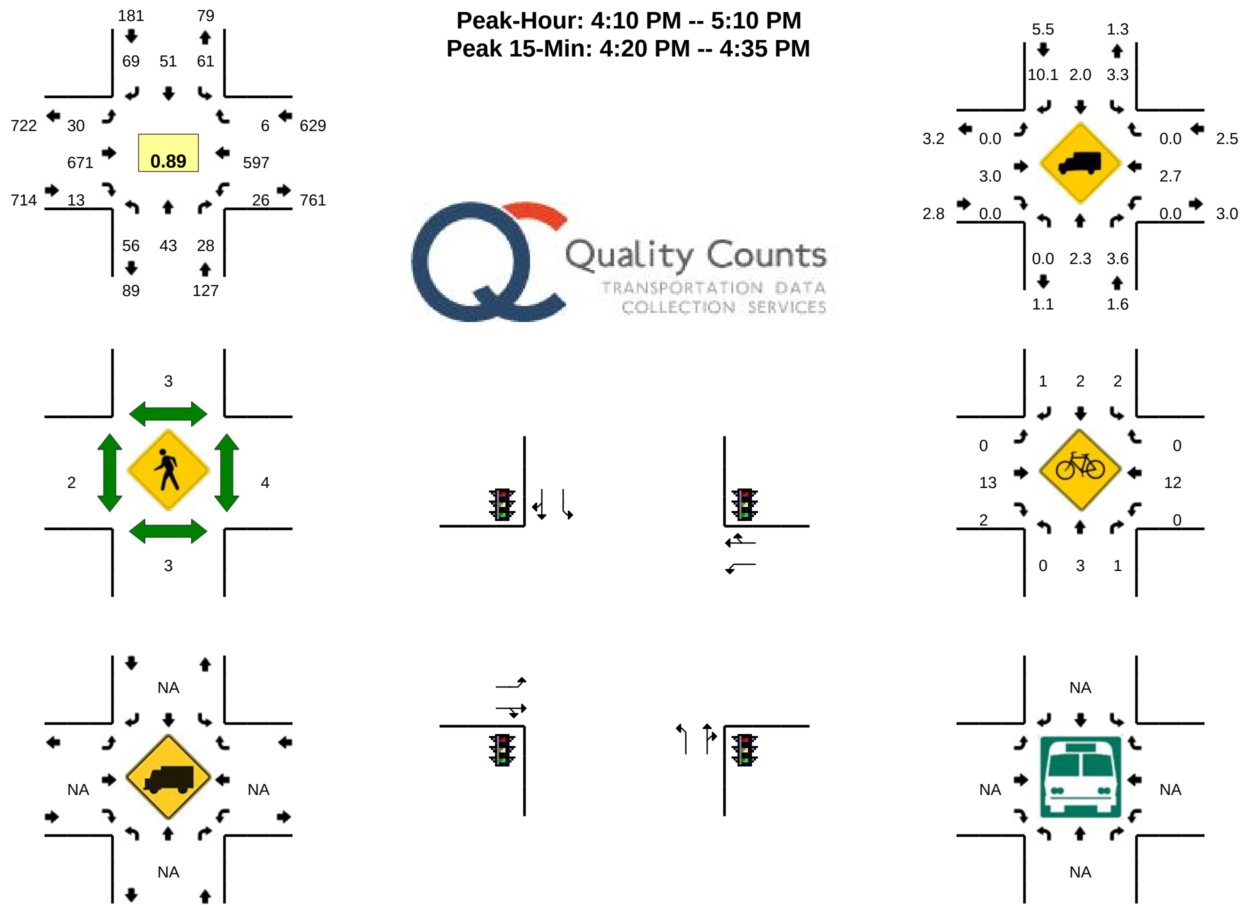
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	80	96	104	0	40	56	12	0	8	796	28	0	28	896	8	0	2152
Heavy Trucks	8	0	0		0	0	0		0	32	4		0	36	0		80
Pedestrians		0				4				0				12			16
Bicycles	1	7	0		0	0	0		0	8	1		0	5	0		22
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak   Method for determining peak hour: Total Entering Volume

LOCATION: Gilbert Ave -- Willow Rd   **QC JOB #:** 12899534
CITY/STATE: Menlo Park, CA   **DATE:** Tue, Sep 30 2014

Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:20 PM -- 4:35 PM



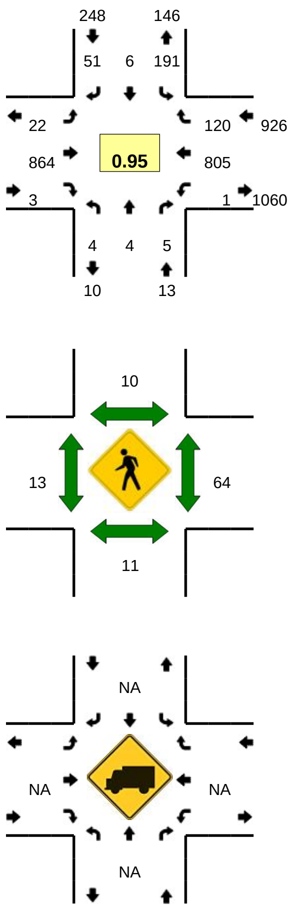
5-Min Count Period Beginning At	Gilbert Ave (Northbound) Left	Thru	Right	U	Gilbert Ave (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	3	2	5	0	0	3	1	0	0	61	1	0	3	53	2	0	134	
4:05 PM	8	3	12	0	1	2	0	0	0	48	2	0	3	47	0	0	126	
4:10 PM	1	5	8	0	1	5	1	0	0	54	4	0	8	54	0	0	141	
4:15 PM	7	3	8	0	4	5	2	0	0	56	1	0	3	46	0	0	135	
4:20 PM	10	4	3	0	4	3	0	0	0	69	2	0	8	59	1	1	164	
4:25 PM	7	8	7	0	4	4	1	0	0	56	2	0	2	53	1	0	145	
4:30 PM	2	2	0	0	3	7	6	0	7	61	1	0	0	67	1	0	157	
4:35 PM	6	1	0	0	8	5	7	0	3	49	0	0	2	46	1	0	128	
4:40 PM	0	1	0	0	10	2	10	0	5	62	0	0	1	23	1	0	115	
4:45 PM	3	2	0	0	8	2	7	0	3	63	0	0	1	32	0	0	121	
4:50 PM	5	2	1	0	6	2	8	0	2	61	1	0	0	55	0	0	143	
4:55 PM	6	6	0	0	5	5	11	0	2	48	1	0	0	51	0	0	135	1644
5:00 PM	2	4	0	0	5	6	7	0	3	51	0	0	0	50	0	0	128	1638
5:05 PM	7	5	1	0	3	5	9	0	5	41	1	0	0	61	1	0	139	1651
5:10 PM	1	3	0	0	7	9	6	0	6	61	3	0	0	44	1	0	141	1651
5:15 PM	3	4	3	0	8	3	4	0	2	58	2	0	0	36	0	0	123	1639
5:20 PM	1	5	1	0	6	1	5	0	4	64	2	0	2	28	3	0	122	1597
5:25 PM	0	7	0	0	5	3	7	0	3	44	0	0	0	65	3	0	137	1589
5:30 PM	1	5	1	0	8	5	3	0	6	76	3	0	0	14	1	0	123	1555
5:35 PM	2	8	1	0	6	2	3	0	6	78	1	0	1	13	1	0	122	1549
5:40 PM	2	3	0	0	5	3	6	0	6	70	2	0	1	41	3	0	142	1576
5:45 PM	2	0	0	0	7	7	8	0	8	65	1	0	0	36	0	0	134	1589
5:50 PM	3	4	4	0	8	4	4	0	8	63	0	0	0	44	1	0	143	1589
5:55 PM	1	11	0	0	6	10	7	0	8	61	2	0	0	8	4	0	118	1572

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	76	56	40	0	44	56	28	0	28	744	20	0	40	716	12	4	1864
Heavy Trucks	0	0	0		4	0	4		0	24	0		0	12	0		44
Pedestrians		4				0				8				8			20
Bicycles	0	1	0		0	1	0		0	3	2		0	1	0		8
Railroad																	
Stopped Buses																	

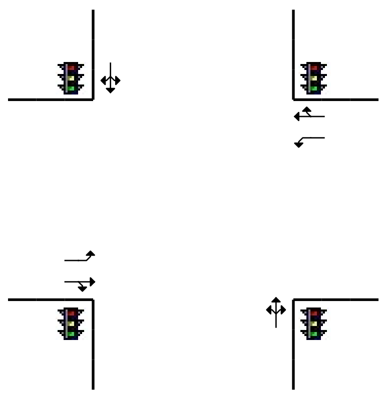
Comments: none

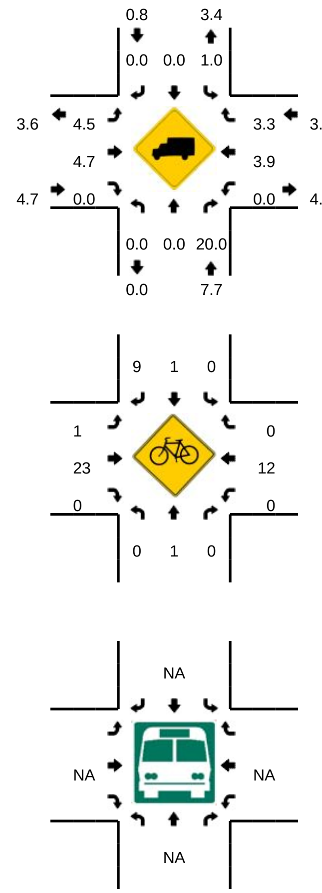
Type of peak hour being reported: Intersection Peak
Method for determining peak hour: Total Entering Volume

LOCATION: Coleman Ave -- Willow Rd
CITY/STATE: Menlo Park, CA
QC JOB #: 12899535
DATE: Tue, Sep 30 2014



Peak-Hour: 7:50 AM -- 8:50 AM
Peak 15-Min: 7:50 AM -- 8:05 AM





5-Min Count Period Beginning At	Coleman Ave (Northbound) Left	Thru	Right	U	Coleman Ave (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	9	0	2	0	0	31	0	0	0	72	6	0	120	
7:05 AM	0	0	0	0	6	0	3	0	1	32	0	0	0	66	3	0	111	
7:10 AM	0	0	0	0	7	0	3	0	0	38	0	0	0	74	4	0	126	
7:15 AM	0	0	0	0	16	0	1	0	0	57	0	0	0	79	3	0	156	
7:20 AM	0	0	0	0	6	0	2	0	2	56	0	0	0	87	13	0	166	
7:25 AM	0	0	0	0	13	0	4	0	0	54	0	0	0	62	7	0	140	
7:30 AM	0	0	0	0	17	0	3	0	0	54	0	0	1	68	6	0	149	
7:35 AM	0	0	0	0	15	0	3	0	0	56	0	0	1	71	8	0	154	
7:40 AM	0	0	0	0	11	0	5	0	1	60	0	0	0	80	11	0	168	
7:45 AM	0	0	0	0	21	0	2	0	1	62	1	0	1	63	9	0	160	
7:50 AM	1	0	1	0	17	2	5	0	0	84	0	0	0	88	6	0	204	
7:55 AM	0	0	0	0	15	0	3	0	0	86	0	0	1	67	9	0	181	1835
8:00 AM	0	1	0	0	16	0	3	0	2	66	0	0	0	65	9	0	162	1877
8:05 AM	0	1	1	0	11	0	2	0	1	80	0	0	0	76	6	0	178	1944
8:10 AM	0	0	0	0	14	0	4	0	2	70	0	0	0	49	16	0	155	1973
8:15 AM	0	0	0	0	12	0	7	0	0	61	1	0	0	61	7	0	149	1966
8:20 AM	0	1	1	0	11	3	5	0	3	70	0	0	0	53	15	0	162	1962
8:25 AM	2	0	0	0	12	0	2	0	3	86	1	0	0	68	10	0	184	2006
8:30 AM	1	1	1	0	20	1	3	0	3	64	0	0	0	65	11	0	170	2027
8:35 AM	0	0	0	0	25	0	6	0	2	56	0	0	0	77	16	0	182	2055
8:40 AM	0	0	1	0	19	0	7	0	3	51	1	0	0	69	5	0	156	2043
8:45 AM	0	0	0	0	19	0	4	0	3	90	0	0	0	67	10	0	193	2076
8:50 AM	0	0	0	0	13	0	5	0	1	70	0	0	0	75	4	0	168	2040
8:55 AM	0	0	0	0	8	0	3	0	2	62	1	0	0	87	5	0	168	2027

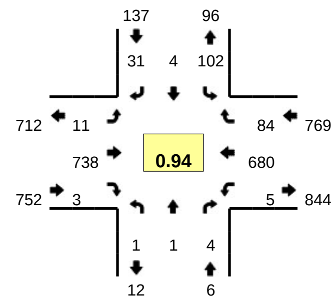
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	4	4	4	0	192	8	44	0	8	944	0	0	4	880	96	0	2188
Heavy Trucks	0	0	0		0	0	0		0	44	0		0	40	4		88
Pedestrians		12				8				16				32			68
Bicycles	0	0	0		0	0	1		0	8	0		0	3	0		12
Railroad																	
Stopped Buses																	

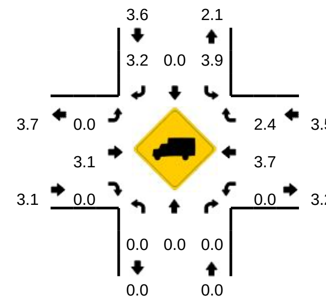
Comments: none

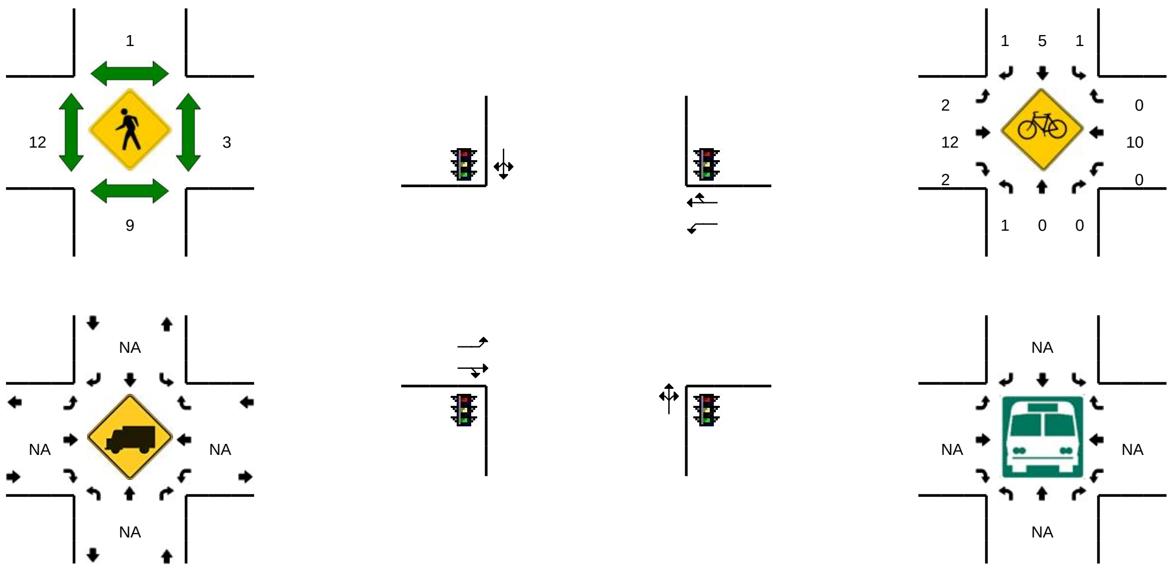
Type of peak hour being reported: Intersection Peak　　　Method for determining peak hour: Total Entering Volume

LOCATION: Coleman Ave -- Willow Rd　　　**QC JOB #:** 12899536
CITY/STATE: Menlo Park, CA　　　**DATE:** Tue, Sep 30 2014

Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:25 PM -- 4:40 PM







5-Min Count Period Beginning At	Coleman Ave (Northbound) Left	Thru	Right	U	Coleman Ave (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	12	0	1	0	0	68	0	0	0	41	5	0	127	
4:05 PM	1	1	0	0	9	0	3	0	0	68	0	0	0	60	8	0	150	
4:10 PM	0	0	0	0	15	0	0	0	0	55	0	0	0	55	2	0	127	
4:15 PM	0	0	0	0	10	0	3	0	0	71	0	0	0	55	4	0	143	
4:20 PM	0	0	0	0	7	0	3	0	2	73	0	0	0	47	5	0	137	
4:25 PM	0	0	2	0	4	1	3	0	1	73	0	0	1	65	5	0	155	
4:30 PM	0	0	0	0	8	1	2	0	2	73	0	0	0	55	6	0	147	
4:35 PM	0	1	0	0	9	0	2	0	1	56	0	0	1	64	5	0	139	
4:40 PM	0	0	0	0	12	0	3	0	1	31	1	0	0	53	7	0	108	
4:45 PM	1	0	0	0	11	1	1	0	0	44	1	0	0	72	3	0	134	
4:50 PM	0	0	0	0	13	1	2	0	2	66	0	0	0	51	11	0	146	
4:55 PM	0	0	0	0	5	0	2	0	1	69	0	0	0	61	7	0	145	1658
5:00 PM	0	0	0	0	9	0	1	0	0	48	0	0	0	47	9	0	114	1645
5:05 PM	0	0	1	0	7	0	3	0	1	84	1	0	1	53	15	0	166	1661
5:10 PM	0	0	1	0	7	0	6	0	0	50	0	0	2	57	7	0	130	1664
5:15 PM	0	0	0	0	10	0	3	0	1	40	0	0	0	65	8	0	127	1648
5:20 PM	0	1	0	0	14	1	3	0	0	25	0	0	0	55	10	0	109	1620
5:25 PM	0	0	1	0	7	0	3	0	0	79	1	0	1	61	6	0	159	1624
5:30 PM	0	1	0	0	5	1	4	0	0	16	0	0	1	71	8	0	107	1584
5:35 PM	0	0	2	0	6	0	5	0	1	18	0	0	0	85	12	0	129	1574
5:40 PM	1	0	0	0	9	0	8	0	2	41	0	0	0	66	9	0	136	1602
5:45 PM	0	1	1	0	7	1	2	0	0	51	0	0	2	77	12	0	154	1622
5:50 PM	0	0	0	0	10	0	4	0	2	43	0	0	0	59	9	0	127	1603
5:55 PM	0	0	0	0	7	0	2	0	1	23	0	0	2	74	9	0	118	1576

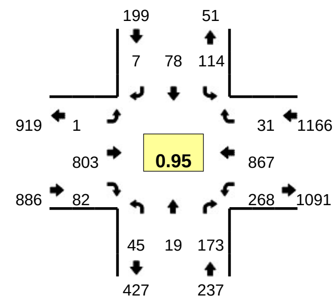
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	4	8	0	84	8	28	0	16	808	0	0	8	736	64	0	1764
Heavy Trucks	0	0	0		8	0	0		0	8	0		0	28	4		48
Pedestrians		8				0				4				4			16
Bicycles	0	0	0		0	3	0		0	1	1		0	4	0		9
Railroad																	
Stopped Buses																	

Comments: none

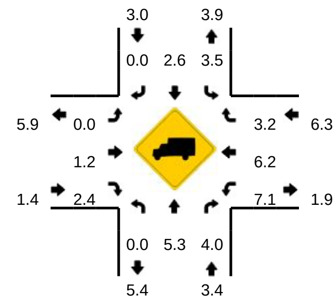
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

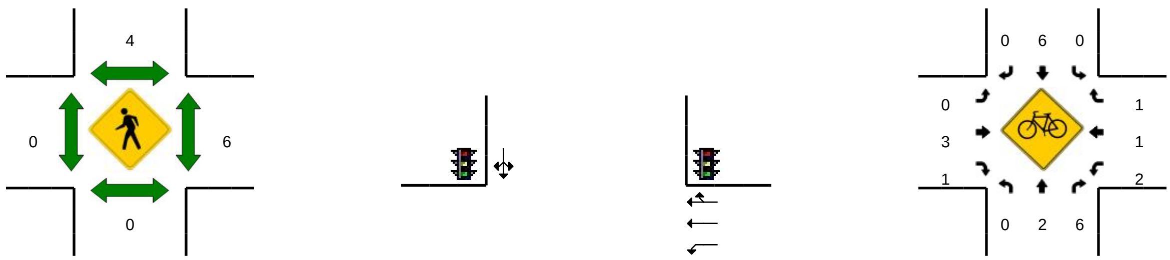
LOCATION: Bay Rd -- Marsh Rd | **QC JOB #:** 12899539

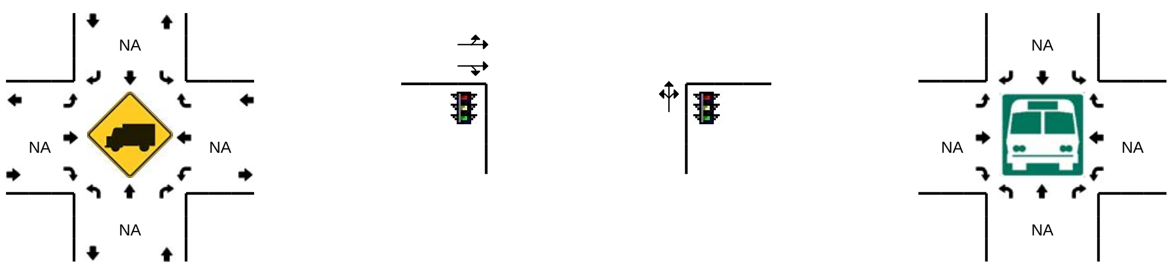
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014



Peak-Hour: 7:55 AM -- 8:55 AM
Peak 15-Min: 8:20 AM -- 8:35 AM







5-Min Count Period Beginning At	Bay Rd (Northbound) Left	Thru	Right	U	Bay Rd (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	2	0	9	0	4	0	0	0	0	38	1	0	7	44	0	0	105	
7:05 AM	3	0	7	0	13	1	0	0	0	31	0	0	6	74	1	0	136	
7:10 AM	3	0	6	0	3	1	0	0	0	58	6	0	2	66	2	0	147	
7:15 AM	1	0	9	0	7	2	0	0	0	46	4	0	13	95	1	0	178	
7:20 AM	1	0	4	0	11	2	0	0	0	39	1	0	13	88	1	0	160	
7:25 AM	6	1	9	0	10	1	0	0	0	37	5	0	22	70	2	0	163	
7:30 AM	4	0	9	0	9	1	0	0	0	68	9	0	22	114	3	0	239	
7:35 AM	6	0	15	0	7	4	1	0	0	41	2	0	25	97	2	0	200	
7:40 AM	7	2	15	0	6	4	0	0	0	58	3	0	22	86	1	0	204	
7:45 AM	8	0	19	0	8	5	1	0	0	57	7	0	20	67	5	0	197	
7:50 AM	10	1	17	0	12	2	1	0	0	48	4	0	22	74	7	0	198	
7:55 AM	8	3	15	0	15	5	1	0	0	47	3	0	28	67	3	0	195	2122
8:00 AM	3	5	13	0	6	3	0	0	0	82	5	0	14	76	5	1	213	2230
8:05 AM	4	0	9	0	9	7	0	0	0	64	10	0	12	76	2	0	193	2287
8:10 AM	3	0	17	0	5	3	0	0	0	61	10	0	29	70	6	0	204	2344
8:15 AM	4	0	19	0	17	2	1	0	0	57	4	0	27	59	3	0	193	2359
8:20 AM	4	2	4	0	8	4	0	0	0	76	9	0	29	100	2	0	238	2437
8:25 AM	5	2	13	0	11	8	2	0	0	66	7	0	22	69	3	0	208	2482
8:30 AM	3	0	16	0	10	12	0	0	1	56	8	0	24	77	2	0	209	2452
8:35 AM	3	0	18	0	11	7	1	0	0	58	6	0	26	77	1	0	208	2460
8:40 AM	0	5	15	0	9	8	0	0	0	84	4	0	19	74	0	0	218	2474
8:45 AM	7	0	23	0	6	7	2	0	0	66	9	0	17	68	3	0	208	2485
8:50 AM	1	2	11	0	7	12	0	0	0	86	7	0	20	54	1	0	201	2488
8:55 AM	8	3	18	0	11	2	0	0	0	54	6	0	23	49	4	0	178	2471

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	48	16	132	0	116	96	8	0	4	792	96	0	300	984	28	0	2620
Heavy Trucks	0	0	12		4	4	0		0	4	8		24	64	0		120
Pedestrians		0				8				0				12			20
Bicycles	0	2	2		0	2	0		0	1	0		1	0	0		8
Railroad																	
Stopped Buses																	

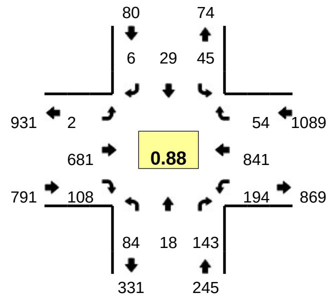
Comments: none

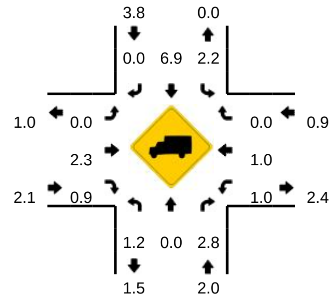
Report generated on 11/4/2014 9:43 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

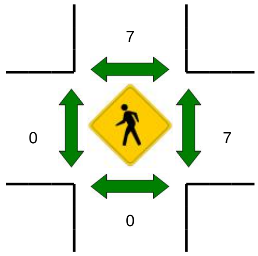
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

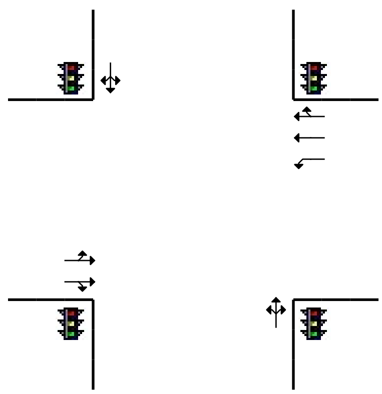
LOCATION: Bay Rd -- Marsh Rd | **QC JOB #:** 12899540
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

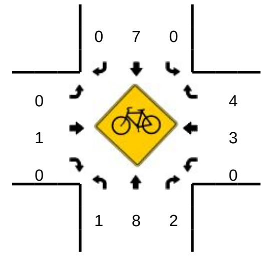
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

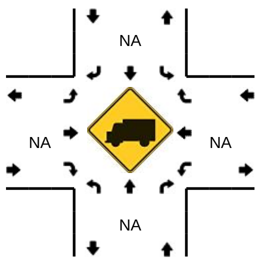


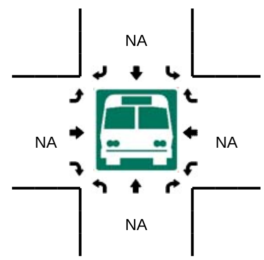












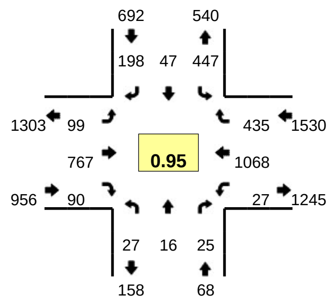
5-Min Count Period Beginning At	Bay Rd (Northbound) Left	Thru	Right	U	Bay Rd (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	4	4	16	0	6	2	1	0	0	84	2	0	14	63	1	0	197	
4:05 PM	2	0	10	0	6	1	0	0	1	90	6	0	6	56	2	0	180	
4:10 PM	3	0	7	0	11	2	0	0	0	72	6	0	7	62	9	0	179	
4:15 PM	4	3	12	0	9	2	0	0	0	87	8	0	11	63	4	0	203	
4:20 PM	7	1	9	0	0	1	0	0	0	71	9	0	20	55	8	0	181	
4:25 PM	9	0	10	0	3	3	0	0	0	60	5	0	9	64	7	0	170	
4:30 PM	6	1	15	0	5	1	0	0	1	61	4	0	11	63	4	0	172	
4:35 PM	7	2	12	0	3	2	0	0	0	77	4	0	9	47	3	0	166	
4:40 PM	6	5	14	0	4	1	0	0	0	66	6	0	10	67	4	0	183	
4:45 PM	9	0	8	0	4	2	0	0	1	52	9	0	8	61	5	0	159	
4:50 PM	3	1	13	0	2	2	0	0	1	62	9	0	6	59	3	0	161	
4:55 PM	5	0	9	0	6	3	1	0	1	62	3	0	16	64	6	0	176	2127
5:00 PM	7	0	11	0	1	0	0	0	0	42	8	0	14	66	4	0	153	2083
5:05 PM	8	3	10	0	3	3	2	0	0	63	8	0	21	78	7	0	206	2109
5:10 PM	12	2	10	0	6	6	1	0	0	61	12	0	18	73	5	0	206	2136
5:15 PM	11	1	10	0	6	3	0	0	0	71	7	0	21	84	4	0	218	2151
5:20 PM	7	1	11	0	2	2	2	0	1	59	5	0	24	56	8	0	178	2148
5:25 PM	2	1	9	0	3	1	0	0	0	60	11	0	18	64	7	0	176	2154
5:30 PM	4	2	8	0	4	1	0	0	1	49	10	0	14	67	3	0	163	2145
5:35 PM	9	2	21	0	4	2	0	0	0	60	12	0	13	67	3	0	193	2172
5:40 PM	9	2	14	0	4	5	0	0	0	43	4	0	9	83	2	0	175	2164
5:45 PM	1	0	11	0	7	2	1	0	0	65	14	0	11	66	4	0	182	2187
5:50 PM	5	2	11	0	1	2	0	0	0	55	9	0	14	59	2	0	160	2186
5:55 PM	9	2	17	0	4	2	0	0	0	53	8	0	17	78	5	0	195	2205

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	124	24	120	0	60	48	12	0	0	780	108	0	240	940	64	0	2520
Heavy Trucks	4	0	4		4	0	0		0	20	0		0	20	0		52
Pedestrians		0				8				0				8			16
Bicycles	0	1	2		0	1	0		0	0	0		0	2	0		6
Railroad																	
Stopped Buses																	

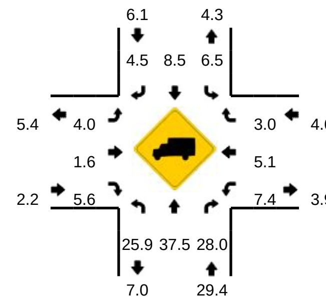
Comments: none

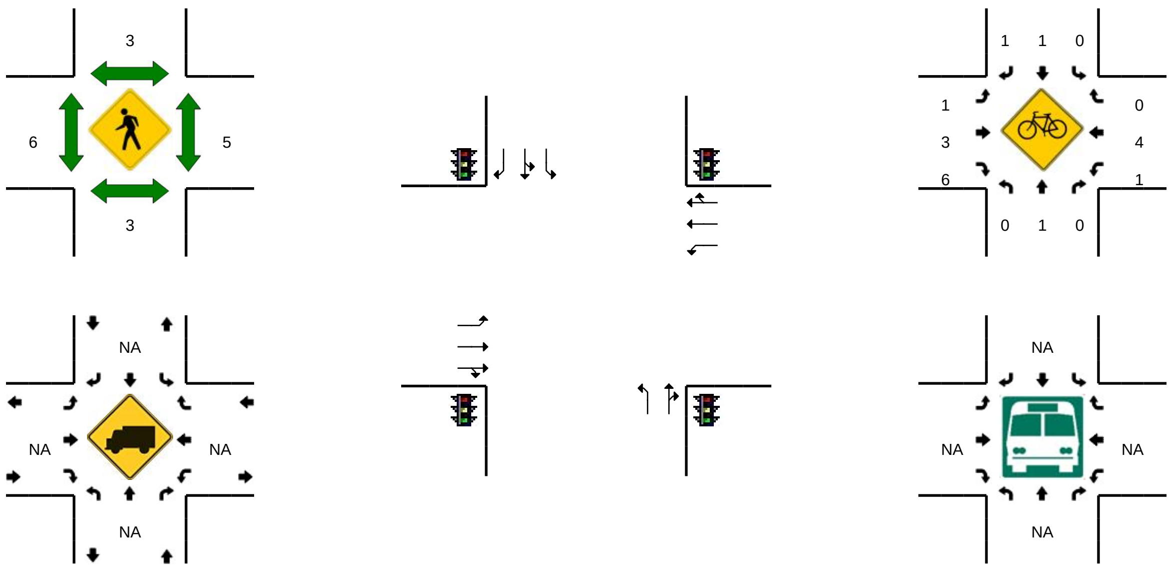
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Bohannon Dr -- Marsh Rd | **QC JOB #:** 12899541
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014



Peak-Hour: 7:20 AM -- 8:20 AM
Peak 15-Min: 8:05 AM -- 8:20 AM





5-Min Count Period Beginning At	Bohannon Dr (Northbound) Left	Thru	Right	U	Bohannon Dr (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	1	3	4	0	34	4	7	0	4	37	6	1	3	54	49	0	207	
7:05 AM	1	1	4	0	27	4	8	0	5	51	2	0	1	61	39	0	204	
7:10 AM	0	0	1	0	30	0	6	0	4	58	5	1	1	96	37	0	239	
7:15 AM	0	1	5	0	35	7	10	0	2	47	10	1	3	86	34	1	242	
7:20 AM	6	0	1	0	40	3	16	0	3	54	2	0	1	92	40	1	259	
7:25 AM	2	3	3	0	28	7	13	0	2	58	4	1	1	112	34	0	268	
7:30 AM	1	0	2	0	40	2	21	0	4	64	9	1	3	101	45	0	293	
7:35 AM	0	0	1	0	31	4	26	0	3	56	5	1	0	101	32	1	261	
7:40 AM	2	1	3	0	56	7	16	0	10	57	7	1	1	64	22	0	247	
7:45 AM	4	4	2	0	41	5	17	0	8	67	9	2	2	85	30	0	276	
7:50 AM	3	1	2	0	25	2	14	0	9	63	5	1	1	73	48	1	248	
7:55 AM	3	0	1	0	36	4	11	0	11	73	12	0	5	85	33	0	274	3018
8:00 AM	3	3	1	0	37	0	11	0	6	63	10	1	1	79	46	1	262	3073
8:05 AM	1	1	7	0	36	5	19	0	11	60	7	2	1	75	32	1	258	3127
8:10 AM	0	3	2	0	33	3	17	0	13	73	9	0	1	99	45	0	298	3186
8:15 AM	2	0	0	0	44	5	17	0	9	79	11	0	4	102	28	1	302	3246
8:20 AM	4	2	1	0	40	3	16	0	7	47	12	1	4	66	37	0	240	3227
8:25 AM	4	2	2	0	19	1	16	0	8	65	14	0	3	69	25	0	228	3187
8:30 AM	4	2	1	0	28	1	15	0	13	65	11	0	5	89	20	0	254	3148
8:35 AM	3	0	1	0	23	6	12	0	12	89	15	1	1	70	28	0	261	3148
8:40 AM	3	1	1	0	36	6	14	0	3	66	19	1	1	94	26	0	271	3172
8:45 AM	2	1	2	0	31	2	12	0	8	70	15	0	4	62	19	2	230	3126
8:50 AM	2	3	1	0	35	3	10	0	9	72	12	0	1	50	21	0	219	3097
8:55 AM	1	3	5	0	25	5	14	0	11	75	20	1	8	98	33	0	299	3122

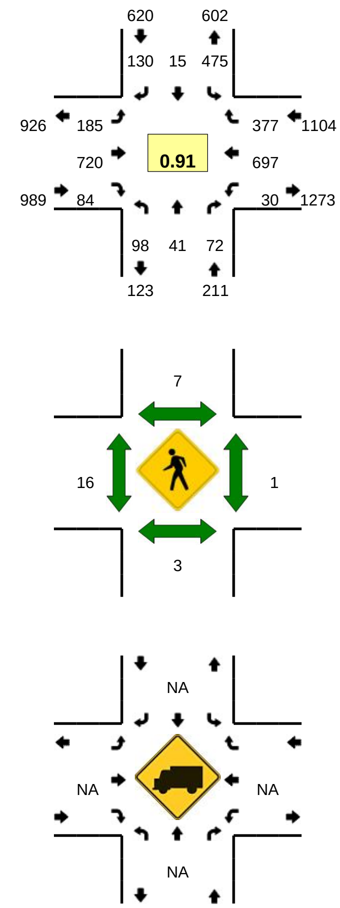
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	12	16	36	0	452	52	212	0	132	848	108	8	24	1104	420	8	3432
Heavy Trucks	0	8	16		8	8	4		4	12	4		0	60	12		136
Pedestrians		4				0				4				8			16
Bicycles	0	0	0		0	0	0		0	1	2		0	1	0		4
Railroad																	
Stopped Buses																	

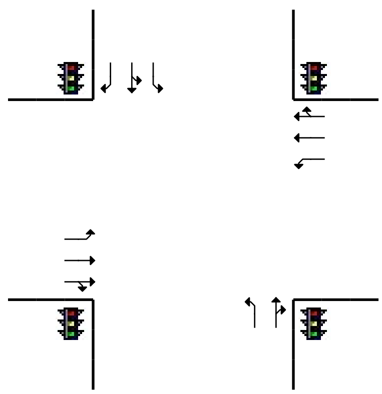
Comments: none

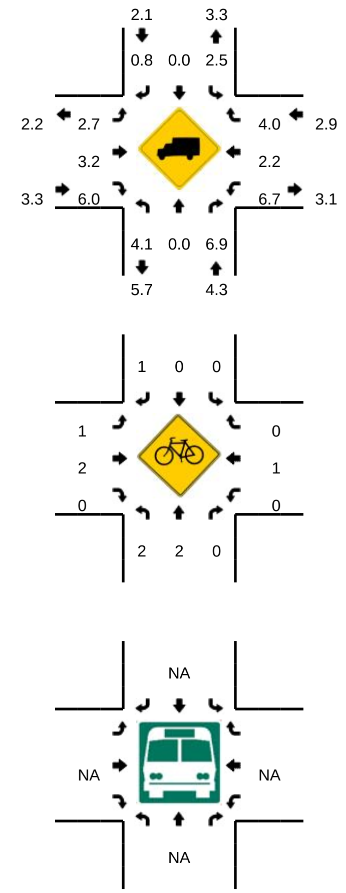
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: Bohannon Dr -- Marsh Rd — **QC JOB #:** 12899542
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:05 PM -- 4:20 PM







5-Min Count Period Beginning At	Bohannon Dr (Northbound) Left	Thru	Right	U	Bohannon Dr (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	5	4	10	0	23	2	7	0	23	57	6	0	1	49	32	0	219	
4:05 PM	5	2	5	0	51	4	15	0	19	68	8	0	3	50	33	0	263	
4:10 PM	6	4	5	0	45	2	12	0	19	84	4	0	2	60	35	0	278	
4:15 PM	9	1	4	0	42	3	10	0	11	84	7	0	3	55	31	0	260	
4:20 PM	6	8	10	0	34	0	9	0	16	57	13	0	3	64	41	0	261	
4:25 PM	12	2	10	0	36	0	9	0	21	51	3	0	1	67	32	0	244	
4:30 PM	9	1	9	0	29	0	6	0	13	61	3	0	0	54	32	2	219	
4:35 PM	6	3	10	0	43	2	10	0	10	58	8	0	4	45	30	1	230	
4:40 PM	7	3	6	0	43	1	15	0	8	36	11	0	2	59	28	0	219	
4:45 PM	9	3	5	0	39	0	7	0	18	47	9	0	1	51	28	0	217	
4:50 PM	9	2	2	0	42	2	8	0	15	56	5	0	2	58	35	0	236	
4:55 PM	8	4	3	0	28	0	14	0	25	78	10	0	1	72	27	1	271	2917
5:00 PM	12	8	3	0	43	1	15	0	9	40	3	1	2	62	25	2	226	2924
5:05 PM	22	9	11	0	31	3	27	0	15	54	9	1	2	58	20	0	262	2923
5:10 PM	23	3	6	0	36	0	16	0	13	51	1	0	0	56	35	1	241	2886
5:15 PM	14	1	2	0	49	0	21	0	19	38	6	0	0	51	23	1	225	2851
5:20 PM	11	3	7	0	34	1	18	0	15	56	6	1	1	60	30	0	243	2833
5:25 PM	10	6	2	0	32	1	8	0	18	54	9	1	1	69	34	0	245	2834
5:30 PM	5	4	8	0	38	0	7	0	19	50	8	0	2	57	39	1	238	2853
5:35 PM	14	8	4	0	19	2	4	0	21	51	12	0	0	91	36	0	262	2885
5:40 PM	15	5	4	0	29	2	6	0	14	44	4	0	1	57	33	1	215	2881
5:45 PM	8	4	4	0	36	0	12	0	17	48	4	1	0	50	25	1	210	2874
5:50 PM	7	0	4	0	28	3	11	0	30	49	2	0	2	63	37	0	236	2874
5:55 PM	13	2	7	0	23	2	3	0	17	50	10	0	2	78	31	1	239	2842

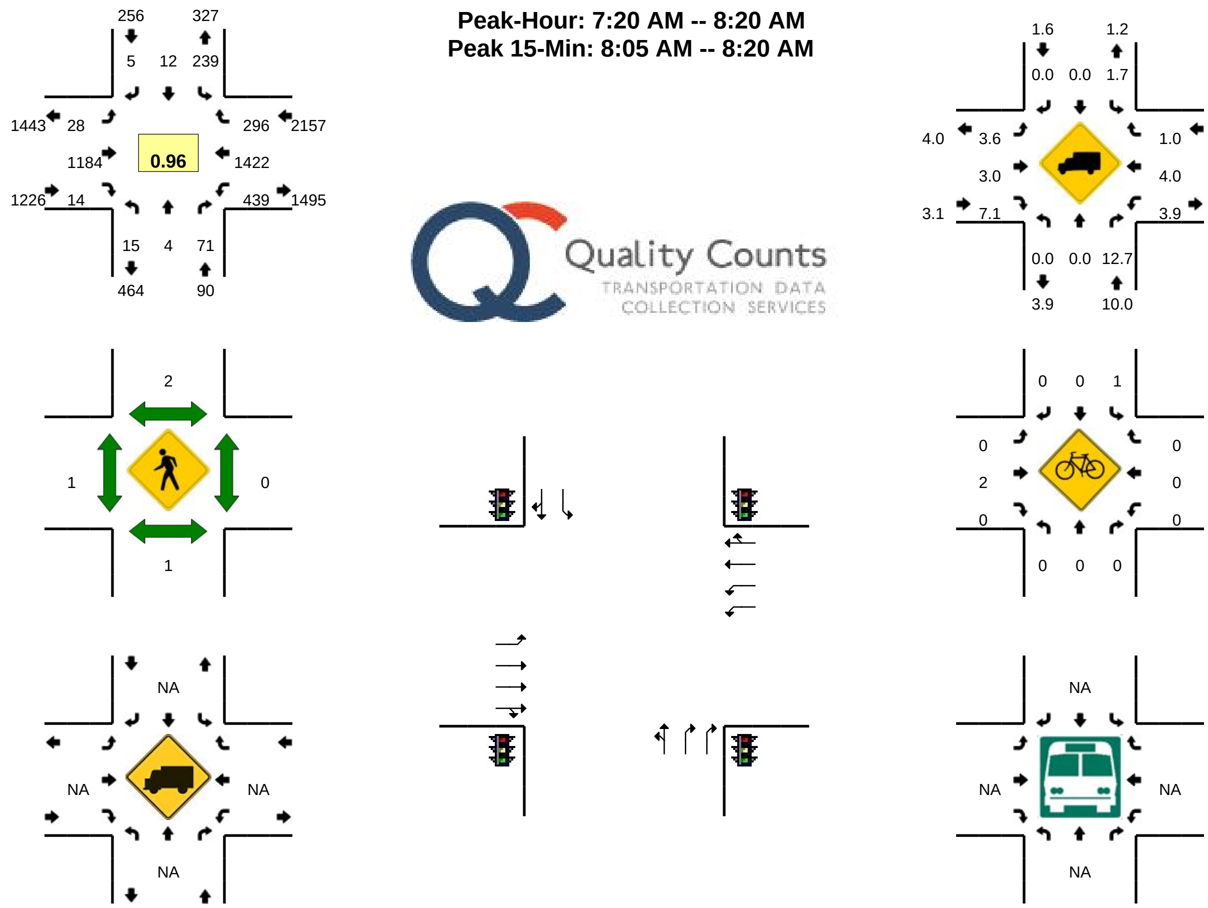
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	80	28	56	0	552	36	148	0	196	944	76	0	32	660	396	0	3204
Heavy Trucks	8	0	4		4	0	0		8	56	0		4	16	16		116
Pedestrians		0				8				20				0			28
Bicycles	1	1	0		0	0	1		0	0	0		0	1	0		4
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Scott Dr -- Marsh Rd | **QC JOB #:** 12899543
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:20 AM -- 8:20 AM
Peak 15-Min: 8:05 AM -- 8:20 AM



5-Min Count Period Beginning At	Scott Dr (Northbound) Left	Thru	Right	U	Scott Dr (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	1	0	6	0	12	1	1	0	2	74	0	0	29	113	26	0	265	
7:05 AM	5	0	2	0	23	2	1	0	0	58	2	0	30	91	13	0	227	
7:10 AM	1	0	5	0	16	1	0	0	0	100	1	0	24	127	19	0	294	
7:15 AM	3	0	3	0	20	0	1	0	0	85	3	1	22	112	27	0	277	
7:20 AM	0	0	1	0	20	0	0	0	0	82	1	0	26	119	17	0	266	
7:25 AM	0	0	4	0	23	1	0	0	1	99	0	0	34	141	22	0	325	
7:30 AM	1	0	3	0	21	1	1	0	0	89	0	1	26	120	30	0	293	
7:35 AM	1	0	7	0	24	1	1	0	5	95	2	0	39	123	25	1	324	
7:40 AM	1	2	9	0	15	0	1	0	2	93	1	0	55	113	22	0	314	
7:45 AM	3	0	9	0	30	3	0	0	4	113	1	0	32	110	21	0	326	
7:50 AM	3	0	7	0	28	1	0	0	4	60	2	0	47	104	25	0	281	
7:55 AM	1	1	9	0	17	4	1	0	4	86	4	0	45	106	33	0	311	3503
8:00 AM	2	1	9	0	11	0	1	0	6	120	1	0	33	109	27	0	320	3558
8:05 AM	1	0	5	0	19	1	0	0	1	91	1	0	29	118	26	0	292	3623
8:10 AM	1	0	3	0	16	0	0	0	0	108	0	0	37	133	26	0	324	3653
8:15 AM	1	0	5	0	15	0	0	0	0	148	1	0	35	126	22	0	353	3729
8:20 AM	0	0	2	0	14	2	0	0	1	81	1	0	39	110	15	0	265	3728
8:25 AM	0	1	1	0	17	2	0	0	5	83	0	2	43	86	16	0	256	3659
8:30 AM	1	1	4	0	8	1	0	0	2	80	2	0	32	88	18	0	237	3603
8:35 AM	0	0	4	0	17	3	0	0	3	60	2	0	44	100	17	0	250	3529
8:40 AM	1	0	10	0	10	0	1	0	0	101	3	0	49	112	20	0	307	3522
8:45 AM	0	0	11	0	11	2	0	0	2	102	2	0	27	79	21	0	257	3453
8:50 AM	1	0	10	0	14	0	0	0	1	103	1	2	43	109	20	1	305	3477
8:55 AM	1	0	10	0	6	2	0	0	1	107	2	0	37	102	20	0	288	3454

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	12	0	52	0	200	4	0	0	4	1388	8	0	404	1508	296	0	3876
Heavy Trucks	0	0	8		4	0	0		0	24	0		28	68	4		136
Pedestrians		0				0				4				0			4
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments: none

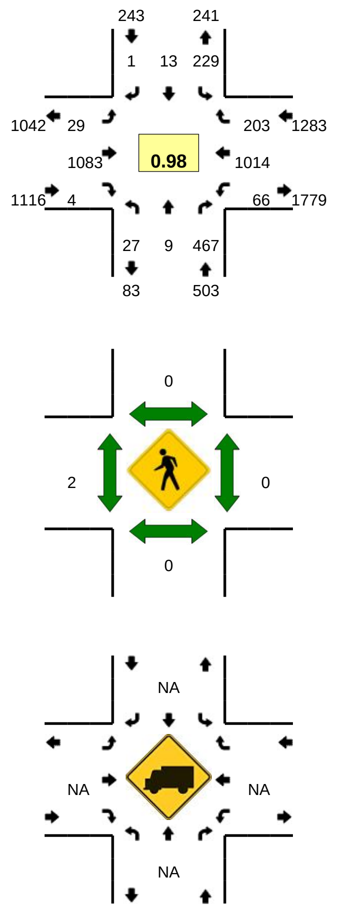
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

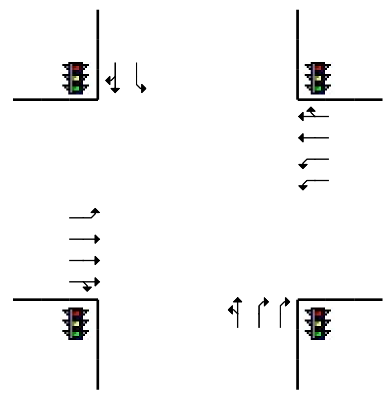
LOCATION: Scott Dr -- Marsh Rd — **QC JOB #:** 12899544

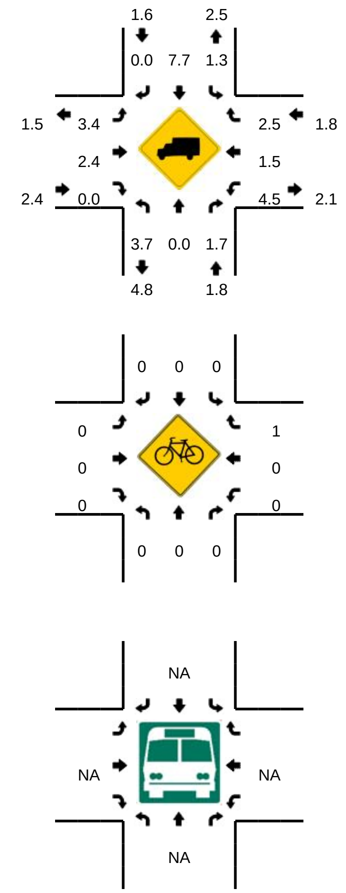
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

Peak-Hour: 4:55 PM -- 5:55 PM

Peak 15-Min: 5:25 PM -- 5:40 PM







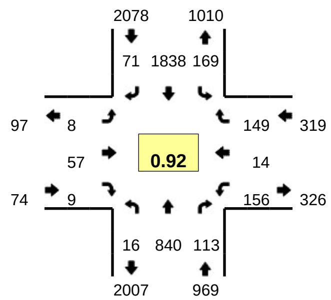
5-Min Count Period Beginning At	Scott Dr (Northbound) Left	Thru	Right	U	Scott Dr (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	25	0	15	2	0	0	6	104	0	0	4	80	18	0	254	
4:05 PM	4	1	47	0	18	0	0	0	2	94	0	0	3	75	11	0	255	
4:10 PM	0	0	22	0	22	1	0	0	1	117	1	0	10	98	19	0	291	
4:15 PM	1	0	19	0	23	1	0	0	2	99	2	0	6	72	15	0	240	
4:20 PM	0	0	29	0	20	1	1	0	3	115	1	0	5	122	24	0	321	
4:25 PM	1	0	28	0	18	0	0	0	2	115	0	0	11	91	17	0	283	
4:30 PM	1	0	37	0	10	0	0	0	2	70	0	0	8	65	17	0	210	
4:35 PM	0	0	44	0	28	0	2	0	0	77	0	0	5	72	18	0	246	
4:40 PM	2	1	31	0	29	1	1	0	0	69	0	0	5	76	13	0	228	
4:45 PM	5	0	44	0	14	0	1	0	2	82	1	0	3	74	11	0	237	
4:50 PM	1	0	34	0	10	0	0	0	0	103	1	0	6	93	15	0	263	
4:55 PM	1	0	22	0	7	0	0	0	5	121	1	0	3	82	23	0	265	3093
5:00 PM	2	1	50	0	23	4	0	0	1	79	0	0	7	90	13	0	270	3109
5:05 PM	1	0	45	0	18	0	0	0	4	88	0	0	4	68	14	0	242	3096
5:10 PM	4	0	39	0	25	2	0	0	1	92	2	0	5	78	14	0	262	3067
5:15 PM	4	0	44	0	27	2	0	0	1	73	0	0	8	71	8	0	238	3065
5:20 PM	2	1	43	0	15	1	0	0	0	97	1	0	0	93	23	0	276	3020
5:25 PM	1	1	32	0	24	1	0	0	0	91	0	0	2	94	15	0	261	2998
5:30 PM	1	0	40	0	11	0	0	0	2	89	0	0	5	82	20	0	250	3038
5:35 PM	2	0	31	0	14	1	1	0	4	102	0	0	8	113	17	0	293	3085
5:40 PM	3	1	38	0	21	1	0	0	6	59	0	0	6	83	18	0	236	3093
5:45 PM	4	3	43	0	19	1	0	0	0	75	0	0	12	71	16	0	244	3100
5:50 PM	2	2	40	0	25	0	0	0	5	117	0	0	6	89	22	0	308	3145
5:55 PM	1	1	25	0	22	1	0	0	1	73	0	0	7	111	14	0	256	3136

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	16	4	412	0	196	8	4	0	24	1128	0	0	60	1156	208	0	3216
Heavy Trucks	0	0	12		0	0	0		4	32	0		0	12	0		60
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	1		1
Railroad																	
Stopped Buses																	

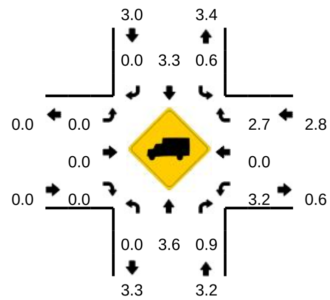
Comments: none

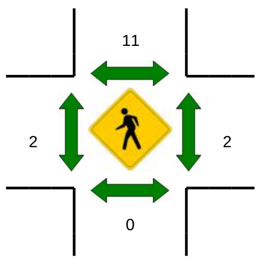
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

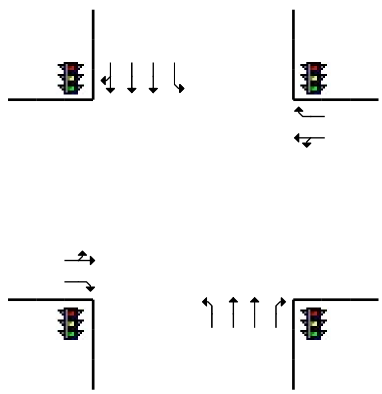
LOCATION: El Camino Real -- Encinal Ave | **QC JOB #:** 12899549
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

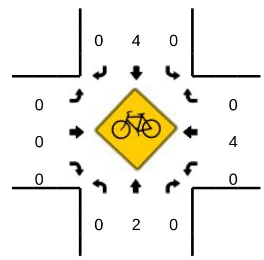


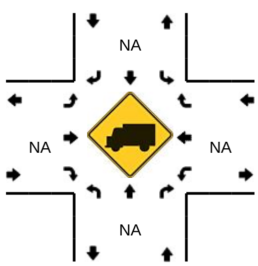
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

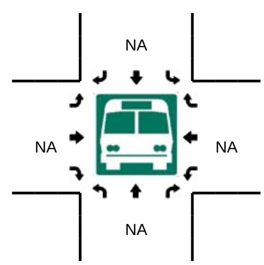












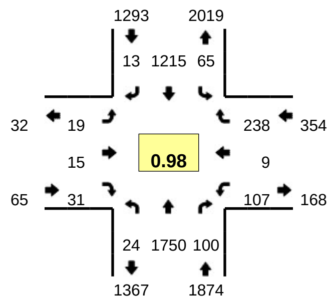
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Encinal Ave (Eastbound) Left	Thru	Right	U	Encinal Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	2	21	3	0	3	76	2	1	0	1	0	0	2	0	7	0	118	
7:05 AM	1	31	3	0	1	90	2	0	0	0	0	0	4	1	2	0	135	
7:10 AM	2	20	2	0	4	77	4	1	0	0	0	0	8	2	3	0	123	
7:15 AM	1	39	3	1	5	93	5	0	0	1	0	0	4	2	8	0	162	
7:20 AM	1	52	4	0	6	112	5	0	0	0	0	0	5	4	7	0	196	
7:25 AM	1	36	3	0	8	133	5	0	0	1	0	0	7	0	3	0	197	
7:30 AM	1	48	3	0	13	145	7	0	1	0	0	0	3	1	8	0	230	
7:35 AM	1	66	5	0	8	170	7	1	0	5	2	0	8	3	14	0	290	
7:40 AM	1	60	6	0	12	169	4	1	2	7	3	0	13	3	17	0	298	
7:45 AM	1	54	9	0	18	176	15	1	0	8	0	0	7	1	9	0	299	
7:50 AM	3	59	15	0	13	158	11	3	0	12	1	0	14	0	14	0	303	
7:55 AM	2	96	12	0	14	150	9	1	2	10	1	0	13	2	17	0	329	2680
8:00 AM	0	80	13	2	11	131	1	0	1	1	1	0	17	1	12	0	271	2833
8:05 AM	2	75	8	0	11	160	5	0	1	1	1	0	21	2	22	0	309	3007
8:10 AM	0	72	10	0	15	149	1	3	0	1	0	0	21	0	9	0	281	3165
8:15 AM	1	67	7	0	11	137	4	0	0	2	0	0	12	0	11	0	252	3255
8:20 AM	0	73	9	0	10	138	4	1	0	2	0	0	11	1	5	0	254	3313
8:25 AM	0	71	4	1	17	154	7	1	1	1	0	0	7	0	14	0	278	3394
8:30 AM	1	67	15	1	16	146	3	1	1	7	0	0	12	1	5	0	276	3440
8:35 AM	0	76	9	0	16	142	3	2	0	2	0	0	12	2	15	0	279	3429
8:40 AM	0	62	5	1	11	137	1	0	0	0	0	0	10	0	10	0	237	3368
8:45 AM	2	67	6	1	10	119	2	0	0	2	0	0	10	0	8	0	227	3296
8:50 AM	1	68	7	0	11	147	4	1	1	1	2	0	6	2	3	0	254	3247
8:55 AM	2	39	14	4	14	138	3	0	2	5	1	0	9	2	2	0	235	3153

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	24	836	144	0	180	1936	140	20	8	120	8	0	136	12	160	0	3724
Heavy Trucks	0	28	0		0	48	0		0	0	0		8	0	4		88
Pedestrians		0				8				0				4			12
Bicycles	0	1	0		0	0	0		0	0	0		0	2	0		3
Railroad																	
Stopped Buses																	

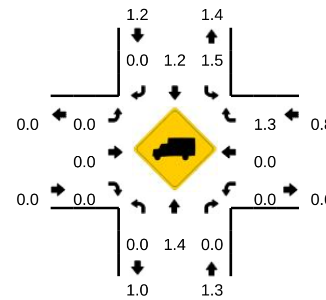
Comments: none

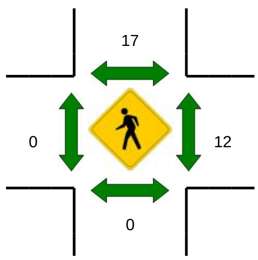
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

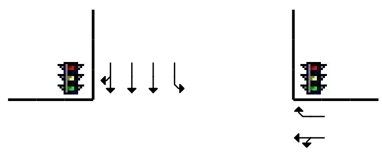
LOCATION: El Camino Real -- Encinal Ave | **QC JOB #:** 12899550
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

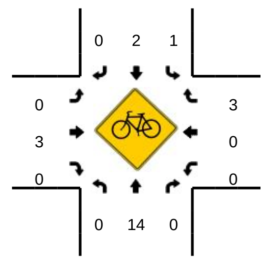


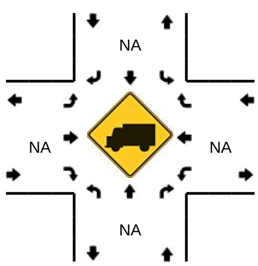
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

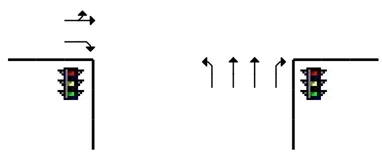


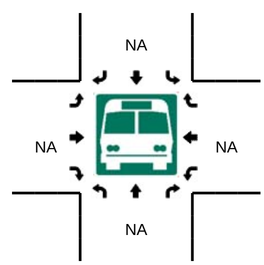












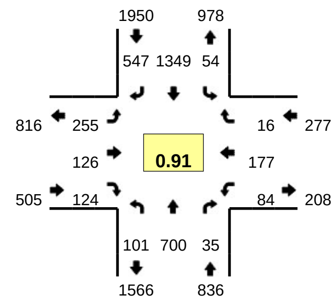
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Encinal Ave (Eastbound) Left	Thru	Right	U	Encinal Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	2	128	9	3	6	66	1	0	2	1	0	0	7	0	10	0	235	
4:05 PM	0	107	6	1	7	87	0	2	2	0	2	0	14	0	21	0	249	
4:10 PM	1	136	14	2	4	103	3	3	2	0	2	0	9	0	18	0	297	
4:15 PM	0	132	18	1	7	113	0	1	1	1	4	0	4	1	18	0	301	
4:20 PM	0	130	7	0	5	86	1	1	2	1	0	0	6	0	16	0	255	
4:25 PM	0	127	13	3	6	90	0	1	1	1	0	0	7	0	17	0	266	
4:30 PM	0	138	5	3	5	98	2	0	1	0	1	0	8	1	17	0	279	
4:35 PM	1	140	7	2	4	87	0	2	0	1	4	0	6	0	24	0	278	
4:40 PM	0	148	11	0	2	95	1	1	1	1	0	0	8	0	18	0	286	
4:45 PM	0	157	14	0	2	107	1	1	2	2	3	0	5	1	16	0	311	
4:50 PM	0	120	8	2	4	108	0	2	1	1	2	0	8	0	14	0	270	
4:55 PM	0	138	5	1	2	108	3	0	2	5	3	0	9	0	17	0	293	3320
5:00 PM	0	158	8	3	7	77	0	2	3	0	4	0	10	1	22	0	295	3380
5:05 PM	0	152	5	0	6	104	1	1	2	3	2	0	7	0	28	0	311	3442
5:10 PM	0	168	7	0	2	96	0	0	0	0	3	0	7	3	23	0	309	3454
5:15 PM	1	157	7	0	1	84	0	2	3	1	3	0	11	0	21	0	291	3444
5:20 PM	2	122	11	4	7	107	1	0	1	1	1	0	10	1	21	0	289	3478
5:25 PM	0	157	7	1	4	91	5	2	2	0	2	0	6	0	22	0	299	3511
5:30 PM	3	152	7	1	6	113	1	1	1	1	0	0	12	1	16	0	315	3547
5:35 PM	1	131	9	2	6	80	1	1	1	0	4	0	7	0	17	0	260	3529
5:40 PM	3	138	12	0	6	140	0	0	1	1	4	0	15	2	21	0	343	3586
5:45 PM	2	150	8	0	3	96	0	1	0	1	3	0	12	1	23	0	300	3575
5:50 PM	2	139	5	1	3	103	0	3	0	1	1	0	8	0	12	0	278	3583
5:55 PM	2	123	9	2	2	87	1	0	0	0	1	0	10	1	31	0	269	3559

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	28	1684	112	12	72	1332	8	8	12	8	32	0	136	12	216	0	3672
Heavy Trucks	0	8	0		4	12	0		0	0	0		0	0	8		32
Pedestrians		0				20				0				8			28
Bicycles	0	6	0		0	1	0		0	2	0		0	0	0		9
Railroad																	
Stopped Buses																	

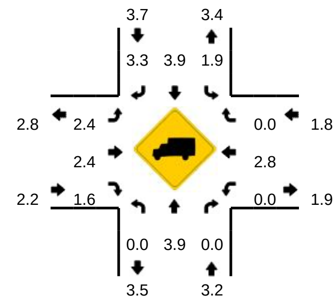
Comments: none

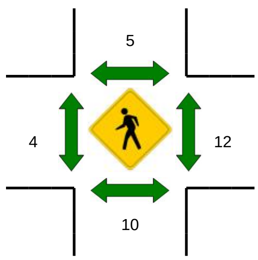
LOCATION: El Camino Real -- Glenwood Ave
CITY/STATE: Menlo Park, CA

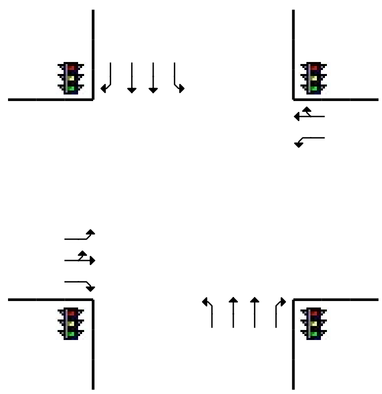
QC JOB #: 12899551
DATE: Thu, Oct 09 2014

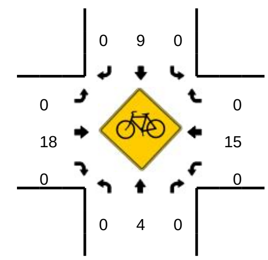


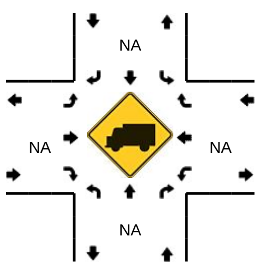
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:55 AM -- 8:10 AM

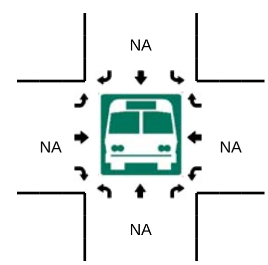












5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Glenwood Ave (Eastbound) Left	Thru	Right	U	Glenwood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	19	1	0	1	45	17	0	5	1	3	0	7	13	0	0	112	
7:05 AM	4	14	2	0	1	54	15	0	6	2	2	0	4	9	2	0	115	
7:10 AM	2	32	1	0	4	100	23	1	8	3	4	0	4	8	0	0	190	
7:15 AM	3	32	1	0	1	78	21	1	8	5	3	0	3	12	0	0	168	
7:20 AM	8	40	0	1	1	99	28	0	5	7	3	0	3	12	0	0	207	
7:25 AM	13	29	2	1	5	61	27	0	13	13	12	0	5	18	1	0	200	
7:30 AM	5	49	0	1	1	134	34	0	11	10	6	0	3	16	0	0	270	
7:35 AM	17	60	1	1	3	127	55	0	13	8	10	0	7	19	1	0	322	
7:40 AM	12	55	2	1	3	114	38	0	14	8	9	0	11	21	0	0	288	
7:45 AM	10	63	4	2	5	99	45	0	19	10	14	0	8	19	0	0	298	
7:50 AM	5	52	3	0	6	103	46	1	33	12	12	0	7	10	2	0	292	
7:55 AM	5	56	2	0	5	120	55	0	22	9	15	0	7	22	2	0	320	2782
8:00 AM	7	77	3	0	1	128	47	0	41	15	12	0	8	16	1	0	356	3026
8:05 AM	10	61	3	0	3	111	46	1	16	15	8	0	8	14	3	0	299	3210
8:10 AM	7	63	2	0	5	101	46	3	22	13	8	0	4	15	3	0	292	3312
8:15 AM	7	54	3	1	2	111	37	0	20	11	8	0	5	8	3	0	270	3414
8:20 AM	4	51	4	0	6	120	43	1	24	6	9	0	7	11	0	0	286	3493
8:25 AM	5	63	5	2	2	88	47	0	15	14	11	0	3	9	1	0	265	3558
8:30 AM	3	45	3	2	6	127	42	1	16	5	8	0	9	13	0	0	280	3568
8:35 AM	4	64	3	1	4	113	31	0	7	8	6	0	1	11	1	0	254	3500
8:40 AM	8	45	4	0	2	109	43	0	13	11	7	0	4	8	0	0	254	3466
8:45 AM	9	54	4	0	5	120	43	0	12	6	4	0	1	8	3	0	269	3437
8:50 AM	3	55	2	3	5	103	44	1	21	7	6	0	3	10	1	0	264	3409
8:55 AM	6	39	5	2	2	111	38	0	11	10	14	0	7	18	5	0	268	3357

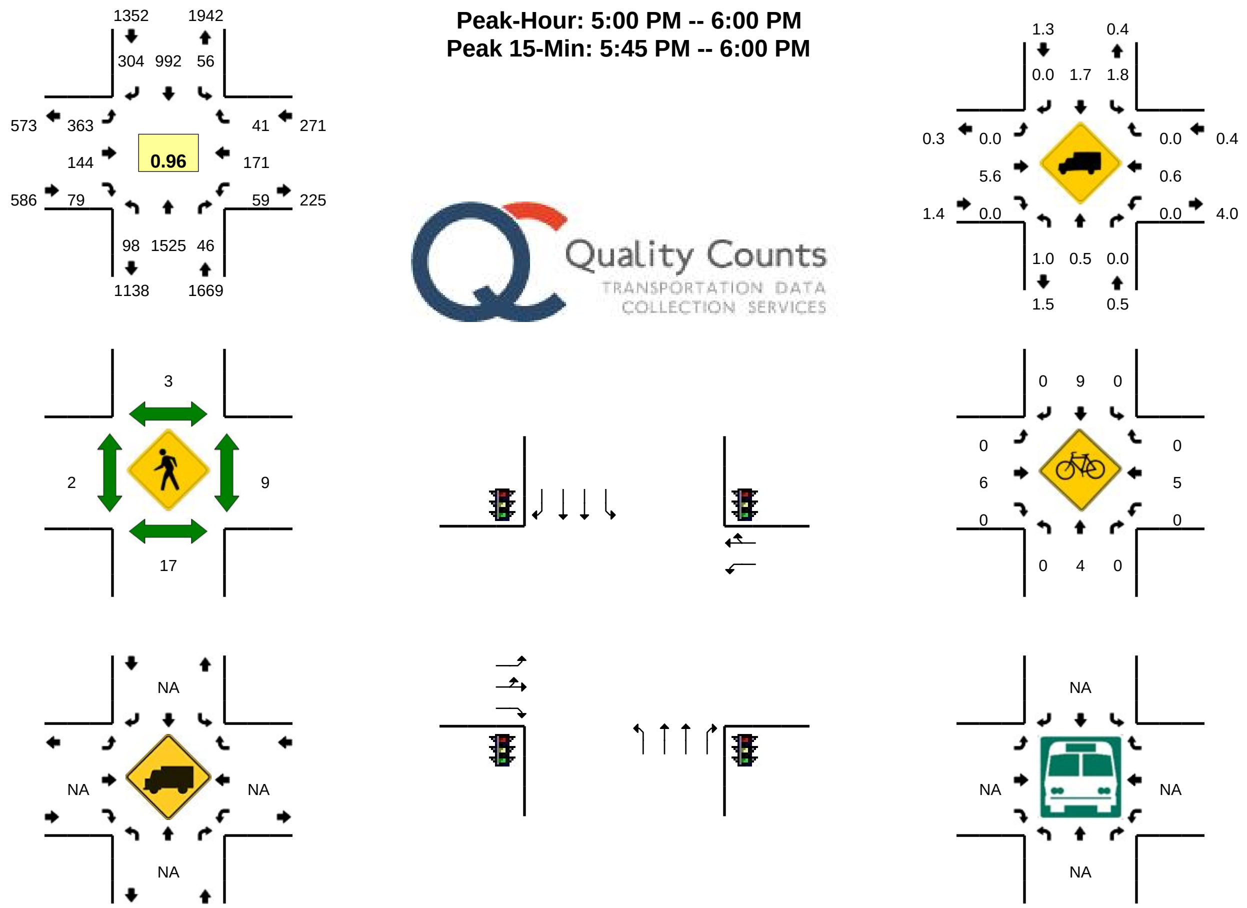
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	88	776	32	0	36	1436	592	4	316	156	140	0	92	208	24	0	3900
Heavy Trucks	0	20	0		4	48	28		12	8	0		0	4	0		124
Pedestrians		20				8				8				20			56
Bicycles	0	1	0		0	2	0		0	2	0		0	4	0		9
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: El Camino Real -- Glenwood Ave — **QC JOB #:** 12899552
CITY/STATE: Menlo Park, CA — **DATE:** Thu, Oct 09 2014

Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:45 PM -- 6:00 PM



5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Glenwood Ave (Eastbound) Left	Thru	Right	U	Glenwood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	11	106	4	2	0	82	25	1	23	9	6	0	5	10	4	0	288	
4:05 PM	12	101	2	3	1	74	22	0	31	17	6	0	3	13	3	0	288	
4:10 PM	10	127	4	4	1	80	27	2	32	8	10	0	10	13	2	0	330	
4:15 PM	13	100	4	1	6	65	21	2	27	13	6	0	2	23	0	0	283	
4:20 PM	6	121	1	0	2	78	22	1	37	7	7	0	5	14	2	1	304	
4:25 PM	10	135	3	0	3	100	17	0	35	2	12	0	4	14	0	0	335	
4:30 PM	5	129	5	7	3	69	21	0	27	12	4	0	3	8	2	0	295	
4:35 PM	11	93	5	1	5	88	27	2	29	9	11	0	4	10	4	0	299	
4:40 PM	7	129	3	1	4	82	29	0	26	10	3	0	4	11	3	0	312	
4:45 PM	9	124	5	5	2	75	30	0	26	13	5	0	1	12	2	0	309	
4:50 PM	6	140	2	1	4	92	19	0	22	11	5	0	6	8	3	0	319	
4:55 PM	5	129	2	0	1	79	22	0	31	9	5	0	3	7	2	0	295	3657
5:00 PM	4	114	6	2	4	77	22	0	21	14	5	0	5	14	2	0	290	3659
5:05 PM	8	119	5	1	5	86	43	6	31	9	9	0	4	17	1	0	344	3715
5:10 PM	12	122	2	2	3	82	22	2	30	9	6	0	11	15	4	0	322	3707
5:15 PM	4	129	5	2	1	76	30	1	34	12	5	0	4	17	4	0	324	3748
5:20 PM	10	131	3	0	4	87	19	1	29	12	8	0	8	18	4	0	334	3778
5:25 PM	7	133	3	1	3	60	25	1	29	17	2	0	3	13	3	0	300	3743
5:30 PM	10	130	2	0	3	95	18	3	33	14	7	4	4	10	3	0	336	3784
5:35 PM	10	140	2	0	2	85	29	1	31	10	2	1	6	9	3	0	331	3816
5:40 PM	7	109	3	0	2	72	14	2	30	14	3	2	5	12	7	0	282	3786
5:45 PM	8	137	5	0	3	99	27	0	30	12	11	1	5	16	4	0	358	3835
5:50 PM	2	130	5	0	2	85	31	2	31	10	15	0	1	12	6	0	332	3848
5:55 PM	8	131	5	0	3	88	24	2	26	11	6	0	3	18	0	0	325	3878

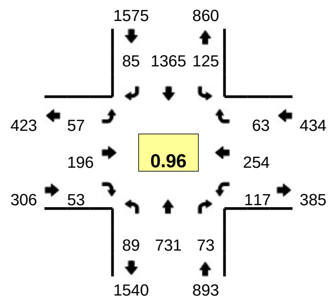
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	72	1592	60	0	32	1088	328	16	348	132	128	4	36	184	40	0	4060
Heavy Trucks	0	0	0		0	28	0		0	16	0		0	0	0		44
Pedestrians		16				0				0				4			20
Bicycles	0	3	0		0	4	0		0	1	0		0	3	0		11
Railroad																	
Stopped Buses																	

Comments: none

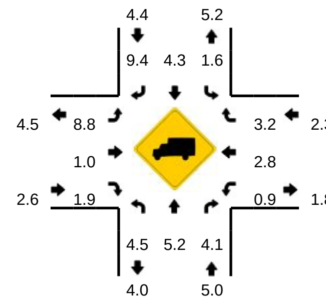
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

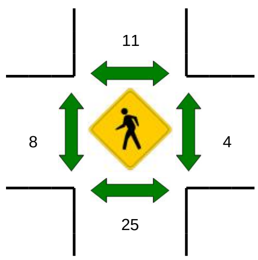
LOCATION: El Camino Real -- Oak Grove Ave
CITY/STATE: Menlo Park, CA

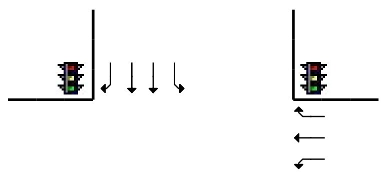
QC JOB #: 12899553
DATE: Tue, Sep 30 2014

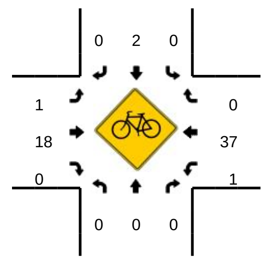


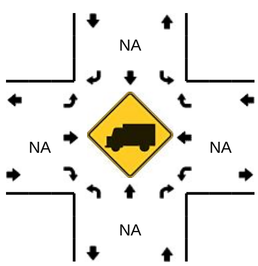
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 7:55 AM -- 8:10 AM

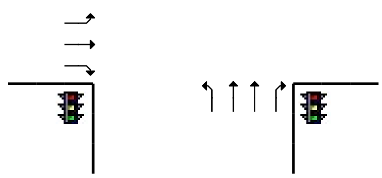


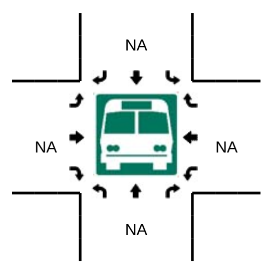












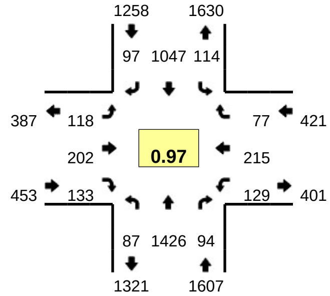
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Oak Grove Ave (Eastbound) Left	Thru	Right	U	Oak Grove Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	1	36	1	0	1	58	1	2	1	4	1	0	2	8	1	0	117	
7:05 AM	4	27	7	1	2	53	3	0	2	8	1	0	0	8	1	0	117	
7:10 AM	2	24	2	0	9	76	5	2	3	9	4	0	5	7	1	0	149	
7:15 AM	1	32	1	4	3	89	7	0	5	9	4	0	5	1	2	0	163	
7:20 AM	5	41	6	0	5	87	3	0	0	7	3	0	1	15	4	0	177	
7:25 AM	5	49	5	1	14	70	5	0	0	8	5	0	7	15	4	0	188	
7:30 AM	2	56	8	1	6	121	4	0	3	7	7	0	11	13	6	0	245	
7:35 AM	5	73	7	0	13	106	6	1	3	13	6	0	12	21	8	0	274	
7:40 AM	6	54	6	0	12	130	11	2	1	16	5	0	6	18	2	0	269	
7:45 AM	3	56	8	0	13	114	7	0	6	11	4	0	11	27	6	0	266	
7:50 AM	8	65	5	2	11	92	10	0	6	25	5	0	13	28	3	0	273	
7:55 AM	5	77	5	0	16	118	9	1	2	6	5	0	11	26	7	0	288	2526
8:00 AM	10	59	3	0	9	124	8	1	4	8	3	0	11	18	8	0	266	2675
8:05 AM	6	66	6	0	12	120	4	1	8	8	1	0	10	27	11	0	280	2838
8:10 AM	4	57	5	1	2	105	7	1	2	14	7	0	6	27	4	0	242	2931
8:15 AM	12	61	4	0	6	116	5	0	6	20	2	0	7	18	4	0	261	3029
8:20 AM	8	53	9	1	5	119	8	0	3	23	7	0	9	11	4	0	260	3112
8:25 AM	8	68	9	1	9	113	7	0	8	26	3	0	8	14	6	0	280	3204
8:30 AM	9	42	6	0	8	108	3	2	8	26	5	0	13	19	0	0	249	3208
8:35 AM	9	66	9	0	10	90	4	0	8	19	5	0	11	20	4	0	255	3189
8:40 AM	7	42	7	1	1	93	4	0	10	5	7	0	13	20	6	0	216	3136
8:45 AM	8	49	11	1	2	94	3	0	3	12	8	0	13	15	4	0	223	3093
8:50 AM	4	61	1	0	5	91	1	0	4	10	10	0	14	15	6	0	222	3042
8:55 AM	13	50	5	1	4	104	4	0	1	10	11	0	7	24	2	0	236	2990

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	84	808	56	0	148	1448	84	12	56	88	36	0	128	284	104	0	3336
Heavy Trucks	4	40	0		4	72	8		0	4	0		0	12	8		152
Pedestrians		12				0				8				0			20
Bicycles	0	0	0		0	0	0		0	1	0		0	16	0		17
Railroad																	
Stopped Buses																	

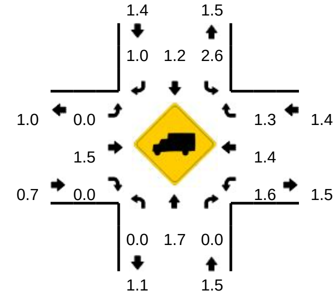
Comments: none

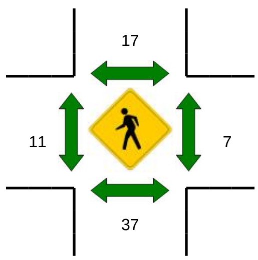
Type of peak hour being reported: Intersection Peak   Method for determining peak hour: Total Entering Volume

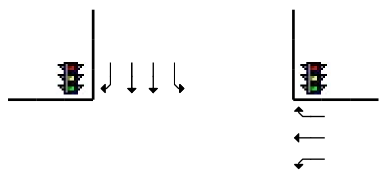
LOCATION: El Camino Real -- Oak Grove Ave   **QC JOB #:** 12899554
CITY/STATE: Menlo Park, CA   **DATE:** Tue, Sep 30 2014

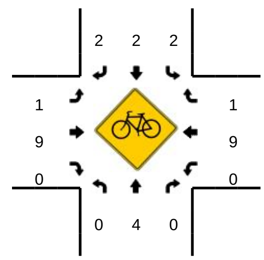


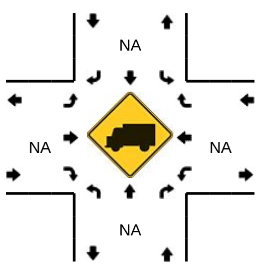
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM

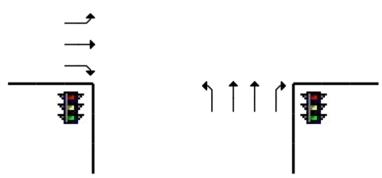


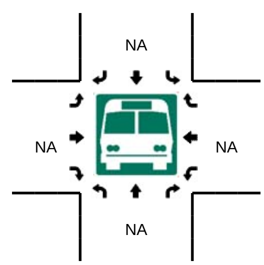












5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Oak Grove Ave (Eastbound) Left	Thru	Right	U	Oak Grove Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	7	108	7	0	4	80	9	0	10	15	13	0	5	17	3	0	278	
4:05 PM	4	114	8	1	4	69	7	3	11	18	6	0	9	22	6	0	282	
4:10 PM	10	118	5	1	7	70	8	0	7	15	12	0	9	13	4	0	279	
4:15 PM	12	106	7	1	7	88	6	2	8	13	11	0	7	17	6	0	291	
4:20 PM	8	107	13	1	2	96	7	0	12	9	9	0	3	6	1	0	274	
4:25 PM	2	112	6	1	7	66	11	0	12	11	11	0	6	18	7	0	270	
4:30 PM	7	122	6	3	4	78	8	2	10	12	11	0	5	14	6	0	288	
4:35 PM	13	110	6	0	9	81	8	1	10	18	11	0	12	19	4	0	302	
4:40 PM	10	107	11	0	4	63	9	1	12	15	5	0	13	17	11	0	278	
4:45 PM	4	120	7	0	9	90	11	3	12	20	10	0	10	15	6	0	317	
4:50 PM	8	121	5	3	7	83	8	0	8	17	9	0	12	26	7	0	314	
4:55 PM	10	105	8	2	12	92	9	0	10	21	10	0	10	10	9	0	308	3481
5:00 PM	9	111	11	0	13	75	5	3	12	12	21	0	9	21	8	0	310	3513
5:05 PM	7	121	5	1	6	94	6	0	5	13	7	0	6	11	5	0	287	3518
5:10 PM	8	131	7	0	8	86	5	0	13	16	10	0	13	16	1	0	314	3553
5:15 PM	6	130	8	1	2	88	6	0	12	16	14	0	13	18	7	0	321	3583
5:20 PM	3	116	9	1	5	78	11	1	10	16	12	0	9	17	7	0	295	3604
5:25 PM	4	119	7	2	15	87	8	0	10	16	9	0	11	17	9	0	314	3648
5:30 PM	5	114	7	0	7	92	9	0	8	19	11	0	13	18	5	0	308	3668
5:35 PM	5	112	13	0	9	100	6	1	9	17	9	0	11	24	6	0	322	3688
5:40 PM	6	126	7	2	12	82	13	1	9	19	11	0	12	22	7	0	329	3739
5:45 PM	8	109	5	0	8	79	5	0	13	14	7	0	13	17	2	0	280	3702
5:50 PM	4	112	2	0	5	88	8	0	7	12	6	0	13	18	8	0	283	3671
5:55 PM	5	118	5	3	6	82	10	0	9	14	8	0	8	23	6	0	297	3660

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	64	1408	108	8	112	1096	112	8	104	220	124	0	144	256	72	0	3836
Heavy Trucks	0	8	0		0	8	0		0	0	0		0	0	0		16
Pedestrians		36				12				32				12			92
Bicycles	0	0	0		0	1	1		0	2	0		0	1	0		5
Railroad																	
Stopped Buses																	

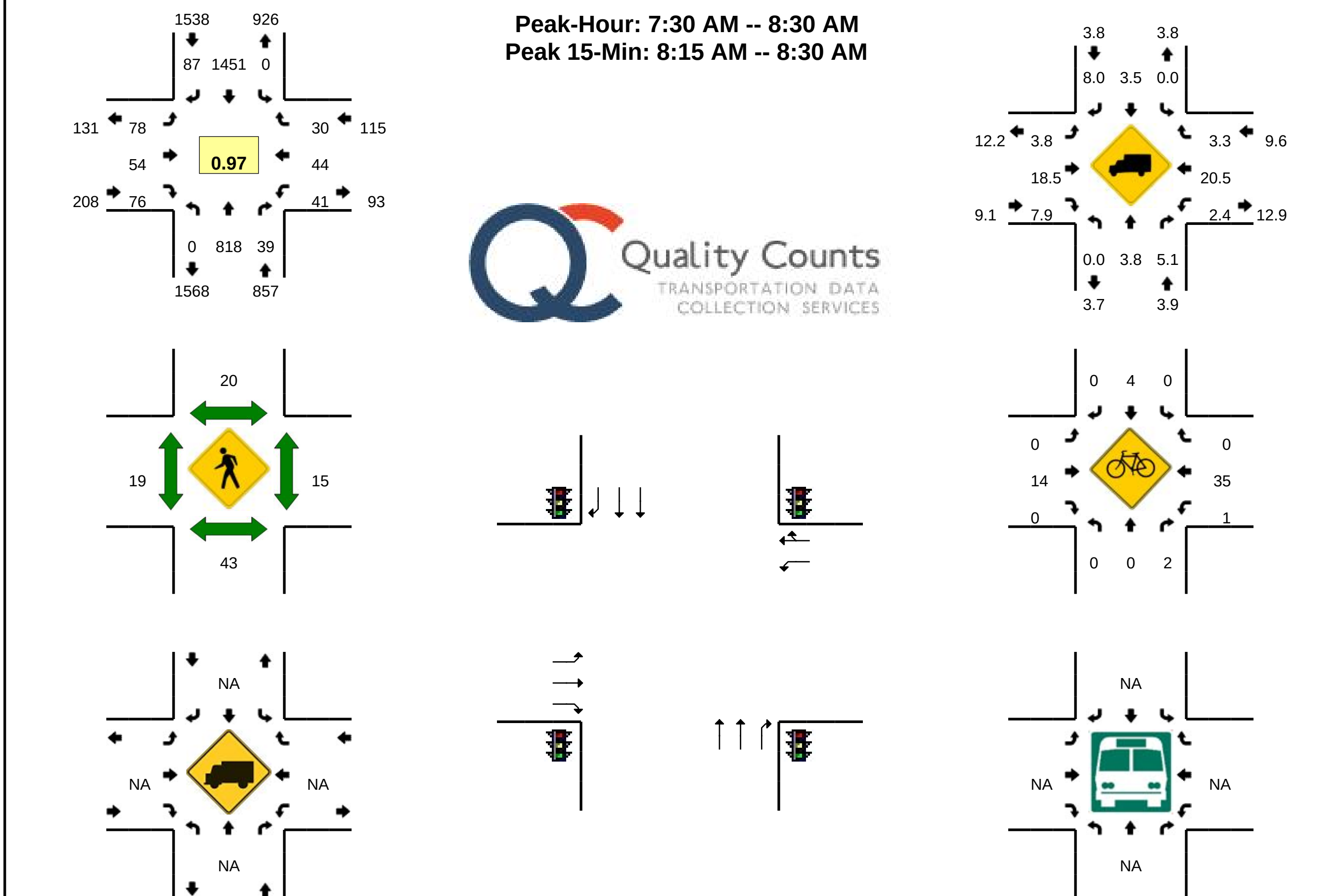
Comments: none

Report generated on 11/4/2014 9:43 AM   SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: El Camino Real -- Santa Cruz Ave | **QC JOB #:** 12899555
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 8:15 AM -- 8:30 AM



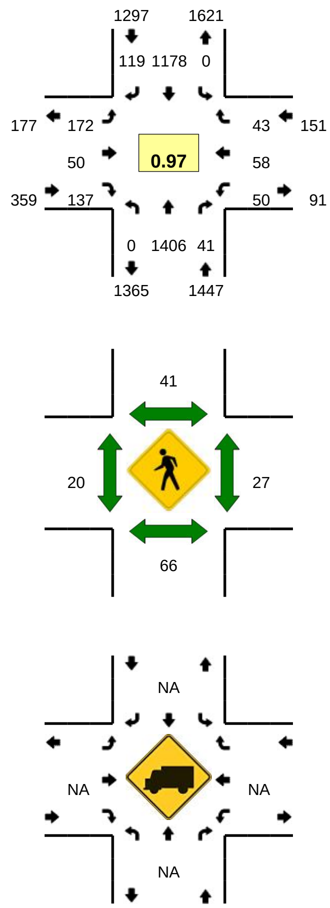
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Santa Cruz Ave (Eastbound) Left	Thru	Right	U	Santa Cruz Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	39	2	0	0	52	4	0	3	1	1	0	2	0	1	0	105	
7:05 AM	0	29	0	0	0	62	2	0	6	2	4	0	2	1	4	0	112	
7:10 AM	0	27	1	0	0	70	7	0	3	1	3	0	2	0	0	0	114	
7:15 AM	0	35	0	0	0	103	6	0	3	1	6	0	1	1	1	0	157	
7:20 AM	0	45	3	0	0	77	9	0	4	2	4	0	2	5	3	0	154	
7:25 AM	0	48	3	0	0	69	9	0	8	3	2	0	1	4	3	0	150	
7:30 AM	0	64	5	0	0	126	10	0	5	6	4	0	1	1	3	0	225	
7:35 AM	0	93	4	0	0	124	6	0	6	1	7	0	7	3	3	0	254	
7:40 AM	0	52	3	0	0	120	11	0	5	7	5	0	3	6	1	0	213	
7:45 AM	0	59	3	0	0	120	6	0	12	5	8	0	4	3	4	0	224	
7:50 AM	0	78	2	0	0	117	7	0	1	5	7	0	5	2	3	0	227	
7:55 AM	0	76	3	0	0	123	6	0	13	4	8	0	2	2	4	0	241	2176
8:00 AM	0	52	1	0	0	131	9	0	4	5	3	0	3	2	3	0	213	2284
8:05 AM	0	67	1	0	0	115	3	0	5	4	7	0	3	7	5	0	217	2389
8:10 AM	0	61	3	0	0	109	5	0	6	2	7	0	7	6	0	0	206	2481
8:15 AM	0	75	3	0	0	128	9	0	9	2	2	0	1	5	0	0	234	2558
8:20 AM	0	54	2	0	0	115	8	0	6	6	9	0	2	4	2	0	208	2612
8:25 AM	0	87	9	0	0	123	7	0	6	7	9	0	3	3	2	0	256	2718
8:30 AM	0	53	6	0	0	123	5	0	7	7	9	0	5	3	2	0	220	2713
8:35 AM	0	75	7	0	0	99	3	0	12	8	8	0	5	3	0	0	220	2679
8:40 AM	0	57	4	0	0	104	9	0	4	2	9	0	6	1	3	0	199	2665
8:45 AM	0	58	3	0	0	127	4	0	5	1	9	0	1	5	4	0	217	2658
8:50 AM	0	67	8	0	0	109	4	0	6	5	15	0	4	2	2	0	222	2653
8:55 AM	0	61	4	0	0	114	4	0	9	6	9	0	2	2	0	0	211	2623

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	864	56	0	0	1464	96	0	84	60	80	0	24	48	16	0	2792
Heavy Trucks	0	40	0		0	44	12		0	8	8		0	4	0		116
Pedestrians		52				24				16				4			96
Bicycles	0	0	2		0	0	0		0	5	0		0	1	0		8
Railroad																	
Stopped Buses																	

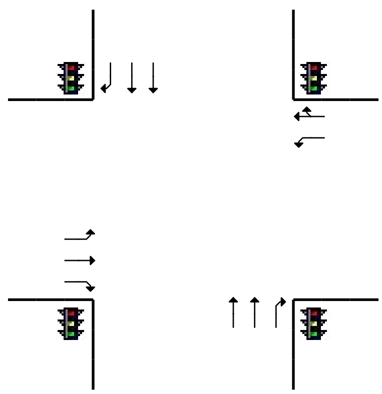
Comments: none

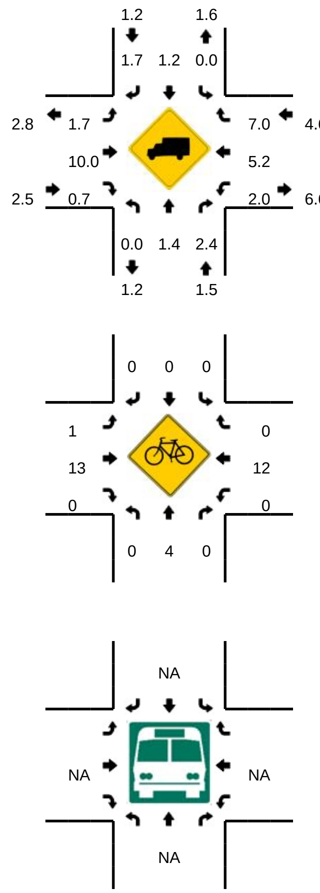
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: El Camino Real -- Santa Cruz Ave — **QC JOB #:** 12899556
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:05 PM -- 5:20 PM





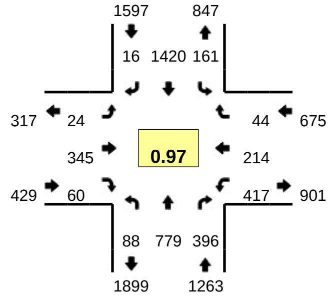
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Santa Cruz Ave (Eastbound) Left	Thru	Right	U	Santa Cruz Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	91	3	0	0	83	5	0	16	11	9	0	5	4	7	0	234	
4:05 PM	0	102	3	0	0	75	10	0	19	6	12	0	5	3	5	0	240	
4:10 PM	0	124	6	0	0	75	17	0	12	2	11	0	6	3	7	0	263	
4:15 PM	0	106	3	0	0	93	11	0	15	7	10	0	5	2	3	0	255	
4:20 PM	0	109	7	0	0	102	12	0	17	2	13	0	3	3	3	0	271	
4:25 PM	0	115	1	0	0	82	8	0	7	3	6	0	6	8	2	0	238	
4:30 PM	0	125	4	0	0	79	9	0	17	4	9	0	6	3	6	0	262	
4:35 PM	0	120	3	0	0	91	13	0	11	6	8	0	7	3	1	0	263	
4:40 PM	0	118	7	0	0	80	10	0	13	9	14	0	4	3	5	0	263	
4:45 PM	0	121	1	0	0	89	9	0	19	2	14	0	5	10	1	0	271	
4:50 PM	0	117	4	0	0	89	12	0	17	2	17	0	5	3	3	0	269	
4:55 PM	0	123	2	0	0	102	18	0	17	3	6	0	3	6	6	0	286	3115
5:00 PM	0	96	1	0	0	86	8	0	13	9	17	0	6	4	4	0	244	3125
5:05 PM	0	115	7	0	0	92	8	0	14	8	16	0	3	2	3	0	268	3153
5:10 PM	0	128	2	0	0	100	8	0	14	4	15	0	2	4	1	0	278	3168
5:15 PM	0	126	4	0	0	108	13	0	11	3	11	0	4	4	5	0	289	3202
5:20 PM	0	107	5	0	0	93	2	0	14	6	10	0	6	7	4	0	254	3185
5:25 PM	0	119	4	0	0	119	13	0	14	4	6	0	2	3	2	0	286	3233
5:30 PM	0	114	7	0	0	108	5	0	7	2	10	0	4	4	8	0	269	3240
5:35 PM	0	118	3	0	0	100	10	0	17	2	7	0	5	2	3	0	267	3244
5:40 PM	0	122	1	0	0	92	13	0	15	5	8	0	5	9	3	0	273	3254
5:45 PM	0	117	4	0	0	92	9	0	9	8	11	0	5	3	3	0	261	3244
5:50 PM	0	103	1	0	0	87	9	0	18	4	9	0	5	7	4	0	247	3222
5:55 PM	0	118	4	0	0	93	6	0	16	4	9	0	6	3	1	0	260	3196

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	1476	52	0	0	1200	116	0	156	60	168	0	36	40	36	0	3340
Heavy Trucks	0	32	0		0	12	0		4	4	0		0	4	0		56
Pedestrians		48				40				12				48			148
Bicycles	0	1	0		0	0	0		0	3	0		0	0	0		4
Railroad																	
Stopped Buses																	

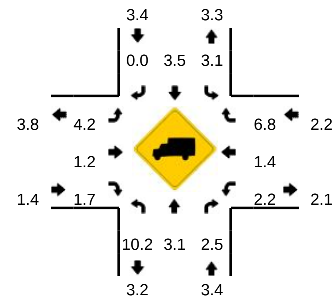
Comments: none

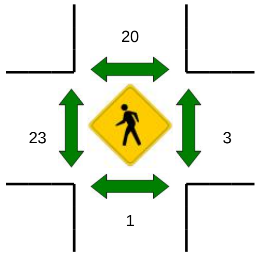
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

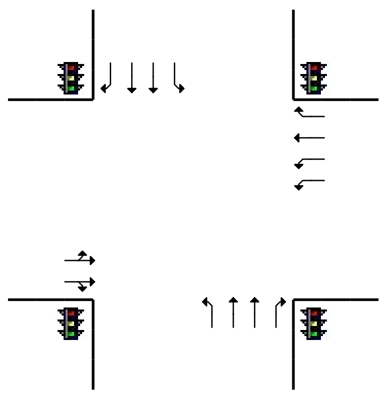
LOCATION: El Camino Real -- Ravenswood Ave — **QC JOB #:** 12899557
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

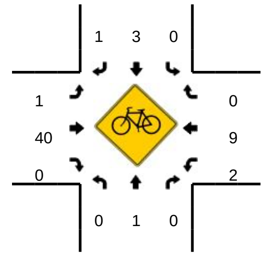


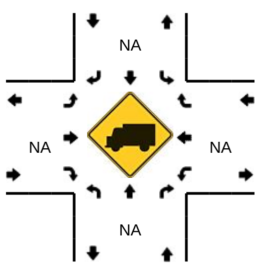
Peak-Hour: 7:35 AM -- 8:35 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

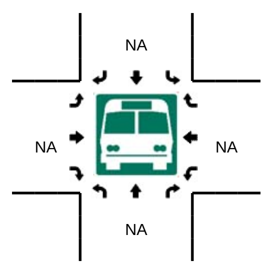












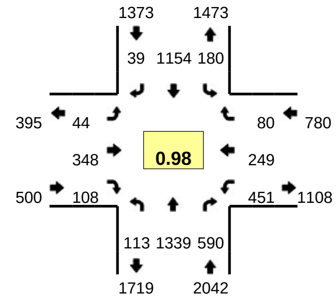
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Ravenswood Ave (Eastbound) Left	Thru	Right	U	Ravenswood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	5	34	13	0	6	49	0	0	1	2	2	0	33	12	1	0	158	
7:05 AM	2	22	16	0	10	55	0	0	1	10	3	0	22	6	1	0	148	
7:10 AM	6	25	22	0	4	69	0	0	1	4	2	0	34	15	2	0	184	
7:15 AM	2	32	12	0	5	84	1	0	1	15	2	0	24	9	1	0	188	
7:20 AM	2	46	25	0	13	82	2	0	2	8	3	0	57	14	2	0	256	
7:25 AM	2	60	24	0	10	75	0	0	3	19	2	0	22	4	5	0	226	
7:30 AM	2	39	16	0	9	102	0	0	1	15	3	0	54	22	5	0	268	
7:35 AM	4	91	22	0	13	118	0	0	2	24	6	0	34	22	5	0	341	
7:40 AM	8	49	35	1	11	113	1	0	2	21	6	0	39	24	4	0	314	
7:45 AM	10	50	34	0	14	116	1	1	2	15	6	0	37	19	5	0	310	
7:50 AM	6	70	26	0	17	113	2	2	3	22	0	0	30	20	6	0	317	
7:55 AM	5	74	30	2	17	112	2	0	2	23	9	0	30	21	1	0	328	3038
8:00 AM	6	69	18	0	16	131	0	0	1	31	3	0	39	22	2	1	339	3219
8:05 AM	7	64	31	1	9	118	2	0	3	20	6	0	44	20	3	0	328	3399
8:10 AM	7	60	34	0	6	128	1	0	1	33	5	0	36	20	2	0	333	3548
8:15 AM	11	64	35	0	12	122	1	0	1	35	9	0	37	5	4	0	336	3696
8:20 AM	9	66	38	0	13	125	5	0	0	39	3	0	30	15	3	0	346	3786
8:25 AM	5	56	50	0	15	117	1	0	3	39	6	1	25	12	7	0	337	3897
8:30 AM	6	66	43	0	15	107	0	0	1	43	1	2	34	14	2	1	335	3964
8:35 AM	8	57	45	1	12	90	0	0	1	34	8	0	52	19	5	0	332	3955
8:40 AM	8	50	23	0	11	109	1	0	1	22	9	0	40	11	5	0	290	3931
8:45 AM	8	55	35	0	6	121	1	0	1	26	4	0	30	21	4	0	312	3933
8:50 AM	8	70	39	0	5	114	1	0	1	32	5	2	42	15	5	0	339	3955
8:55 AM	13	56	34	1	15	110	2	1	1	23	3	1	45	16	3	0	324	3951

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	100	744	492	0	160	1456	28	0	16	452	72	4	368	128	56	0	4076
Heavy Trucks	12	28	8		4	52	0		0	8	0		4	0	4		120
Pedestrians		4				0				44				4			52
Bicycles	0	0	0		0	0	0		1	16	0		2	4	0		23
Railroad																	
Stopped Buses																	

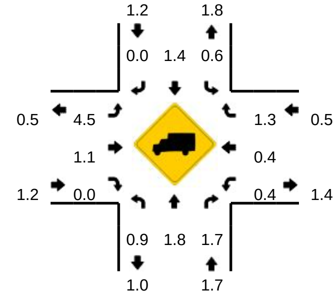
Comments: none

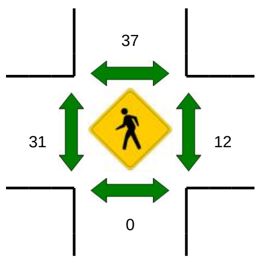
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

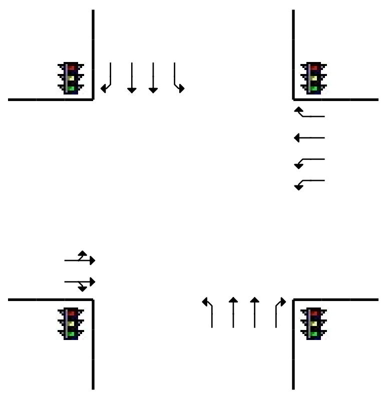
LOCATION: El Camino Real -- Ravenswood Ave | **QC JOB #:** 12899558
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

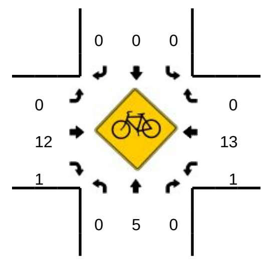


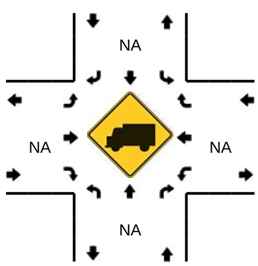
Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:20 PM -- 5:35 PM

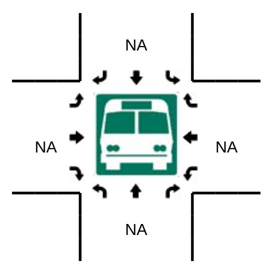












5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Ravenswood Ave (Eastbound) Left	Thru	Right	U	Ravenswood Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	15	86	31	0	14	81	2	2	2	31	9	0	32	21	0	0	326	
4:05 PM	10	110	55	1	11	78	2	0	1	23	5	0	35	18	2	0	351	
4:10 PM	11	107	50	0	17	77	0	0	4	19	8	0	35	19	11	0	358	
4:15 PM	18	103	51	0	15	79	3	2	2	28	7	0	32	22	4	1	367	
4:20 PM	12	104	43	1	11	96	1	3	2	33	7	0	19	20	8	0	360	
4:25 PM	11	103	47	0	12	75	3	2	8	26	5	0	30	23	5	0	350	
4:30 PM	10	116	53	1	12	79	5	0	3	30	8	0	31	24	8	0	380	
4:35 PM	8	113	55	1	8	83	2	2	4	23	12	0	28	17	5	0	361	
4:40 PM	6	112	60	0	14	86	3	1	6	33	13	0	33	14	8	0	389	
4:45 PM	13	109	37	0	17	81	3	0	3	35	6	0	31	18	7	0	360	
4:50 PM	14	119	48	2	19	91	3	0	3	29	12	0	37	23	8	0	408	
4:55 PM	10	114	47	0	15	104	4	1	3	26	11	0	35	20	3	0	393	4403
5:00 PM	10	101	48	1	13	92	4	1	2	31	6	0	37	23	5	0	374	4451
5:05 PM	10	118	50	0	15	103	2	1	3	29	10	0	26	21	5	0	393	4493
5:10 PM	8	121	51	0	14	107	1	1	5	28	7	0	26	17	8	0	394	4529
5:15 PM	6	118	49	0	12	104	5	0	6	29	9	0	40	19	3	0	400	4562
5:20 PM	7	104	60	1	15	97	4	0	3	27	14	0	38	20	10	0	400	4602
5:25 PM	7	114	46	0	10	93	4	3	2	26	8	0	46	24	5	0	388	4640
5:30 PM	4	100	54	2	15	104	5	0	5	28	7	0	50	24	9	0	407	4667
5:35 PM	12	109	40	0	11	92	1	2	3	27	5	0	52	26	9	0	389	4695
5:40 PM	7	103	52	1	15	72	3	0	3	26	14	0	40	22	7	0	365	4671
5:45 PM	7	111	47	2	10	89	2	0	3	35	9	0	44	18	4	0	381	4692
5:50 PM	7	89	43	0	16	85	6	1	9	27	17	0	24	20	10	0	354	4638
5:55 PM	11	106	55	1	15	98	2	0	2	19	9	0	38	21	2	0	379	4624

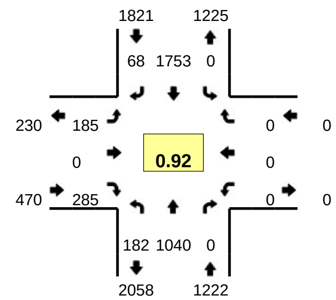
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	72	1272	640	12	160	1176	52	12	40	324	116	0	536	272	96	0	4780
Heavy Trucks	0	8	12		4	16	0		0	4	0		0	0	4		48
Pedestrians		0				24				32				20			76
Bicycles	0	1	0		0	0	0		0	5	0		1	4	0		11
Railroad																	
Stopped Buses																	

Comments: none

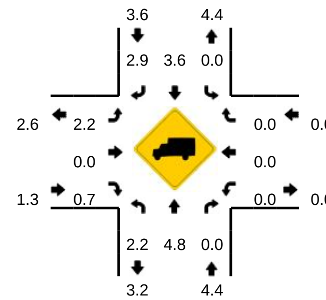
Report generated on 11/4/2014 9:43 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

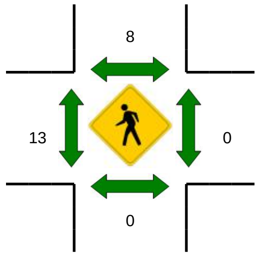
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

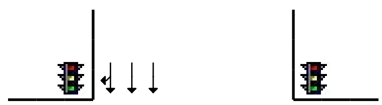
LOCATION: El Camino Real -- Middle Ave | **QC JOB #:** 12899561
CITY/STATE: Menlo Park, CA | **DATE:** Thu, Oct 09 2014

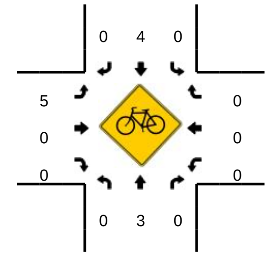


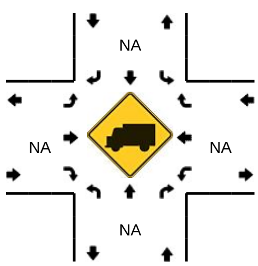
Peak-Hour: 7:05 AM -- 8:05 AM
Peak 15-Min: 7:35 AM -- 7:50 AM

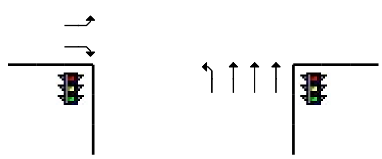


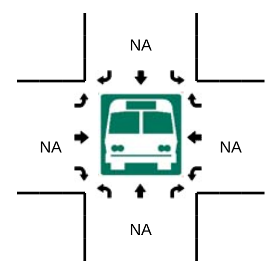












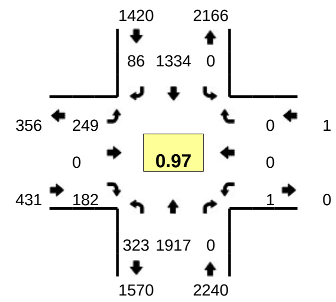
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Middle Ave (Eastbound) Left	Thru	Right	U	Middle Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	12	55	0	4	0	136	3	0	12	0	22	0	0	0	0	0	244	
7:05 AM	19	104	0	2	0	138	8	0	13	0	30	0	0	0	0	0	314	
7:10 AM	13	66	0	3	0	152	4	0	17	0	34	0	0	0	0	0	289	
7:15 AM	15	103	0	4	0	126	6	0	10	0	21	0	0	0	0	0	285	
7:20 AM	17	78	0	1	0	142	3	0	20	0	20	0	0	0	0	0	281	
7:25 AM	11	82	0	1	0	149	7	0	18	0	22	0	0	0	0	0	290	
7:30 AM	9	90	0	0	0	154	7	0	10	0	23	0	0	0	0	0	293	
7:35 AM	12	86	0	2	0	165	4	0	15	0	27	0	0	0	0	0	311	
7:40 AM	5	73	0	1	0	171	4	0	13	0	25	0	0	0	0	0	292	
7:45 AM	17	118	0	1	0	165	5	0	10	0	32	0	0	0	0	0	348	
7:50 AM	14	63	0	2	0	140	5	0	25	0	23	0	0	0	0	0	272	
7:55 AM	17	107	0	1	0	129	9	0	18	0	11	0	0	0	0	0	292	3511
8:00 AM	13	70	0	2	0	122	6	0	16	0	17	0	0	0	0	0	246	3513
8:05 AM	6	89	0	0	0	151	6	0	21	0	27	0	0	0	0	0	300	3499
8:10 AM	6	72	0	0	0	132	4	0	23	0	24	0	0	0	0	0	261	3471
8:15 AM	14	99	0	6	0	122	7	0	20	0	24	0	0	0	0	0	292	3478
8:20 AM	13	83	0	2	0	114	10	0	23	1	24	0	0	0	0	0	270	3467
8:25 AM	11	87	0	1	0	111	7	0	14	0	16	0	0	0	0	0	247	3424
8:30 AM	5	74	0	2	0	111	7	0	17	0	16	0	0	0	0	0	232	3363
8:35 AM	14	104	0	3	0	121	8	0	15	0	14	0	0	0	0	0	279	3331
8:40 AM	16	104	0	6	0	120	7	0	7	0	15	0	0	0	0	0	275	3314
8:45 AM	9	108	0	0	0	127	6	0	13	0	26	0	0	0	0	0	289	3255
8:50 AM	14	121	0	3	0	126	11	0	14	0	21	0	0	0	0	0	310	3293
8:55 AM	12	104	0	2	0	145	6	0	16	0	15	0	0	0	0	0	300	3301

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	136	1108	0	16	0	2004	52	0	152	0	336	0	0	0	0	0	3804
Heavy Trucks	0	44	0		0	80	0		4	0	0		0	0	0		128
Pedestrians		0				4				20				0			24
Bicycles	0	1	0		0	2	0		1	0	0		0	0	0		4
Railroad																	
Stopped Buses																	

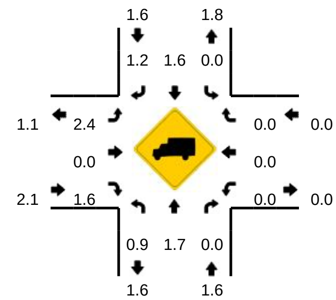
Comments: none

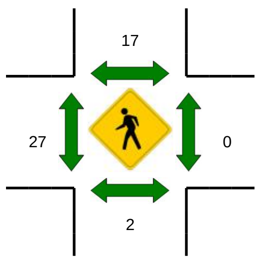
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

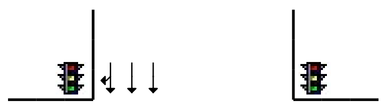
LOCATION: El Camino Real -- Middle Ave | **QC JOB #:** 12899562
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

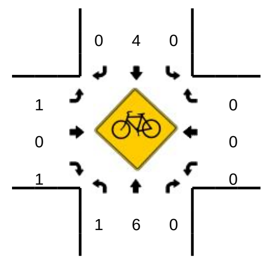


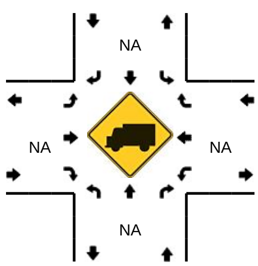
Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

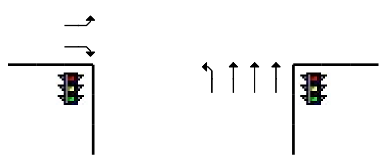


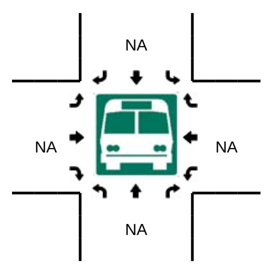












5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Middle Ave (Eastbound) Left	Thru	Right	U	Middle Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	20	143	0	4	0	103	4	0	26	0	15	0	0	0	0	0	315	
4:05 PM	17	146	0	10	0	111	8	0	20	0	22	0	0	0	0	0	334	
4:10 PM	18	156	0	6	0	100	10	0	23	0	14	0	0	0	0	0	327	
4:15 PM	14	164	0	6	0	117	2	0	21	0	20	0	1	0	0	0	345	
4:20 PM	20	158	0	3	0	110	5	0	27	0	18	0	0	0	0	0	341	
4:25 PM	21	166	0	4	0	107	7	0	23	0	15	0	0	0	0	0	343	
4:30 PM	18	170	0	5	0	97	16	0	22	0	11	0	0	0	0	0	339	
4:35 PM	33	161	0	4	0	94	9	0	22	0	10	0	0	0	0	0	333	
4:40 PM	33	177	0	4	0	113	4	0	17	0	17	0	0	0	0	0	365	
4:45 PM	28	144	0	3	0	105	6	0	19	0	19	0	0	0	0	0	324	
4:50 PM	21	163	0	2	0	136	9	0	15	0	22	0	0	0	0	0	368	
4:55 PM	23	150	0	6	0	104	6	0	23	0	10	0	0	0	0	0	322	4056
5:00 PM	23	159	0	5	0	121	3	0	18	0	12	0	0	0	0	0	341	4082
5:05 PM	18	149	0	5	0	130	9	0	19	0	14	0	0	0	0	0	344	4092
5:10 PM	23	136	0	2	0	116	7	0	22	0	15	0	0	0	0	0	321	4086
5:15 PM	32	145	0	2	0	124	7	0	22	0	14	0	0	0	0	0	346	4087
5:20 PM	17	154	0	0	0	121	19	0	22	0	13	0	0	0	0	0	346	4092
5:25 PM	18	136	0	3	0	129	13	0	20	0	12	0	0	0	0	0	331	4080
5:30 PM	29	121	0	6	0	134	11	0	26	0	8	0	0	0	0	0	335	4076
5:35 PM	33	134	0	3	0	114	13	0	17	0	14	0	0	0	0	0	328	4071
5:40 PM	28	151	0	3	0	118	10	0	19	0	20	0	0	0	0	0	349	4055
5:45 PM	23	147	0	3	0	105	7	0	24	0	15	0	0	0	0	0	324	4055
5:50 PM	27	135	0	4	0	112	7	0	15	0	21	0	0	0	0	0	321	4008
5:55 PM	25	148	0	4	0	132	14	0	20	0	24	0	0	0	0	0	367	4053

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	328	1936	0	36	0	1416	76	0	204	0	232	0	0	0	0	0	4228
Heavy Trucks	0	32	0		0	32	0		0	0	0		0	0	0		64
Pedestrians		0				20				24				0			44
Bicycles	0	3	0		0	1	0		0	0	1		0	0	0		5
Railroad																	
Stopped Buses																	

Comments: none

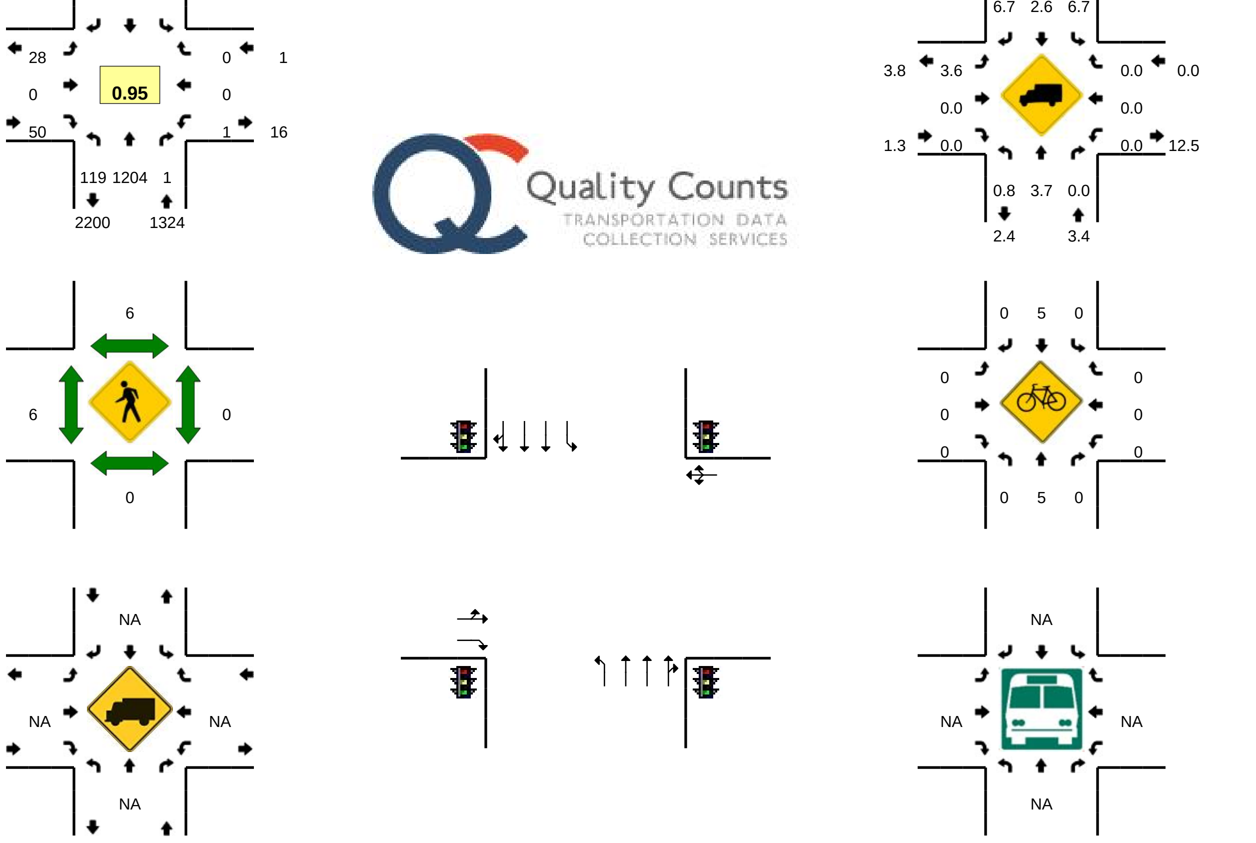
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: El Camino Real -- Cambridge Ave | **QC JOB #:** 12899563

CITY/STATE: Menlo Park, CA | **DATE:** Mon, Sep 29 2014

Peak-Hour: 8:00 AM -- 9:00 AM

Peak 15-Min: 8:45 AM -- 9:00 AM



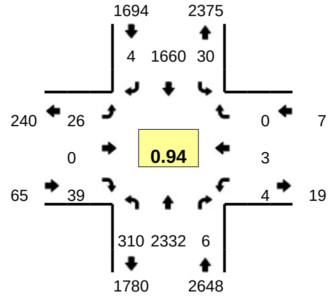
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Cambridge Ave (Eastbound) Left	Thru	Right	U	Cambridge Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	1	50	0	3	0	74	1	2	2	0	0	0	0	0	0	0	133	
7:05 AM	3	48	0	4	0	92	1	1	2	0	1	0	0	0	0	0	152	
7:10 AM	0	58	0	3	0	98	0	0	0	0	1	0	0	0	0	0	160	
7:15 AM	3	56	0	3	1	111	0	1	0	0	3	0	0	0	0	0	178	
7:20 AM	1	85	0	4	0	96	1	0	0	0	4	0	0	0	0	0	191	
7:25 AM	7	83	0	3	0	127	0	1	1	0	1	0	0	0	0	0	223	
7:30 AM	1	77	0	3	1	143	0	2	1	0	6	0	0	0	0	0	234	
7:35 AM	3	117	0	5	1	172	1	0	2	0	2	0	0	0	0	0	303	
7:40 AM	1	93	0	4	2	185	1	2	0	0	4	0	0	0	0	0	292	
7:45 AM	1	100	0	5	1	173	1	1	3	0	3	0	0	0	0	0	288	
7:50 AM	1	108	0	7	1	165	0	1	3	0	4	0	0	0	0	0	290	
7:55 AM	4	96	0	3	2	152	3	0	0	0	2	0	0	0	0	0	262	2706
8:00 AM	2	91	0	7	2	169	0	0	4	0	3	0	0	0	0	0	278	2851
8:05 AM	3	87	0	3	1	172	2	0	0	0	4	0	0	0	0	0	272	2971
8:10 AM	4	110	0	11	2	186	1	3	0	0	0	0	0	0	0	0	317	3128
8:15 AM	4	101	1	10	2	164	3	1	6	0	3	0	1	0	0	0	296	3246
8:20 AM	3	94	0	9	1	178	1	0	3	0	5	0	0	0	0	0	294	3349
8:25 AM	2	104	0	4	1	173	0	0	4	0	10	0	0	0	0	0	298	3424
8:30 AM	6	116	0	5	0	143	1	2	0	0	7	0	0	0	0	0	280	3470
8:35 AM	2	93	0	5	3	152	2	3	0	0	4	0	0	0	0	0	264	3431
8:40 AM	3	97	0	6	0	167	2	2	4	0	6	0	0	0	0	0	287	3426
8:45 AM	5	111	0	8	0	194	1	1	1	0	3	0	0	0	0	0	324	3462
8:50 AM	4	104	0	4	1	192	1	1	5	0	2	0	0	0	0	0	314	3486
8:55 AM	0	96	0	9	2	178	1	2	1	0	3	0	0	0	0	0	292	3516

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	36	1244	0	84	12	2256	12	16	28	0	32	0	0	0	0	0	3720
Heavy Trucks	0	36	0		4	76	0		4	0	0		0	0	0		120
Pedestrians		0				4				4				0			8
Bicycles	0	4	0		0	1	0		0	0	0		0	0	0		5
Railroad																	
Stopped Buses																	

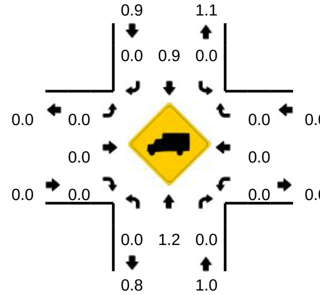
Comments: none

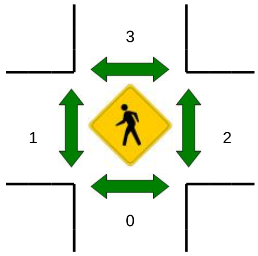
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

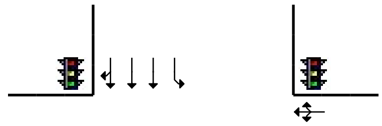
LOCATION: El Camino Real -- Cambridge Ave | **QC JOB #:** 12899564
CITY/STATE: Menlo Park, CA | **DATE:** Mon, Sep 29 2014

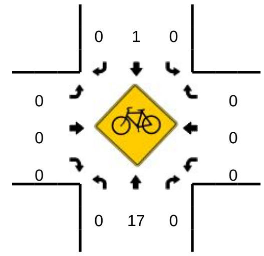


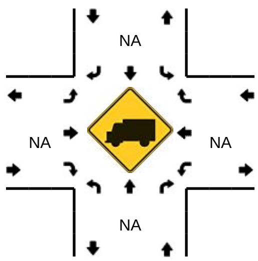
Peak-Hour: 4:55 PM -- 5:55 PM
Peak 15-Min: 5:35 PM -- 5:50 PM

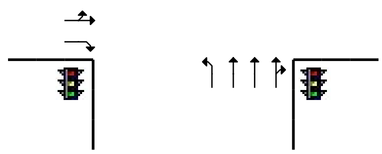


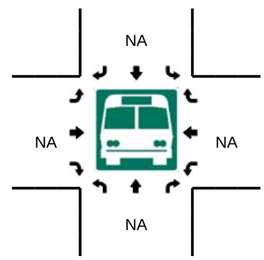












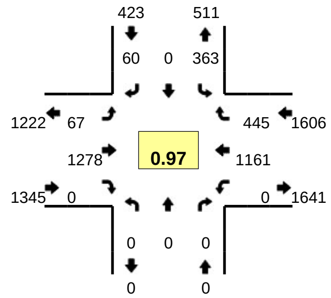
5-Min Count Period Beginning At	El Camino Real (Northbound) Left	Thru	Right	U	El Camino Real (Southbound) Left	Thru	Right	U	Cambridge Ave (Eastbound) Left	Thru	Right	U	Cambridge Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	3	158	1	8	0	119	2	3	1	1	3	0	1	0	0	0	300	
4:05 PM	3	165	0	7	0	125	2	2	3	0	3	0	0	0	0	0	310	
4:10 PM	4	177	0	10	0	103	2	1	2	0	1	0	0	0	0	0	300	
4:15 PM	2	185	0	11	1	134	2	3	4	0	3	0	0	0	0	0	345	
4:20 PM	5	191	0	7	0	128	0	1	0	0	2	0	0	0	0	0	334	
4:25 PM	5	222	1	9	0	139	1	1	2	0	4	0	0	0	0	0	384	
4:30 PM	10	199	1	6	0	121	1	3	2	0	2	0	1	0	0	0	346	
4:35 PM	11	201	0	5	0	102	1	1	1	0	2	0	0	0	0	0	324	
4:40 PM	4	208	0	5	0	138	2	1	1	0	3	0	0	0	0	0	362	
4:45 PM	13	164	0	11	0	114	1	2	4	0	2	0	0	0	0	0	311	
4:50 PM	10	205	1	5	1	137	0	3	4	0	0	0	1	0	0	0	367	
4:55 PM	7	191	1	6	0	155	2	1	0	0	2	0	0	0	0	0	365	4048
5:00 PM	7	225	0	2	0	123	1	3	1	0	1	0	0	1	0	0	364	4112
5:05 PM	16	194	1	7	0	123	1	2	3	0	3	0	0	1	0	0	351	4153
5:10 PM	16	185	0	8	1	143	0	0	2	0	4	0	0	0	0	0	359	4212
5:15 PM	22	192	1	9	2	136	0	1	2	0	2	0	0	1	0	0	368	4235
5:20 PM	27	190	0	6	1	125	0	0	6	0	6	0	0	0	0	0	361	4262
5:25 PM	20	153	0	6	1	132	0	5	2	0	2	0	0	0	0	0	321	4199
5:30 PM	22	180	0	2	1	125	0	2	1	0	5	0	1	0	0	0	339	4192
5:35 PM	27	226	1	10	0	173	0	1	2	0	1	0	0	0	0	0	441	4309
5:40 PM	21	198	2	4	1	161	0	0	1	0	4	0	0	0	0	0	392	4339
5:45 PM	19	196	0	10	1	110	0	1	2	0	5	0	2	0	0	0	346	4374
5:50 PM	29	202	0	7	5	154	0	1	4	0	4	0	1	0	0	0	407	4414
5:55 PM	15	173	1	10	0	134	0	1	1	1	7	0	1	0	1	0	345	4394

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	268	2480	12	96	8	1776	0	8	20	0	40	0	8	0	0	0	4716
Heavy Trucks	0	24	0		0	24	0		0	0	0		0	0	0		48
Pedestrians		0				0				0				8			8
Bicycles	0	4	0		0	0	0		0	0	0		0	0	0		4
Railroad																	
Stopped Buses																	

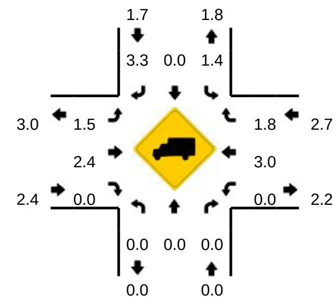
Comments: none

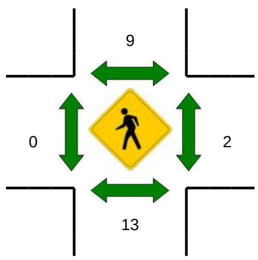
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

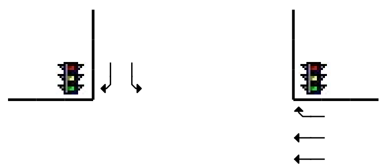
LOCATION: Bay Rd -- Willow Rd | **QC JOB #:** 12899565
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

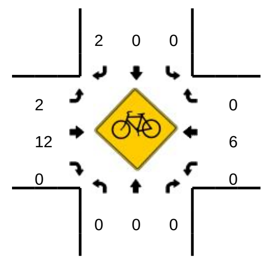


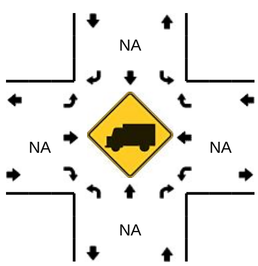
Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 7:55 AM -- 8:10 AM

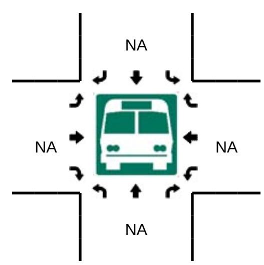












5-Min Count Period Beginning At	Bay Rd (Northbound) Left	Thru	Right	U	Bay Rd (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	13	0	0	0	0	57	0	1	0	89	19	0	179	
7:05 AM	0	0	0	0	10	0	1	0	0	46	0	0	0	98	37	0	192	
7:10 AM	0	0	0	0	9	0	3	0	1	71	0	0	0	113	44	0	241	
7:15 AM	0	0	0	0	11	0	1	0	2	72	0	0	0	117	42	0	245	
7:20 AM	0	0	0	0	23	0	2	0	4	94	0	0	0	87	53	0	263	
7:25 AM	0	0	0	0	9	0	2	0	2	88	0	0	0	97	63	0	261	
7:30 AM	0	0	0	0	24	0	4	0	2	94	0	0	0	107	34	0	265	
7:35 AM	0	0	0	0	33	0	4	0	5	93	0	0	0	84	37	0	256	
7:40 AM	0	0	0	0	39	0	7	0	4	89	0	1	0	83	57	0	280	
7:45 AM	0	0	0	0	27	0	4	0	3	116	0	0	0	104	50	0	304	
7:50 AM	0	0	0	0	33	0	1	0	4	90	0	0	0	97	31	0	256	
7:55 AM	0	0	0	0	38	0	6	0	4	104	0	0	0	96	28	0	276	3018
8:00 AM	0	0	0	0	29	0	8	0	7	116	0	0	0	90	36	0	286	3125
8:05 AM	0	0	0	0	24	0	4	0	11	132	0	0	0	103	32	0	306	3239
8:10 AM	0	0	0	0	29	0	5	0	7	76	0	0	0	93	30	0	240	3238
8:15 AM	0	0	0	0	26	0	5	0	12	113	0	0	0	99	36	0	291	3284
8:20 AM	0	0	0	0	30	0	4	0	6	102	0	0	0	98	29	0	269	3290
8:25 AM	0	0	0	0	20	0	4	0	4	118	0	0	0	101	52	0	299	3328
8:30 AM	0	0	0	0	34	0	6	0	4	122	0	0	0	107	20	0	293	3356
8:35 AM	0	0	0	0	34	0	6	0	0	100	0	0	0	90	44	0	274	3374
8:40 AM	0	0	0	0	40	0	10	0	0	73	0	1	0	72	17	0	213	3307
8:45 AM	0	0	0	0	40	0	15	0	5	90	0	0	0	80	23	0	253	3256
8:50 AM	0	0	0	0	34	0	1	0	5	137	0	0	0	109	36	0	322	3322
8:55 AM	0	0	0	0	20	0	3	0	1	110	0	0	0	115	39	0	288	3334

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	364	0	72	0	88	1408	0	0	0	1156	384	0	3472
Heavy Trucks	0	0	0		8	0	0		0	24	0		0	28	8		68
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	1		0	5	0		0	3	0		9
Railroad																	
Stopped Buses																	

Comments: none

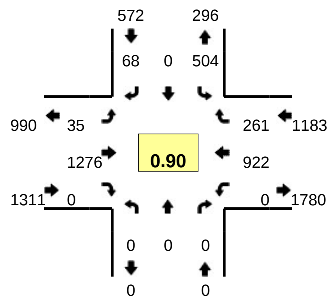
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

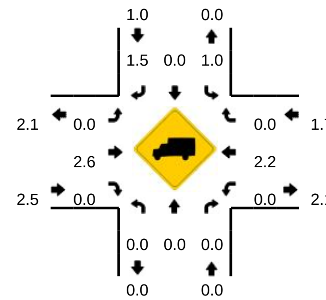
LOCATION: Bay Rd -- Willow Rd | **QC JOB #:** 12899566

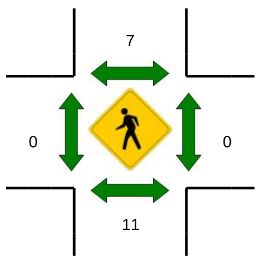
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

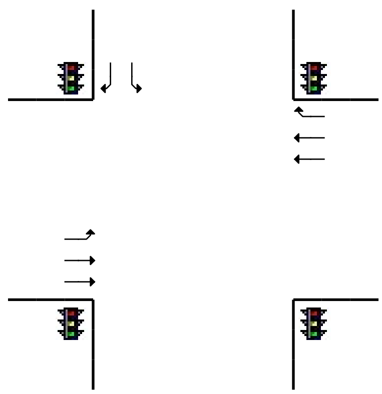
Peak-Hour: 4:15 PM -- 5:15 PM

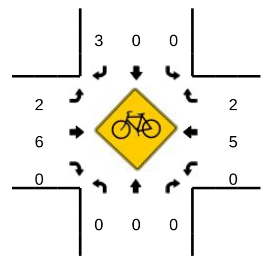
Peak 15-Min: 4:15 PM -- 4:30 PM

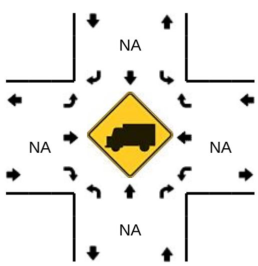


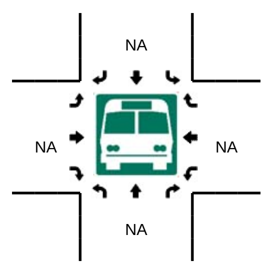












5-Min Count Period Beginning At	Bay Rd (Northbound) Left	Thru	Right	U	Bay Rd (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	27	0	1	0	4	112	0	0	0	71	15	0	230	
4:05 PM	0	0	0	0	54	0	3	0	3	115	0	0	0	75	17	0	267	
4:10 PM	0	0	0	0	47	0	6	0	0	98	0	0	0	49	18	0	218	
4:15 PM	0	0	0	0	43	0	5	0	2	147	0	0	0	77	16	0	290	
4:20 PM	0	0	0	0	52	0	7	0	2	117	0	0	0	70	27	0	275	
4:25 PM	0	0	0	0	43	0	4	0	3	122	0	0	0	91	27	0	290	
4:30 PM	0	0	0	0	34	0	9	0	4	103	0	0	0	76	18	0	244	
4:35 PM	0	0	0	0	59	0	5	0	3	78	0	0	0	62	19	0	226	
4:40 PM	0	0	0	0	33	0	10	0	3	92	0	0	0	70	19	0	227	
4:45 PM	0	0	0	0	36	0	2	0	2	111	0	0	0	81	18	0	250	
4:50 PM	0	0	0	0	44	0	5	0	1	100	0	0	0	84	17	0	251	
4:55 PM	0	0	0	0	44	0	5	0	5	110	0	0	0	60	22	0	246	3014
5:00 PM	0	0	0	0	30	0	3	0	5	118	0	0	0	79	32	0	267	3051
5:05 PM	0	0	0	0	36	0	6	0	4	100	0	0	0	85	20	0	251	3035
5:10 PM	0	0	0	0	50	0	7	0	1	78	0	0	0	87	26	0	249	3066
5:15 PM	0	0	0	0	52	0	4	0	0	68	0	0	0	88	22	0	234	3010
5:20 PM	0	0	0	0	36	0	9	0	3	83	0	0	0	90	21	0	242	2977
5:25 PM	0	0	0	0	36	0	13	0	2	86	0	0	0	78	26	0	241	2928
5:30 PM	0	0	0	0	43	0	3	0	1	57	0	0	0	87	21	0	212	2896
5:35 PM	0	0	0	0	37	0	4	0	2	61	0	0	0	91	24	0	219	2889
5:40 PM	0	0	0	0	34	0	6	0	5	106	0	0	0	97	17	0	265	2927
5:45 PM	0	0	0	0	33	0	2	0	2	124	0	0	0	117	28	0	306	2983
5:50 PM	0	0	0	0	32	0	4	0	7	52	0	0	0	88	21	0	204	2936
5:55 PM	0	0	0	0	44	0	4	0	3	76	0	0	0	100	23	0	250	2940

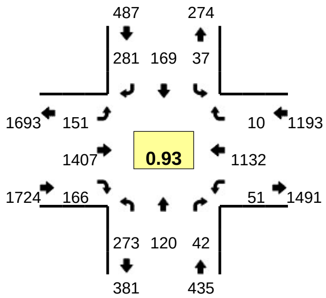
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	552	0	64	0	28	1544	0	0	0	952	280	0	3420
Heavy Trucks	0	0	0		8	0	4		0	40	0		0	16	0		68
Pedestrians		8				4				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	2	0		2
Railroad																	
Stopped Buses																	

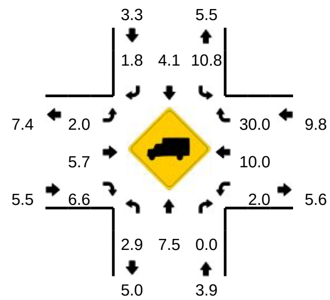
Comments: none

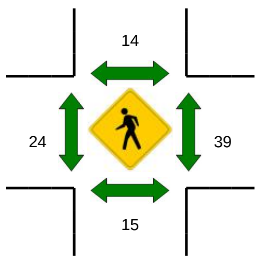
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

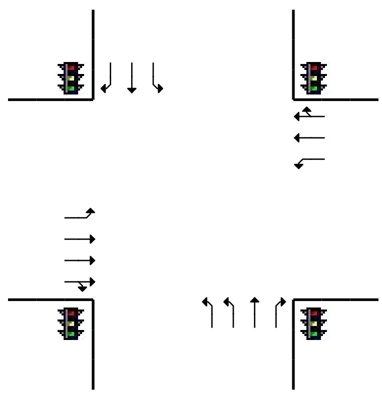
LOCATION: Newbridge St -- Willow Rd | **QC JOB #:** 12899567
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

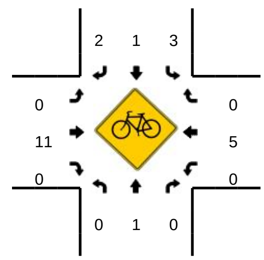
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:30 AM -- 8:45 AM

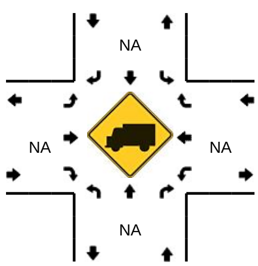


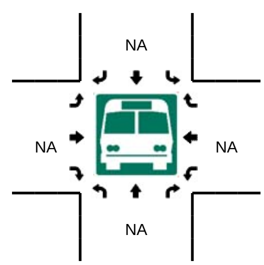












5-Min Count Period Beginning At	Newbridge St (Northbound) Left	Thru	Right	U	Newbridge St (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	14	8	3	0	1	6	21	0	11	73	10	1	1	141	1	0	291	
7:05 AM	26	10	6	0	3	9	33	0	8	55	6	0	1	132	0	0	289	
7:10 AM	35	6	0	0	0	17	39	0	10	73	4	0	2	128	0	0	314	
7:15 AM	33	7	3	0	4	9	28	0	2	63	7	1	3	159	0	0	319	
7:20 AM	38	8	3	0	2	7	31	0	6	78	13	2	4	139	1	0	332	
7:25 AM	25	7	4	0	1	16	40	0	15	78	15	0	1	150	2	0	354	
7:30 AM	34	3	1	0	3	15	30	0	9	89	7	0	1	121	0	0	313	
7:35 AM	29	4	1	0	3	8	25	0	17	87	11	0	0	79	0	0	264	
7:40 AM	42	4	2	0	3	14	30	0	9	80	7	1	5	110	1	0	308	
7:45 AM	35	9	0	0	0	6	38	0	12	66	18	1	3	98	2	0	288	
7:50 AM	25	5	2	0	3	15	24	0	7	86	10	0	2	97	1	0	277	
7:55 AM	19	8	1	0	2	14	32	0	12	89	14	1	1	71	0	1	265	3614
8:00 AM	31	16	2	0	7	5	15	0	9	112	13	3	3	78	1	1	296	3619
8:05 AM	4	2	3	0	5	20	26	0	15	121	20	0	3	80	2	0	301	3631
8:10 AM	26	12	4	0	3	18	15	0	12	116	8	0	3	77	1	0	295	3612
8:15 AM	29	13	3	0	2	8	24	0	13	109	21	0	5	105	1	2	335	3628
8:20 AM	23	12	5	0	6	16	30	0	16	124	9	0	2	72	0	0	315	3611
8:25 AM	19	12	2	0	6	16	32	0	10	114	12	2	5	65	2	1	298	3555
8:30 AM	33	18	5	0	2	18	25	0	10	94	10	1	8	109	1	0	334	3576
8:35 AM	25	7	3	0	1	20	19	0	10	118	20	0	2	118	1	1	345	3657
8:40 AM	23	8	2	0	0	9	23	0	15	117	13	0	7	136	0	0	353	3702
8:45 AM	10	6	3	0	0	12	21	0	14	133	13	0	3	74	0	0	289	3703
8:50 AM	26	9	4	0	3	18	21	0	13	129	12	0	2	91	0	0	328	3754
8:55 AM	24	5	6	0	2	9	30	0	7	120	15	1	3	127	1	0	350	3839

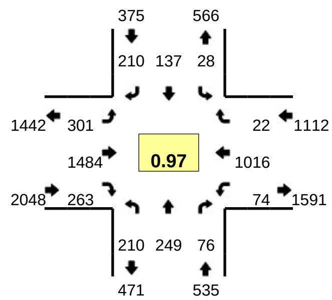
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	324	132	40	0	12	188	268	0	140	1316	172	4	68	1452	8	4	4128
Heavy Trucks	0	8	0		4	8	4		8	80	12		4	164	0		292
Pedestrians		4				8				24				28			64
Bicycles	0	1	0		0	1	0		0	5	0		0	1	0		8
Railroad																	
Stopped Buses																	

Comments: none

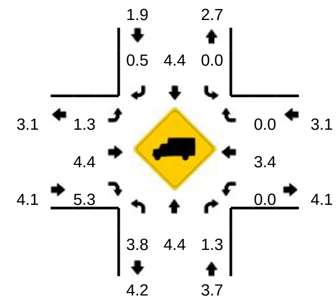
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

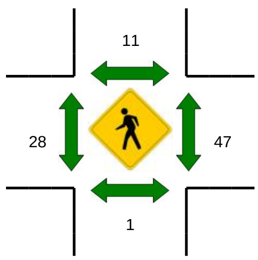
LOCATION: Newbridge St -- Willow Rd | **QC JOB #:** 12899568

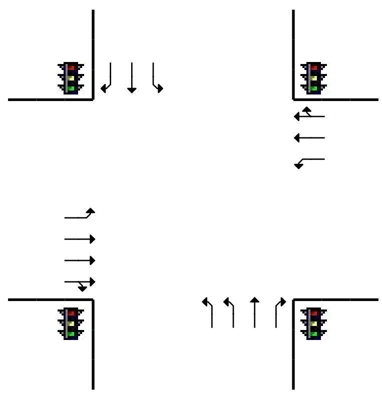
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

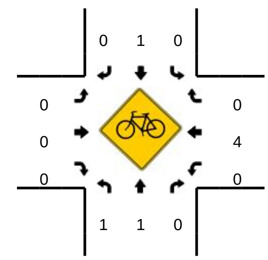


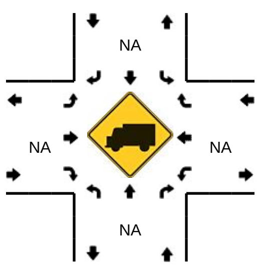
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

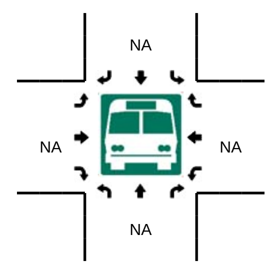












5-Min Count Period Beginning At	Newbridge St (Northbound) Left	Thru	Right	U	Newbridge St (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	17	11	6	0	0	9	15	0	25	139	27	1	6	57	3	1	317	
4:05 PM	21	16	8	0	1	19	22	0	25	127	25	1	4	71	4	0	344	
4:10 PM	14	15	2	0	1	18	12	0	28	124	28	1	4	55	0	0	302	
4:15 PM	21	20	3	0	4	12	17	0	22	128	29	0	5	79	3	0	343	
4:20 PM	18	14	6	0	4	17	25	0	28	142	34	3	4	68	1	0	364	
4:25 PM	14	16	8	0	5	6	14	0	32	133	18	0	3	85	4	0	338	
4:30 PM	25	13	9	0	0	6	17	0	22	100	24	0	9	79	4	0	308	
4:35 PM	18	23	5	0	2	8	7	0	20	119	21	0	3	89	2	0	317	
4:40 PM	12	21	11	0	4	12	21	0	29	133	14	0	5	86	0	1	349	
4:45 PM	14	20	7	0	2	12	14	0	22	124	29	0	7	103	0	0	354	
4:50 PM	17	27	11	0	0	15	15	0	25	129	21	1	5	78	2	1	347	
4:55 PM	15	22	2	0	1	14	23	0	28	127	14	0	10	70	0	0	326	4009
5:00 PM	15	23	2	0	1	9	23	0	27	109	24	2	7	86	2	1	331	4023
5:05 PM	25	23	6	0	1	16	17	0	29	131	16	0	8	93	2	0	367	4046
5:10 PM	16	27	6	0	4	10	17	0	11	109	19	0	5	100	2	0	326	4070
5:15 PM	14	18	7	0	3	17	17	0	21	96	19	0	4	96	1	0	313	4040
5:20 PM	6	19	5	0	2	22	13	0	24	125	13	0	2	91	0	0	322	3998
5:25 PM	20	23	8	0	0	13	11	0	21	113	15	0	9	101	2	2	338	3998
5:30 PM	8	20	6	0	2	20	18	0	16	86	13	1	6	102	2	2	302	3992
5:35 PM	27	22	5	0	2	14	16	0	26	140	24	1	8	88	1	0	374	4049
5:40 PM	15	20	7	0	0	12	18	0	31	122	22	0	4	86	3	0	340	4040
5:45 PM	16	15	4	0	4	16	15	0	28	93	20	0	7	48	3	0	269	3955
5:50 PM	16	23	12	0	7	15	21	0	12	113	11	0	7	100	4	0	341	3949
5:55 PM	17	22	12	0	6	19	15	0	22	111	15	0	5	86	1	0	331	3954

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	172	272	116	0	24	156	200	0	304	1544	256	4	68	1068	8	8	4200
Heavy Trucks	4	8	0		0	8	4		4	64	8		0	28	0		128
Pedestrians		4				4				28				32			68
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

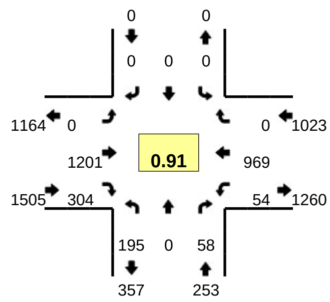
Comments: none

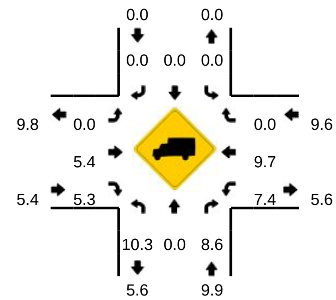
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

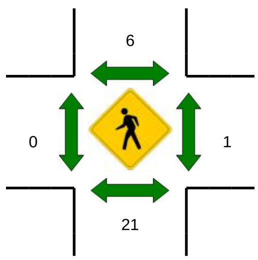
LOCATION: O'Brien Dr -- Willow Rd | **QC JOB #:** 12899569

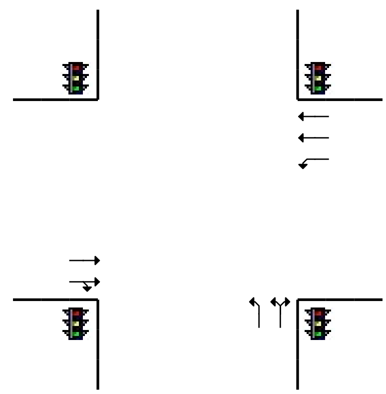
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

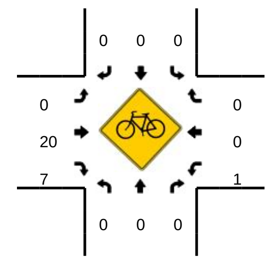
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:30 AM -- 8:45 AM

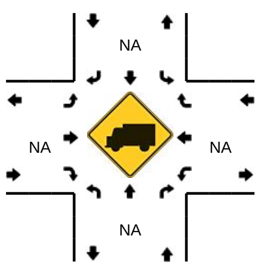


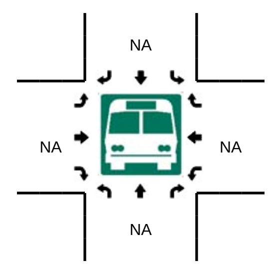












5-Min Count Period Beginning At	O'Brien Dr (Northbound) Left	Thru	Right	U	O'Brien Dr (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	8	0	3	0	0	0	0	0	0	46	19	0	1	137	0	0	214	
7:05 AM	11	0	1	0	0	0	0	0	0	57	15	0	7	119	0	0	210	
7:10 AM	20	0	3	0	0	0	0	0	0	62	19	0	2	120	0	0	226	
7:15 AM	16	0	1	0	0	0	0	0	0	66	20	0	4	133	0	0	240	
7:20 AM	13	0	1	0	0	0	0	0	0	63	16	0	0	121	0	0	214	
7:25 AM	27	0	3	0	0	0	0	0	0	64	14	0	2	115	0	0	225	
7:30 AM	23	0	4	0	0	0	0	0	0	66	15	0	4	120	0	0	232	
7:35 AM	25	0	6	0	0	0	0	0	0	55	19	0	2	64	0	0	171	
7:40 AM	18	0	3	0	0	0	0	0	0	79	14	0	6	99	0	0	219	
7:45 AM	17	0	4	0	0	0	0	0	0	62	19	0	3	95	0	0	200	
7:50 AM	24	0	8	0	0	0	0	0	0	82	28	0	1	77	0	0	220	
7:55 AM	24	0	5	0	0	0	0	0	0	84	28	0	2	56	0	0	199	2570
8:00 AM	15	0	2	0	0	0	0	0	0	97	33	0	4	54	0	0	205	2561
8:05 AM	22	0	6	0	0	0	0	0	0	95	22	0	5	54	0	0	204	2555
8:10 AM	16	0	6	0	0	0	0	0	0	102	23	0	3	84	0	0	234	2563
8:15 AM	23	0	8	0	0	0	0	0	0	77	34	0	9	87	0	0	238	2561
8:20 AM	17	0	8	0	0	0	0	0	0	94	29	0	4	51	0	0	203	2550
8:25 AM	16	0	8	0	0	0	0	0	0	120	28	0	5	63	0	0	240	2565
8:30 AM	14	0	5	0	0	0	0	0	0	99	28	0	9	90	0	0	245	2578
8:35 AM	13	0	1	0	0	0	0	0	0	106	24	0	3	94	0	0	241	2648
8:40 AM	9	0	4	0	0	0	0	0	0	107	18	0	5	133	0	0	276	2705
8:45 AM	16	0	4	0	0	0	0	0	0	101	32	0	3	70	0	1	227	2732
8:50 AM	16	0	4	0	0	0	0	0	0	86	15	0	3	77	0	0	201	2713
8:55 AM	18	0	2	0	0	0	0	0	0	117	18	0	0	112	0	0	267	2781

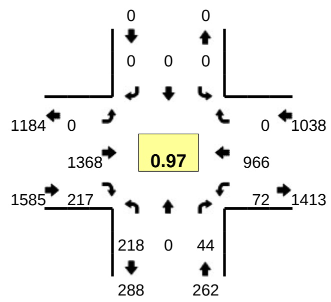
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	144	0	40	0	0	0	0	0	0	1248	280	0	68	1268	0	0	3048
Heavy Trucks	16	0	0		0	0	0		0	72	12		4	116	0		220
Pedestrians		16				4				0				0			20
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

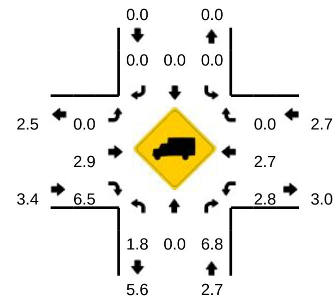
LOCATION: O'Brien Dr -- Willow Rd — **QC JOB #:** 12899570

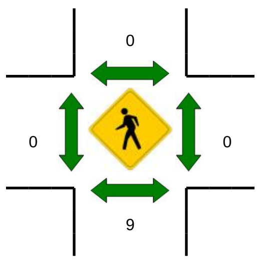
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

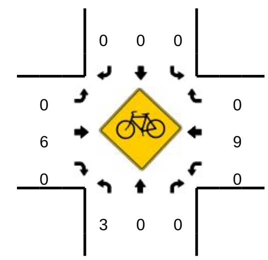


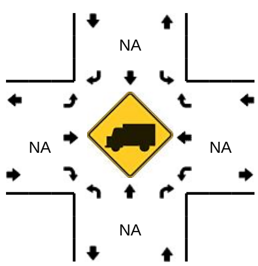
Peak-Hour: 4:40 PM -- 5:40 PM

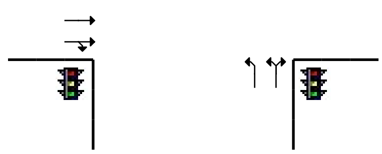
Peak 15-Min: 4:40 PM -- 4:55 PM

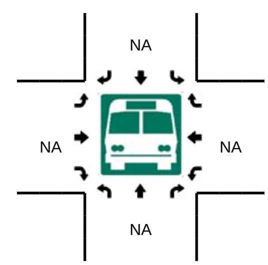












5-Min Count Period Beginning At	O'Brien Dr (Northbound) Left	Thru	Right	U	O'Brien Dr (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	11	0	5	0	0	0	0	0	0	141	18	0	1	57	0	0	233	
4:05 PM	22	0	5	0	0	0	0	0	0	136	18	0	5	59	0	0	245	
4:10 PM	15	0	0	0	0	0	0	0	0	101	8	0	4	52	0	0	180	
4:15 PM	14	0	7	0	0	0	0	0	0	135	13	0	4	73	0	0	246	
4:20 PM	21	0	0	0	0	0	0	0	0	105	9	0	1	64	0	0	200	
4:25 PM	27	0	6	0	0	0	0	0	0	115	21	0	2	57	0	0	228	
4:30 PM	23	0	8	0	0	0	0	0	0	94	17	0	1	73	0	0	216	
4:35 PM	20	0	4	0	0	0	0	0	0	103	12	0	4	64	0	0	207	
4:40 PM	17	0	1	0	0	0	0	0	0	133	17	0	9	82	0	0	259	
4:45 PM	14	0	3	0	0	0	0	0	0	126	16	0	7	82	0	0	248	
4:50 PM	16	0	4	0	0	0	0	0	0	131	19	0	5	59	0	1	235	
4:55 PM	9	0	1	0	0	0	0	0	0	112	27	0	3	78	0	0	230	2727
5:00 PM	15	0	5	0	0	0	0	0	0	104	20	0	4	88	0	0	236	2730
5:05 PM	26	0	3	0	0	0	0	0	0	104	16	0	3	70	0	0	222	2707
5:10 PM	19	0	4	0	0	0	0	0	0	101	19	0	7	87	0	0	237	2764
5:15 PM	23	0	3	0	0	0	0	0	0	137	13	0	8	89	0	0	273	2791
5:20 PM	18	0	6	0	0	0	0	0	0	81	17	0	2	90	0	0	214	2805
5:25 PM	17	0	6	0	0	0	0	0	0	93	23	0	10	79	0	0	228	2805
5:30 PM	32	0	7	0	0	0	0	0	0	112	14	0	6	94	0	0	265	2854
5:35 PM	12	0	1	0	0	0	0	0	0	134	16	0	7	68	0	0	238	2885
5:40 PM	16	0	4	0	0	0	0	0	0	88	20	0	5	82	0	0	215	2841
5:45 PM	11	0	3	0	0	0	0	0	0	74	20	0	8	72	0	0	188	2781
5:50 PM	16	0	2	0	0	0	0	0	0	127	15	0	6	68	0	0	234	2780
5:55 PM	13	0	8	0	0	0	0	0	0	94	22	0	4	97	0	0	238	2788

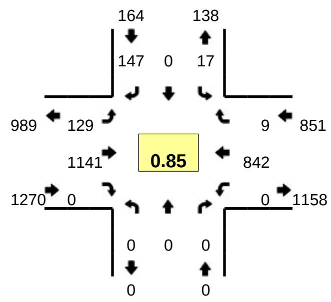
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	188	0	32	0	0	0	0	0	0	1560	208	0	84	892	0	4	2968
Heavy Trucks	0	0	0		0	0	0		0	64	16		4	28	0		112
Pedestrians		12				0				0				0			12
Bicycles	0	0	0		0	0	0		0	2	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments: none

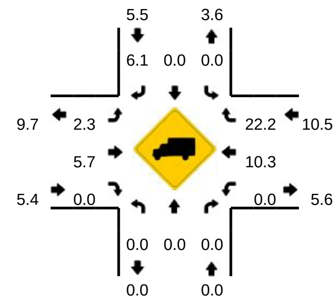
Report generated on 11/4/2014 9:44 AM — SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

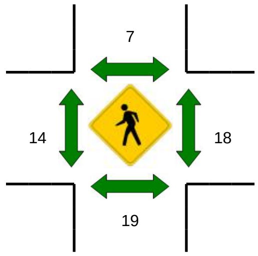
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

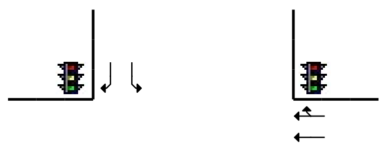
LOCATION: Ivy Dr -- Willow Rd | **QC JOB #:** 12899571
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

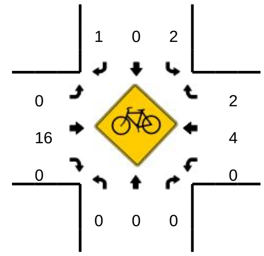


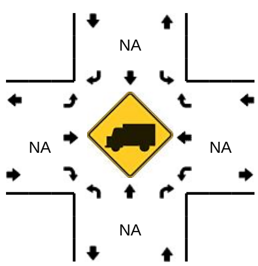
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:30 AM -- 8:45 AM

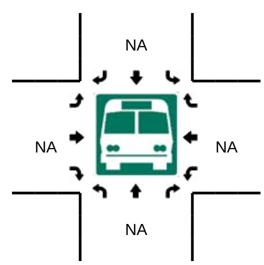












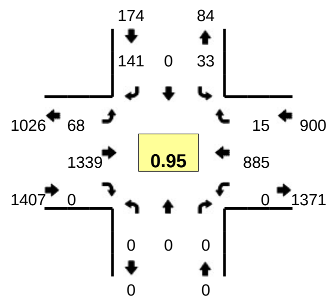
5-Min Count Period Beginning At	Ivy Dr (Northbound) Left	Thru	Right	U	Ivy Dr (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	3	0	5	0	2	44	0	0	0	135	1	0	190	
7:05 AM	0	0	0	0	2	0	13	0	6	51	0	0	0	109	0	0	181	
7:10 AM	0	0	0	0	1	0	11	0	2	62	0	0	0	116	2	0	194	
7:15 AM	0	0	0	0	3	0	15	0	1	66	0	0	0	118	1	0	204	
7:20 AM	0	0	0	0	1	0	12	0	1	64	0	0	0	111	0	0	189	
7:25 AM	0	0	0	0	0	0	21	0	7	63	0	0	0	97	0	0	188	
7:30 AM	0	0	0	0	0	0	17	0	8	64	0	0	0	103	1	0	193	
7:35 AM	0	0	0	0	2	0	14	0	7	51	0	0	0	53	0	0	127	
7:40 AM	0	0	0	0	0	0	25	0	5	83	0	0	0	79	0	0	192	
7:45 AM	0	0	0	0	2	0	21	0	3	61	0	0	0	70	0	0	157	
7:50 AM	0	0	0	0	0	0	15	0	4	81	0	0	0	66	0	0	166	
7:55 AM	0	0	0	0	0	0	18	0	12	77	0	0	0	44	0	0	151	2132
8:00 AM	0	0	0	0	0	0	8	0	6	93	0	0	0	42	1	0	150	2092
8:05 AM	0	0	0	0	0	0	18	0	16	86	0	0	0	46	0	0	166	2077
8:10 AM	0	0	0	0	0	0	25	0	13	98	0	0	0	61	1	0	198	2081
8:15 AM	0	0	0	0	3	0	10	0	19	72	0	0	0	70	0	0	174	2051
8:20 AM	0	0	0	0	0	0	16	0	14	88	0	0	0	54	0	0	172	2034
8:25 AM	0	0	0	0	6	0	13	0	19	115	0	0	0	43	0	0	196	2042
8:30 AM	0	0	0	0	1	0	8	0	11	95	0	0	0	98	1	0	214	2063
8:35 AM	0	0	0	0	0	0	14	0	9	100	0	0	0	77	1	0	201	2137
8:40 AM	0	0	0	0	1	0	7	0	6	107	0	0	0	136	2	0	259	2204
8:45 AM	0	0	0	0	1	0	11	0	6	100	0	0	0	58	2	0	178	2225
8:50 AM	0	0	0	0	1	0	7	0	6	96	0	0	0	76	1	0	187	2246
8:55 AM	0	0	0	0	4	0	10	0	4	91	0	0	0	81	0	0	190	2285

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	8	0	116	0	104	1208	0	0	0	1244	16	0	2696
Heavy Trucks	0	0	0		0	0	8		4	76	0		0	116	8		212
Pedestrians		28				16				20				24			88
Bicycles	0	0	0		0	0	0		0	2	0		0	1	0		3
Railroad																	
Stopped Buses																	

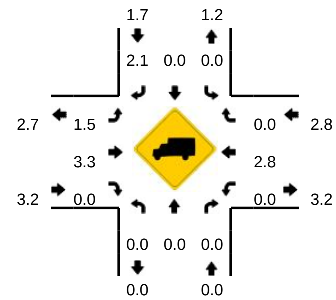
Comments: none

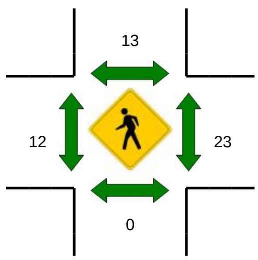
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

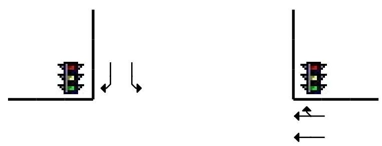
LOCATION: Ivy Dr -- Willow Rd | **QC JOB #:** 12899572
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

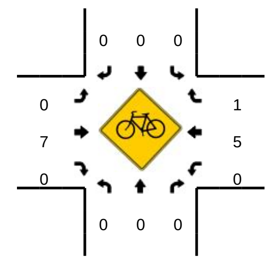


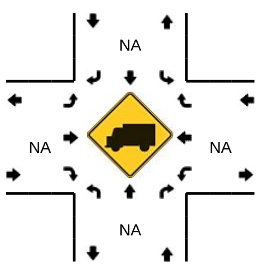
Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

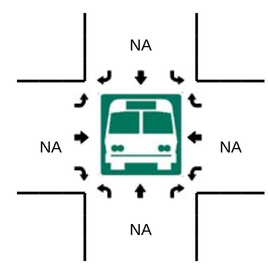












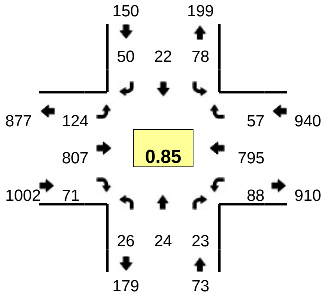
5-Min Count Period Beginning At	Ivy Dr (Northbound) Left	Thru	Right	U	Ivy Dr (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	3	0	2	0	6	146	0	0	0	61	0	0	218	
4:05 PM	0	0	0	0	2	0	6	0	13	117	0	0	0	56	1	0	195	
4:10 PM	0	0	0	0	1	0	5	0	5	102	0	0	0	44	1	0	158	
4:15 PM	0	0	0	0	0	0	8	0	8	126	0	0	0	44	0	0	186	
4:20 PM	0	0	0	0	0	0	7	0	5	109	0	0	0	57	1	0	179	
4:25 PM	0	0	0	0	2	0	16	0	4	110	0	0	0	52	3	0	187	
4:30 PM	0	0	0	0	1	0	9	0	9	105	0	0	0	59	0	0	183	
4:35 PM	0	0	0	0	1	0	12	0	9	103	0	0	0	63	1	0	189	
4:40 PM	0	0	0	0	1	0	10	0	3	123	0	0	0	74	1	0	212	
4:45 PM	0	0	0	0	2	0	9	0	3	127	0	0	0	75	2	0	218	
4:50 PM	0	0	0	0	3	0	7	0	8	122	0	0	0	68	4	0	212	
4:55 PM	0	0	0	0	0	0	8	1	4	102	0	0	0	60	3	0	178	2315
5:00 PM	0	0	0	0	0	0	7	0	5	112	0	0	0	87	1	0	212	2309
5:05 PM	0	0	0	0	2	0	10	0	4	88	0	0	0	62	0	0	166	2280
5:10 PM	0	0	0	0	6	0	18	0	7	119	0	0	0	91	1	0	242	2364
5:15 PM	0	0	0	0	4	0	13	0	3	130	0	0	0	70	0	0	220	2398
5:20 PM	0	0	0	0	3	0	13	0	6	73	0	0	0	97	0	0	192	2411
5:25 PM	0	0	0	0	6	0	17	0	7	111	0	0	0	67	1	0	209	2433
5:30 PM	0	0	0	0	2	0	17	0	7	112	0	0	0	74	1	0	213	2463
5:35 PM	0	0	0	0	3	0	12	0	11	120	0	0	0	60	1	0	207	2481
5:40 PM	0	0	0	0	5	0	15	0	1	97	0	0	0	86	1	0	205	2474
5:45 PM	0	0	0	0	0	0	8	0	10	70	0	0	0	71	2	0	161	2417
5:50 PM	0	0	0	0	2	0	15	0	4	117	0	0	0	50	1	0	189	2394
5:55 PM	0	0	0	0	4	0	14	0	4	92	0	0	0	90	3	0	207	2423

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	52	0	176	0	64	1288	0	0	0	1032	4	0	2616
Heavy Trucks	0	0	0		0	0	4		0	28	0		0	28	0		60
Pedestrians		0				8				8				36			52
Bicycles	0	0	0		0	0	0		0	1	0		0	2	0		3
Railroad																	
Stopped Buses																	

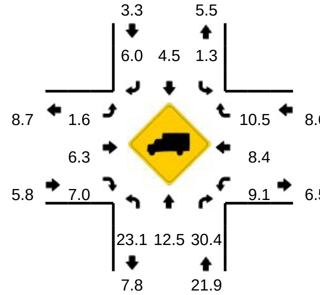
Comments: none

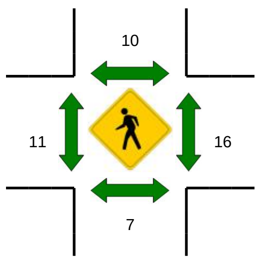
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

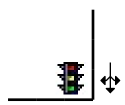
LOCATION: Hamilton Ave -- Willow Rd | **QC JOB #:** 12899573
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

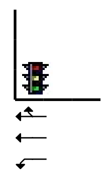


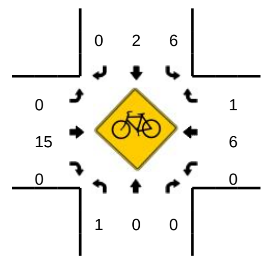
Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:35 AM -- 8:50 AM

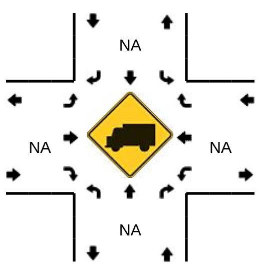


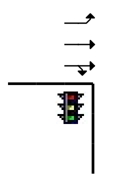


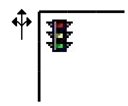


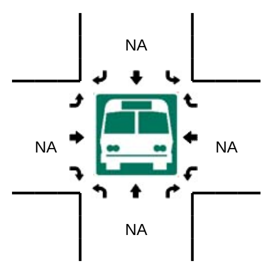












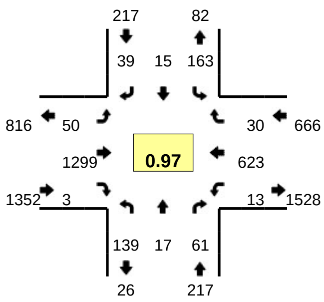
5-Min Count Period Beginning At	Hamilton Ave (Northbound) Left	Thru	Right	U	Hamilton Ave (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	1	2	0	0	3	4	1	0	3	33	8	2	4	112	4	0	177	
7:05 AM	1	0	1	0	8	1	4	0	5	31	2	0	4	131	4	1	193	
7:10 AM	1	2	3	0	8	4	7	0	3	41	10	0	5	111	3	0	198	
7:15 AM	3	1	3	0	5	3	11	0	8	46	7	1	1	98	8	1	196	
7:20 AM	0	1	0	0	7	5	6	0	12	37	10	0	2	86	3	0	169	
7:25 AM	2	1	2	0	4	4	3	0	11	43	5	0	1	115	8	1	200	
7:30 AM	3	3	1	0	9	1	7	0	12	33	4	1	6	72	5	0	157	
7:35 AM	1	1	2	0	11	2	5	0	8	40	3	0	1	68	7	0	149	
7:40 AM	0	3	3	0	7	4	4	0	11	64	3	0	0	52	0	0	151	
7:45 AM	3	2	1	0	11	5	4	0	8	44	4	0	7	69	4	0	162	
7:50 AM	0	0	6	0	3	2	4	0	10	61	5	0	4	60	6	0	161	
7:55 AM	5	2	5	0	5	6	3	0	14	55	3	0	7	54	3	1	163	2076
8:00 AM	1	3	1	0	7	1	2	0	15	62	4	0	5	45	2	0	148	2047
8:05 AM	1	3	1	0	7	2	4	0	12	58	9	0	9	42	4	1	153	2007
8:10 AM	2	2	3	0	12	0	4	0	6	76	7	0	4	35	3	1	155	1964
8:15 AM	0	3	4	0	11	4	3	0	14	54	3	0	7	64	2	0	169	1937
8:20 AM	5	1	0	0	5	1	4	0	10	64	7	2	10	32	4	0	145	1913
8:25 AM	0	3	2	0	5	3	3	0	9	74	8	1	5	60	2	0	175	1888
8:30 AM	1	1	1	0	4	4	6	0	11	66	3	0	7	75	9	0	188	1919
8:35 AM	3	1	1	0	4	2	10	0	7	74	6	0	5	106	5	0	224	1994
8:40 AM	5	1	3	0	7	2	3	0	13	69	6	2	6	84	4	0	205	2048
8:45 AM	0	2	3	0	6	0	3	0	7	67	3	1	11	95	7	0	205	2091
8:50 AM	4	0	0	0	5	0	2	0	6	78	9	0	3	67	4	0	178	2108
8:55 AM	4	4	4	0	5	3	6	0	8	65	6	0	14	90	11	0	220	2165

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	32	16	28	0	68	16	64	0	108	840	60	12	88	1140	64	0	2536
Heavy Trucks	8	4	4		0	0	0		4	68	4		4	88	4		188
Pedestrians		8				4				4				28			44
Bicycles	0	0	0		3	1	0		0	4	0		0	1	0		9
Railroad																	
Stopped Buses																	

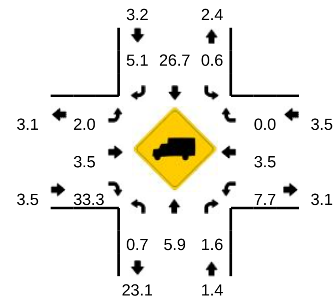
Comments: none

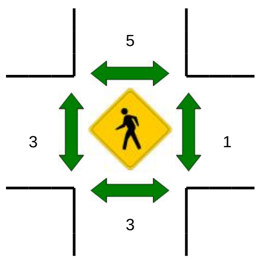
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

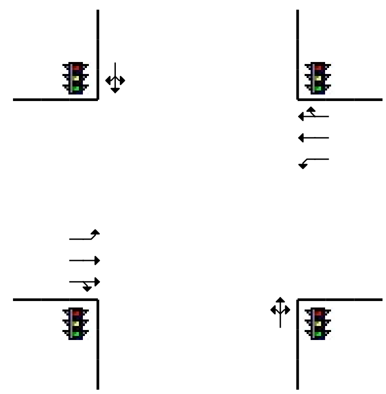
LOCATION: Hamilton Ave -- Willow Rd | **QC JOB #:** 12899574
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

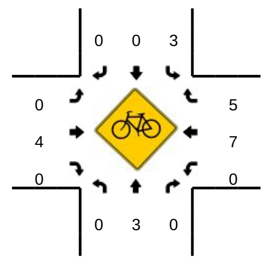


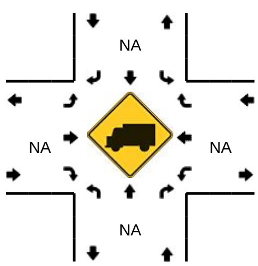
Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

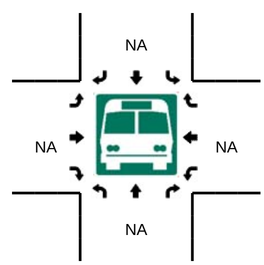












5-Min Count Period Beginning At	Hamilton Ave (Northbound) Left	Thru	Right	U	Hamilton Ave (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	4	0	1	0	5	0	4	0	7	142	0	4	2	39	1	0	209	
4:05 PM	12	4	3	0	9	2	4	0	4	86	1	1	2	32	1	0	161	
4:10 PM	9	1	4	0	11	0	3	0	1	82	0	1	3	42	2	2	161	
4:15 PM	2	2	3	0	4	1	4	0	9	140	0	1	0	55	11	0	232	
4:20 PM	12	0	1	0	7	1	4	0	3	83	0	0	0	33	3	0	147	
4:25 PM	9	1	2	0	4	2	4	0	2	92	0	1	4	49	6	0	176	
4:30 PM	8	0	6	0	10	0	4	0	5	110	0	2	1	37	3	1	187	
4:35 PM	8	0	5	0	5	1	3	0	3	113	0	1	0	58	5	0	202	
4:40 PM	12	1	5	0	9	0	7	0	3	129	0	0	1	50	4	0	221	
4:45 PM	16	0	3	0	10	0	6	0	3	80	1	0	1	45	1	0	166	
4:50 PM	14	0	3	0	7	3	6	0	6	146	1	2	3	48	5	1	245	
4:55 PM	11	1	9	0	16	1	3	0	2	70	1	0	1	47	4	0	166	2273
5:00 PM	9	2	4	0	10	0	1	0	2	111	0	4	0	59	0	0	202	2266
5:05 PM	19	0	1	0	17	1	5	0	4	139	0	3	0	45	1	1	236	2341
5:10 PM	8	2	3	0	14	0	4	0	3	90	0	3	1	36	2	1	167	2347
5:15 PM	16	2	4	0	17	0	0	0	3	103	0	0	1	57	0	0	203	2318
5:20 PM	11	2	11	0	16	4	2	0	2	118	0	2	0	66	3	0	237	2408
5:25 PM	6	1	6	0	16	1	2	0	4	90	0	1	0	56	2	2	187	2419
5:30 PM	10	2	5	0	16	1	3	0	2	94	0	0	0	56	6	0	195	2427
5:35 PM	7	4	7	0	15	4	0	0	1	129	0	0	0	58	2	0	227	2452
5:40 PM	8	0	7	0	18	0	3	0	4	85	0	0	0	58	3	0	186	2417
5:45 PM	5	2	1	0	17	0	3	0	4	66	0	0	0	48	0	1	147	2398
5:50 PM	7	1	4	0	17	2	3	0	2	135	0	0	0	66	3	0	240	2393
5:55 PM	8	1	4	0	19	2	1	0	3	119	0	0	0	46	6	0	209	2436

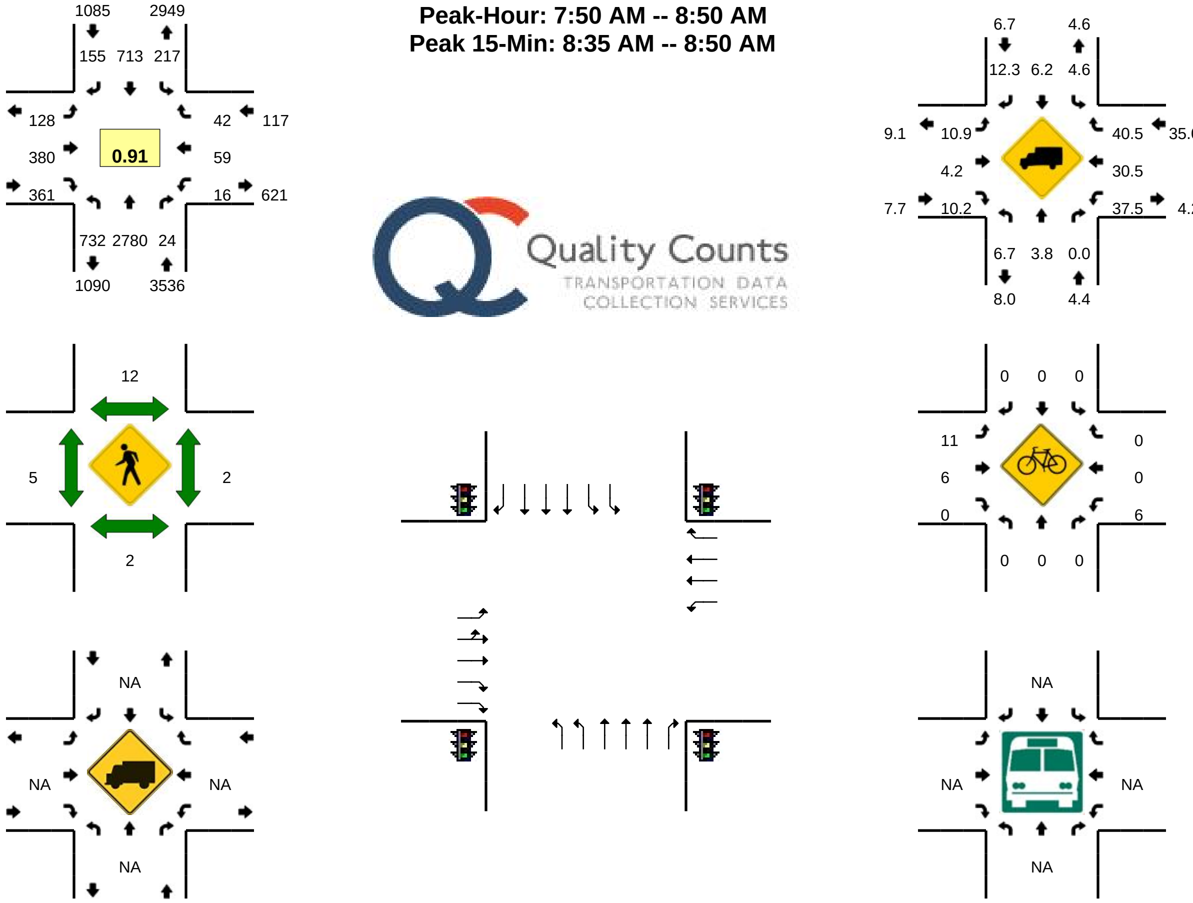
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	168	4	44	0	104	12	76	0	48	1420	8	8	20	572	40	4	2528
Heavy Trucks	4	0	0		0	0	4		4	64	4		4	20	0		104
Pedestrians		8				4				4				0			16
Bicycles	0	0	0		0	0	0		0	2	0		0	0	0		2
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Bayfront Expressway -- Willow Rd | **QC JOB #:** 12899575
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:50 AM -- 8:50 AM
Peak 15-Min: 8:35 AM -- 8:50 AM



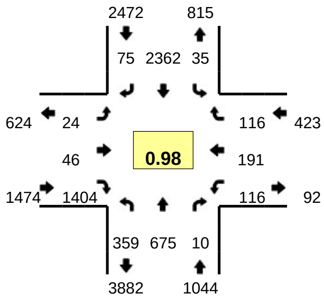
5-Min Count Period Beginning At	Bayfront Expressway (Northbound) Left	Thru	Right	U	Bayfront Expressway (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	141	237	1	0	9	36	1	0	7	8	28	0	0	1	0	0	469	
7:05 AM	123	190	2	0	3	32	4	0	9	6	28	0	1	4	1	0	403	
7:10 AM	123	196	2	0	8	47	3	0	11	9	35	1	0	1	2	0	438	
7:15 AM	89	219	0	0	8	53	11	1	4	19	26	0	0	2	3	0	435	
7:20 AM	100	247	3	0	4	51	6	0	7	7	17	0	2	2	3	0	449	
7:25 AM	101	235	3	0	6	47	5	0	9	13	46	0	0	0	2	0	467	
7:30 AM	101	230	1	0	6	54	12	0	3	13	20	0	1	3	3	0	447	
7:35 AM	76	245	0	0	12	44	5	0	16	9	33	0	1	0	2	0	443	
7:40 AM	33	274	0	0	6	53	3	0	10	19	37	0	0	1	0	0	436	
7:45 AM	92	238	4	0	10	63	16	0	2	8	37	0	1	7	2	0	480	
7:50 AM	52	279	2	0	8	56	10	0	19	15	33	0	0	1	2	0	477	
7:55 AM	61	196	0	0	13	83	9	0	16	21	31	0	0	2	5	0	437	5381
8:00 AM	30	232	1	0	6	38	11	0	10	30	31	1	3	7	4	0	404	5316
8:05 AM	33	260	6	0	11	75	10	0	14	29	28	0	1	5	2	0	474	5387
8:10 AM	44	230	2	0	19	48	13	0	13	26	31	0	4	9	7	0	446	5395
8:15 AM	47	268	0	0	13	63	15	0	11	22	32	0	1	5	1	0	478	5438
8:20 AM	67	205	4	0	26	70	20	0	7	41	27	0	2	6	5	0	480	5469
8:25 AM	34	192	1	0	25	66	13	0	12	45	21	0	0	3	5	0	417	5419
8:30 AM	56	234	1	0	10	46	14	0	6	45	33	0	1	4	2	0	452	5424
8:35 AM	122	266	2	0	31	54	8	0	3	25	41	0	2	1	1	0	556	5537
8:40 AM	63	171	5	0	23	66	15	0	9	38	30	0	2	9	5	0	436	5537
8:45 AM	123	247	0	0	32	48	17	0	7	43	23	0	0	7	3	0	550	5607
8:50 AM	36	204	3	0	28	64	12	0	5	42	25	0	0	2	1	0	422	5552
8:55 AM	100	213	6	0	10	30	9	0	6	41	36	0	2	6	4	0	463	5578

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	1232	2736	28	0	344	672	160	0	76	424	376	0	16	68	36	0	6168
Heavy Trucks	96	76	0		16	56	16		24	8	60		0	12	4		368
Pedestrians		0				16				4				8			28
Bicycles	0	0	0		0	0	0		0	6	0		0	0	0		6
Railroad																	
Stopped Buses																	

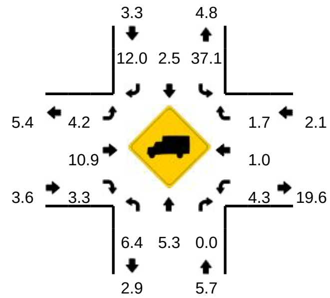
Comments: none

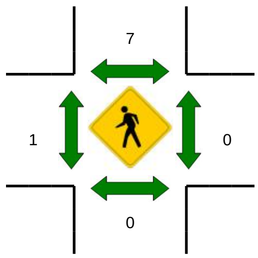
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

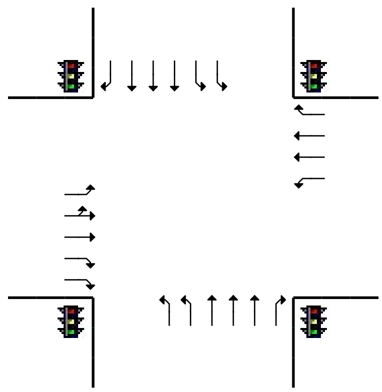
LOCATION: Bayfront Expressway -- Willow Rd | **QC JOB #:** 12899576
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

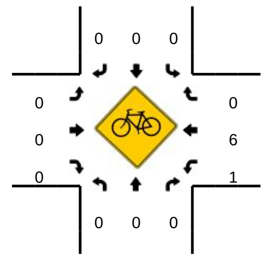


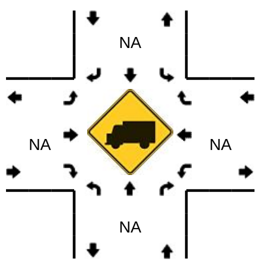
Peak-Hour: 4:20 PM -- 5:20 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

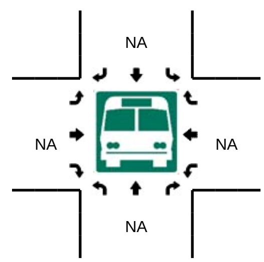












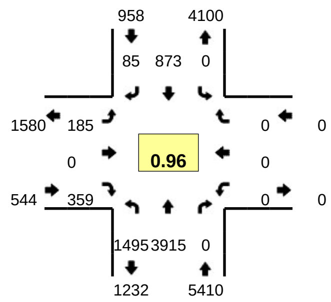
5-Min Count Period Beginning At	Bayfront Expressway (Northbound) Left	Thru	Right	U	Bayfront Expressway (Southbound) Left	Thru	Right	U	Willow Rd (Eastbound) Left	Thru	Right	U	Willow Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	17	42	0	0	6	126	10	0	5	6	126	0	11	16	8	0	373	
4:05 PM	12	49	1	0	6	283	8	0	5	1	68	0	2	7	6	0	448	
4:10 PM	43	54	0	0	1	147	2	0	4	6	146	0	5	11	4	0	423	
4:15 PM	23	39	2	0	5	168	7	0	9	8	93	0	8	23	9	0	394	
4:20 PM	17	71	0	0	1	277	4	0	0	1	74	0	8	12	7	0	472	
4:25 PM	38	58	1	0	4	147	8	0	1	4	136	0	3	9	11	1	421	
4:30 PM	16	62	2	0	4	253	3	0	3	5	76	0	20	23	10	0	477	
4:35 PM	40	52	1	1	2	124	13	0	5	1	150	0	5	15	9	0	418	
4:40 PM	24	52	0	0	4	180	10	0	2	8	110	0	17	21	13	0	441	
4:45 PM	35	59	0	0	1	238	6	0	2	4	107	0	7	12	7	0	478	
4:50 PM	29	65	0	0	1	144	8	0	2	6	145	0	10	22	6	0	438	
4:55 PM	15	50	2	0	3	279	8	0	2	0	74	0	4	17	14	0	468	5251
5:00 PM	39	56	3	0	2	163	4	0	1	5	147	0	8	13	9	0	450	5328
5:05 PM	24	34	0	0	5	152	4	0	1	7	126	0	18	22	12	0	405	5285
5:10 PM	18	56	0	0	4	250	5	0	3	4	97	0	7	10	9	0	463	5325
5:15 PM	63	60	1	0	4	155	2	0	2	1	162	0	8	15	9	0	482	5413
5:20 PM	25	44	1	0	1	149	3	0	5	5	119	0	18	24	11	0	405	5346
5:25 PM	24	65	2	0	3	251	7	0	4	5	88	0	4	18	7	0	478	5403
5:30 PM	57	52	3	0	4	184	1	0	1	1	149	0	10	14	5	0	481	5407
5:35 PM	33	46	0	0	1	142	3	0	6	7	138	0	20	19	4	0	419	5408
5:40 PM	25	51	2	0	8	201	2	0	1	4	66	0	17	16	16	0	409	5376
5:45 PM	37	67	3	0	0	207	1	0	0	3	95	0	10	15	8	0	446	5344
5:50 PM	51	49	2	0	5	75	0	0	1	8	168	0	5	11	6	0	381	5287
5:55 PM	29	62	0	0	3	163	0	0	2	3	99	0	14	24	15	0	414	5233

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	316	696	8	0	20	2644	88	0	24	40	1304	0	84	204	108	0	5536
Heavy Trucks	20	40	0		8	64	4		0	8	40		0	0	0		184
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

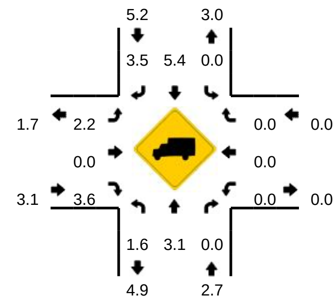
Comments: none

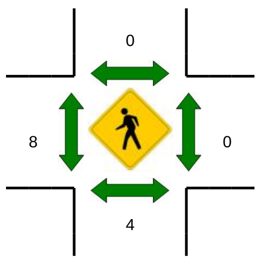
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

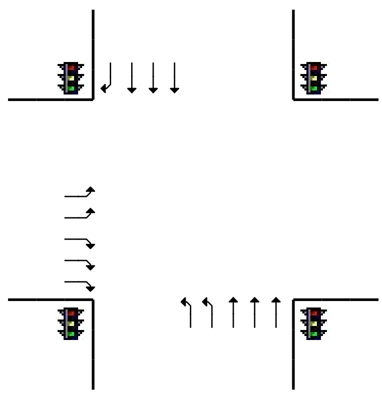
LOCATION: Bayfront Expressway -- University Ave **QC JOB #:** 12899577
CITY/STATE: Menlo Park, CA **DATE:** Tue, Sep 30 2014

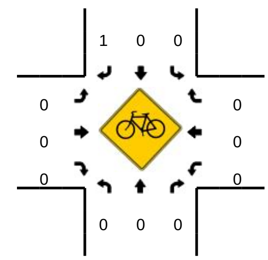


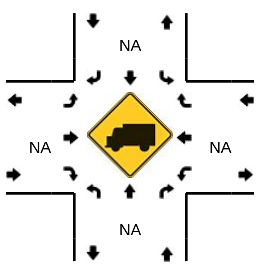
Peak-Hour: 7:00 AM -- 8:00 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

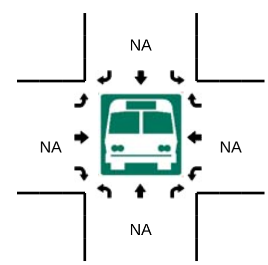












5-Min Count Period Beginning At	Bayfront Expressway (Northbound) Left	Thru	Right	U	Bayfront Expressway (Southbound) Left	Thru	Right	U	University Ave (Eastbound) Left	Thru	Right	U	University Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	114	349	0	0	0	72	4	0	5	0	29	0	0	0	0	0	573	
7:05 AM	132	303	0	0	0	36	3	0	10	0	34	0	0	0	0	0	518	
7:10 AM	121	346	0	0	0	62	6	0	18	0	25	0	0	0	0	0	578	
7:15 AM	113	316	0	0	0	96	7	0	19	0	21	0	0	0	0	0	572	
7:20 AM	122	347	0	0	0	70	4	0	18	0	32	0	0	0	0	0	593	
7:25 AM	106	313	0	0	0	80	4	0	25	0	31	0	0	0	0	0	559	
7:30 AM	141	360	0	0	0	84	5	0	12	0	24	0	0	0	0	0	626	
7:35 AM	141	317	0	0	0	55	11	0	26	0	34	0	0	0	0	0	584	
7:40 AM	72	291	0	0	0	95	6	0	15	0	33	0	0	0	0	0	512	
7:45 AM	138	370	0	0	0	89	15	0	8	0	28	0	0	0	0	0	648	
7:50 AM	154	310	0	0	0	51	8	0	18	0	35	0	0	0	0	0	576	
7:55 AM	141	293	0	0	0	83	12	0	11	0	33	0	0	0	0	0	573	6912
8:00 AM	111	283	0	0	0	94	15	0	19	0	25	0	0	0	0	0	547	6886
8:05 AM	101	251	0	0	0	96	20	0	19	0	28	0	0	0	0	0	515	6883
8:10 AM	138	274	0	0	0	71	12	0	15	0	27	0	0	0	0	0	537	6842
8:15 AM	146	288	0	0	0	47	12	0	10	0	47	0	0	0	0	0	550	6820
8:20 AM	140	288	0	0	0	77	9	0	14	0	29	1	0	0	0	0	558	6785
8:25 AM	136	287	0	0	0	93	11	0	9	0	33	2	0	0	0	0	571	6797
8:30 AM	106	256	0	0	0	101	9	0	10	0	35	0	0	0	0	0	517	6688
8:35 AM	137	310	0	0	0	77	9	0	14	0	21	0	0	0	0	0	568	6672
8:40 AM	137	322	0	0	0	72	10	0	5	0	27	0	0	0	0	0	573	6733
8:45 AM	127	307	0	0	0	60	6	0	21	0	23	0	0	0	0	0	544	6629
8:50 AM	138	313	0	0	0	72	13	0	12	0	32	0	0	0	0	0	580	6633
8:55 AM	81	242	0	0	0	88	18	0	12	0	31	0	0	0	0	0	472	6532

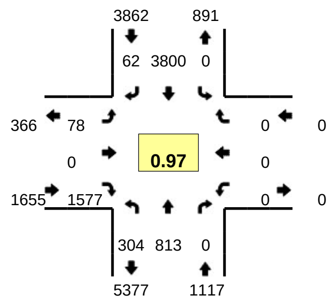
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	1732	3892	0	0	0	892	140	0	148	0	384	0	0	0	0	0	7188
Heavy Trucks	24	136	0		0	56	8		0	0	16		0	0	0		240
Pedestrians		4				0				12				0			16
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

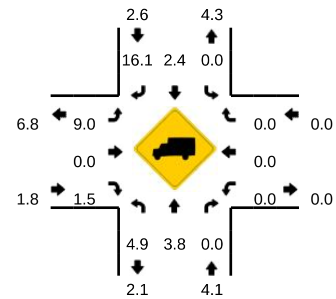
Comments: none

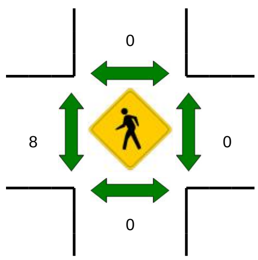
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

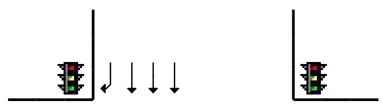
LOCATION: Bayfront Expressway -- University Ave | **QC JOB #:** 12899578
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

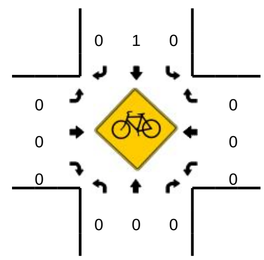
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

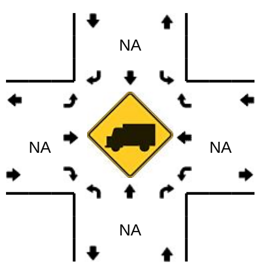


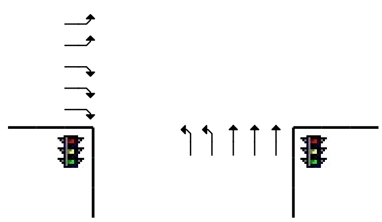


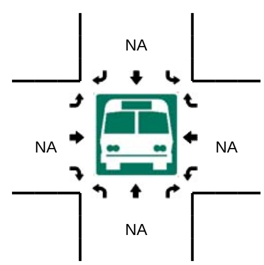












5-Min Count Period Beginning At	Bayfront Expressway (Northbound) Left	Thru	Right	U	Bayfront Expressway (Southbound) Left	Thru	Right	U	University Ave (Eastbound) Left	Thru	Right	U	University Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	21	58	0	0	0	327	7	0	3	0	65	0	0	0	0	0	481	
4:05 PM	22	54	0	0	0	285	8	0	11	0	108	0	0	0	0	0	488	
4:10 PM	26	75	0	0	0	295	6	0	9	0	135	0	0	0	0	0	546	
4:15 PM	41	60	0	0	0	264	6	0	4	0	140	0	0	0	0	0	515	
4:20 PM	23	81	0	0	0	295	9	0	6	0	143	0	0	0	0	0	557	
4:25 PM	23	70	0	0	0	306	6	0	7	0	121	0	0	0	0	0	533	
4:30 PM	32	79	0	0	0	337	12	0	3	0	109	0	0	0	0	0	572	
4:35 PM	28	64	0	0	0	327	7	0	7	0	120	0	0	0	0	0	553	
4:40 PM	17	59	0	0	0	298	3	0	11	0	125	0	0	0	0	0	513	
4:45 PM	21	70	0	0	0	301	8	0	19	0	156	0	0	0	0	0	575	
4:50 PM	52	86	0	0	0	297	3	0	6	0	156	0	0	0	0	0	600	
4:55 PM	20	54	0	0	0	272	6	0	8	0	172	0	0	0	0	0	532	6465
5:00 PM	24	56	0	0	0	324	6	0	5	0	127	0	0	0	0	0	542	6526
5:05 PM	19	53	0	0	0	329	4	0	2	0	105	0	0	0	0	0	512	6550
5:10 PM	25	72	0	0	0	347	5	0	2	0	107	0	0	0	0	0	558	6562
5:15 PM	22	84	0	0	0	308	4	0	3	0	152	0	0	0	0	0	573	6620
5:20 PM	23	69	0	0	0	327	3	0	9	0	135	0	0	0	0	0	566	6629
5:25 PM	21	67	0	0	0	333	1	0	3	0	113	0	0	0	0	0	538	6634
5:30 PM	30	69	0	0	0	347	3	0	4	0	118	0	0	0	0	0	571	6633
5:35 PM	32	65	0	0	0	233	0	0	8	0	139	0	0	0	0	0	477	6557
5:40 PM	34	71	0	0	0	253	2	0	4	0	179	0	0	0	0	0	543	6587
5:45 PM	23	75	0	0	0	279	3	0	4	0	79	0	0	0	0	0	463	6475
5:50 PM	33	81	0	0	0	289	0	0	3	0	115	0	0	0	0	0	521	6396
5:55 PM	35	73	0	0	0	271	2	0	6	0	113	0	0	0	0	0	500	6364

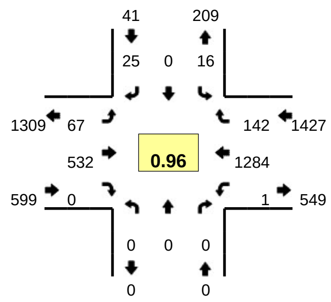
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	372	840	0	0	0	3480	68	0	132	0	1936	0	0	0	0	0	6828
Heavy Trucks	16	44	0		0	100	8		16	0	24		0	0	0		208
Pedestrians		0				0				12				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments: none

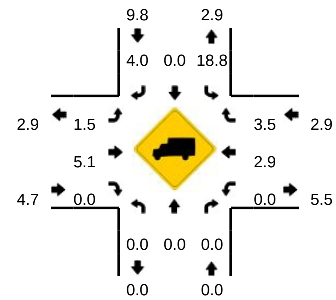
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

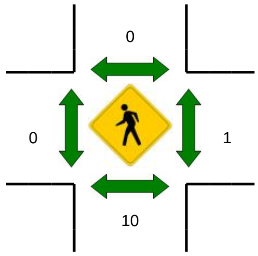
LOCATION: O'Brien Dr -- University Ave | **QC JOB #:** 12899579

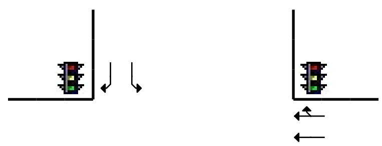
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

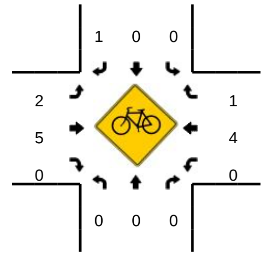


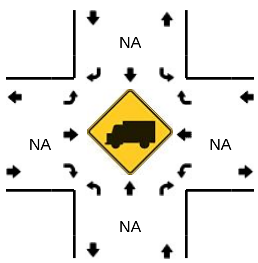
Peak-Hour: 7:50 AM -- 8:50 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

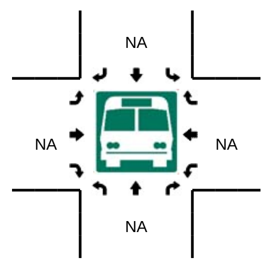












5-Min Count Period Beginning At	O'Brien Dr (Northbound) Left	Thru	Right	U	O'Brien Dr (Southbound) Left	Thru	Right	U	University Ave (Eastbound) Left	Thru	Right	U	University Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	0	0	0	0	5	31	0	0	0	101	7	0	144	
7:05 AM	0	0	0	0	0	0	0	0	1	15	0	0	0	61	4	0	81	
7:10 AM	0	0	0	0	1	0	2	0	3	49	0	0	0	138	8	0	201	
7:15 AM	0	0	0	0	1	0	1	0	0	30	0	0	0	84	6	0	122	
7:20 AM	0	0	0	0	3	0	4	0	1	35	0	0	0	110	9	0	162	
7:25 AM	0	0	0	0	2	0	2	0	4	55	0	0	0	119	7	0	189	
7:30 AM	0	0	0	0	1	0	3	0	3	41	0	0	0	121	11	0	180	
7:35 AM	0	0	0	0	0	0	3	0	3	55	0	0	0	117	11	0	189	
7:40 AM	0	0	0	0	2	0	0	0	2	39	0	0	0	95	4	0	142	
7:45 AM	0	0	0	0	1	0	1	0	5	48	0	0	0	81	14	0	150	
7:50 AM	0	0	0	0	1	0	3	0	8	42	0	0	0	103	18	0	175	
7:55 AM	0	0	0	0	1	0	3	0	4	37	0	0	0	103	15	0	163	1898
8:00 AM	0	0	0	0	2	0	1	0	7	47	0	0	0	121	20	0	198	1952
8:05 AM	0	0	0	0	4	0	2	0	5	58	0	0	0	74	10	0	153	2024
8:10 AM	0	0	0	0	1	0	1	0	8	43	0	0	0	116	15	0	184	2007
8:15 AM	0	0	0	0	1	0	0	0	3	46	0	0	0	108	13	0	171	2056
8:20 AM	0	0	0	0	0	0	1	0	7	54	0	0	0	96	9	0	167	2061
8:25 AM	0	0	0	0	0	0	1	0	6	40	0	0	0	108	11	0	166	2038
8:30 AM	0	0	0	0	1	0	1	0	5	51	0	0	0	123	9	1	191	2049
8:35 AM	0	0	0	0	1	0	4	0	3	32	0	0	0	120	3	0	163	2023
8:40 AM	0	0	0	0	1	0	6	0	4	32	0	0	0	118	10	0	171	2052
8:45 AM	0	0	0	0	3	0	2	0	7	50	0	0	0	94	9	0	165	2067
8:50 AM	0	0	0	0	1	0	2	0	1	42	0	0	0	100	8	0	154	2046
8:55 AM	0	0	0	0	0	0	3	0	13	25	0	0	0	79	1	0	121	2004

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	16	0	28	0	76	504	0	0	0	1308	212	0	2144
Heavy Trucks	0	0	0		4	0	0		0	12	0		0	60	8		84
Pedestrians		12				0				0				0			12
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

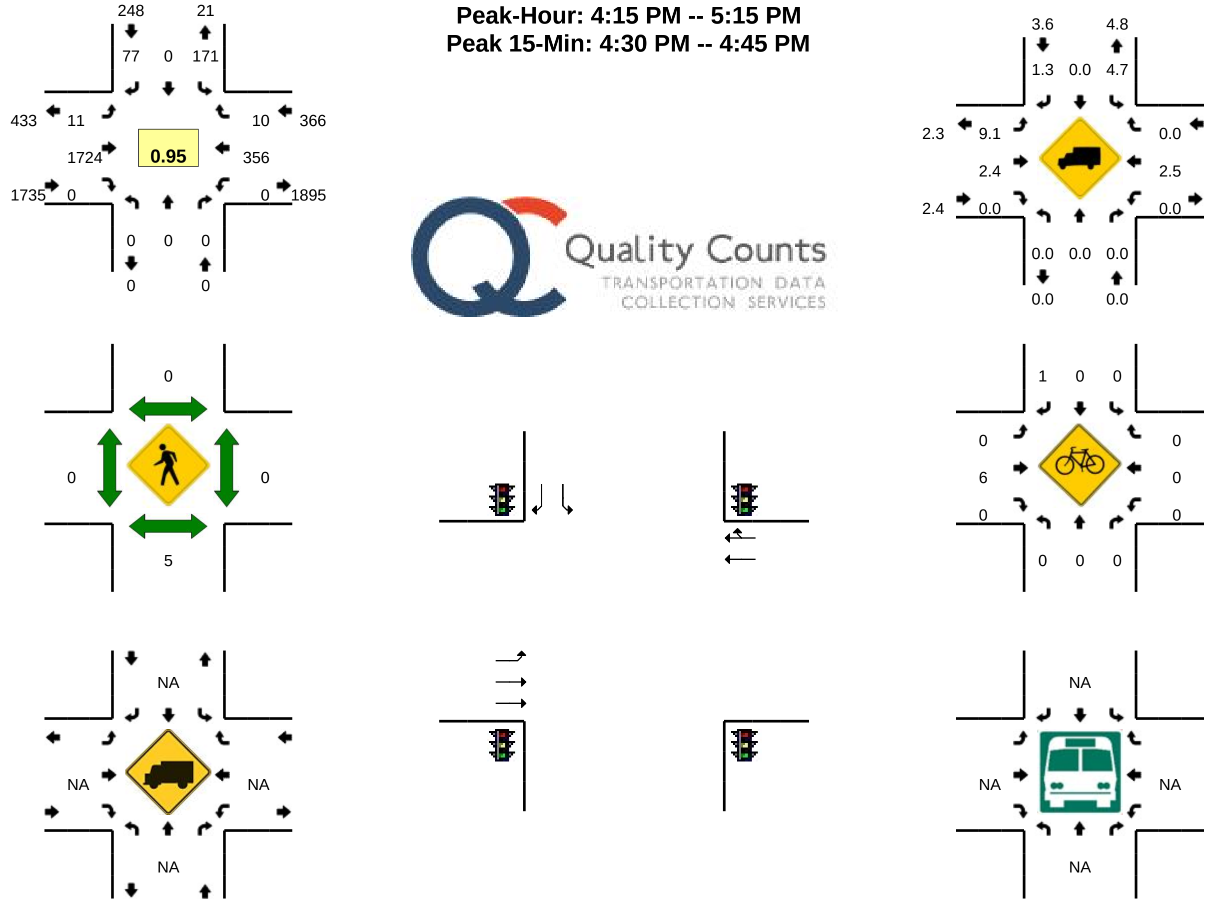
Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: O'Brien Dr -- University Ave | **QC JOB #:** 12899580

CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:30 PM -- 4:45 PM



5-Min Count Period Beginning At	O'Brien Dr (Northbound) Left	Thru	Right	U	O'Brien Dr (Southbound) Left	Thru	Right	U	University Ave (Eastbound) Left	Thru	Right	U	University Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	7	0	3	0	2	96	0	0	0	34	2	0	144	
4:05 PM	0	0	0	0	10	0	5	0	0	126	0	0	0	47	0	0	188	
4:10 PM	0	0	0	0	9	0	13	0	1	105	0	0	0	33	1	2	164	
4:15 PM	0	0	0	0	12	0	3	0	3	122	0	0	0	31	1	0	172	
4:20 PM	0	0	0	0	8	0	3	0	1	180	0	0	0	19	0	0	211	
4:25 PM	0	0	0	0	7	0	8	0	0	137	0	0	0	26	2	0	180	
4:30 PM	0	0	0	0	14	0	10	0	0	150	0	0	0	34	1	0	209	
4:35 PM	0	0	0	0	13	0	2	0	0	161	0	0	0	36	1	0	213	
4:40 PM	0	0	0	0	19	0	7	0	1	118	0	0	0	49	1	0	195	
4:45 PM	0	0	0	0	15	0	3	0	0	137	0	0	0	24	1	0	180	
4:50 PM	0	0	0	0	9	0	6	0	1	148	0	0	0	35	0	0	199	
4:55 PM	0	0	0	0	17	0	5	0	2	147	0	0	0	24	0	0	195	2250
5:00 PM	0	0	0	0	20	0	10	0	0	159	0	0	0	25	0	0	214	2320
5:05 PM	0	0	0	0	21	0	8	0	1	139	0	0	0	28	3	0	200	2332
5:10 PM	0	0	0	0	16	0	12	0	2	126	0	0	0	25	0	0	181	2349
5:15 PM	0	0	0	0	13	0	11	0	0	102	0	0	0	25	0	0	151	2328
5:20 PM	0	0	0	0	21	0	10	0	0	123	0	0	0	44	0	0	198	2315
5:25 PM	0	0	0	0	11	0	10	0	1	127	0	0	0	30	1	0	180	2315
5:30 PM	0	0	0	0	12	0	5	0	1	101	0	0	0	34	1	0	154	2260
5:35 PM	0	0	0	0	8	0	6	0	0	104	0	0	0	30	0	0	148	2195
5:40 PM	0	0	0	0	9	0	4	0	0	128	0	0	0	23	2	1	167	2167
5:45 PM	0	0	0	0	8	0	2	0	2	131	0	0	0	23	0	0	166	2153
5:50 PM	0	0	0	0	15	0	7	0	2	91	0	0	0	33	0	0	148	2102
5:55 PM	0	0	0	0	3	0	5	0	0	109	0	0	0	36	1	0	154	2061

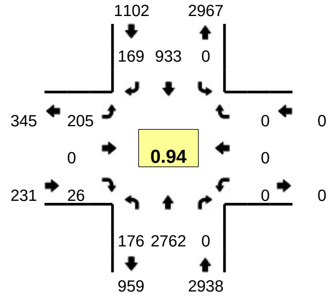
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	184	0	76	0	4	1716	0	0	0	476	12	0	2468
Heavy Trucks	0	0	0		4	0	0		0	48	0		0	12	0		64
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

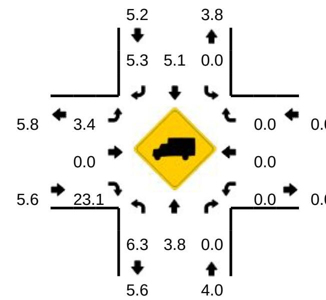
Comments: none

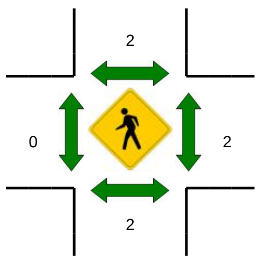
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

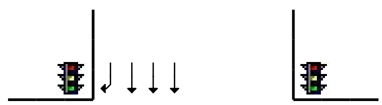
LOCATION: Bayfront Expressway -- Chilco St | **QC JOB #:** 12899581
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

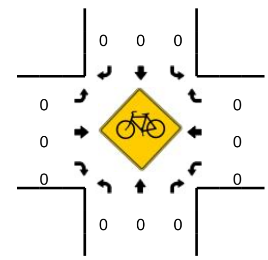
Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

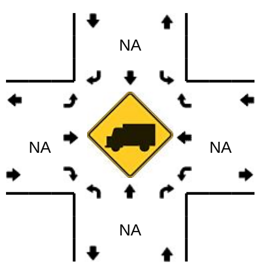


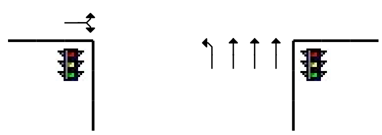


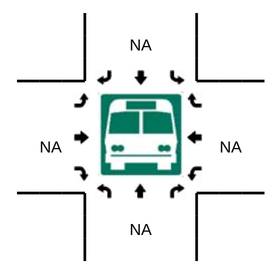












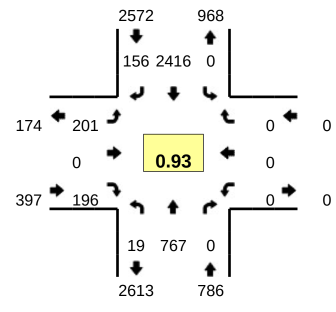
5-Min Count Period Beginning At	Bayfront Expressway (Northbound) Left	Thru	Right	U	Bayfront Expressway (Southbound) Left	Thru	Right	U	Chilco St (Eastbound) Left	Thru	Right	U	Chilco St (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	8	194	0	0	0	50	6	0	17	0	2	0	0	0	0	0	277	
7:05 AM	7	188	0	0	0	45	8	0	15	0	3	0	0	0	0	0	266	
7:10 AM	6	170	0	0	0	67	12	0	13	0	2	0	0	0	0	0	270	
7:15 AM	14	233	0	0	0	55	8	0	21	0	3	0	0	0	0	0	334	
7:20 AM	8	191	0	0	0	52	8	0	25	0	0	0	0	0	0	0	284	
7:25 AM	15	230	0	0	0	70	8	0	13	0	2	0	0	0	0	0	338	
7:30 AM	10	251	0	0	0	70	7	0	25	0	2	0	0	0	0	0	365	
7:35 AM	10	242	0	0	0	50	13	0	27	0	2	0	0	0	0	0	344	
7:40 AM	6	194	0	0	0	82	10	0	27	0	2	0	0	0	0	0	321	
7:45 AM	7	255	0	0	0	57	12	0	19	0	1	0	0	0	0	0	351	
7:50 AM	25	258	0	0	0	72	18	0	19	0	3	0	0	0	0	0	395	
7:55 AM	13	212	0	0	0	69	21	0	15	0	2	0	0	0	0	0	332	3877
8:00 AM	13	216	0	0	0	94	10	0	8	0	2	0	0	0	0	0	343	3943
8:05 AM	26	220	0	0	0	86	13	0	19	0	2	0	0	0	0	0	366	4043
8:10 AM	22	195	0	0	0	71	18	0	13	0	0	0	0	0	0	0	319	4092
8:15 AM	17	235	0	0	0	85	8	0	14	0	6	0	0	0	0	0	365	4123
8:20 AM	13	240	0	0	0	98	26	0	11	0	2	0	0	0	0	0	390	4229
8:25 AM	14	244	0	0	0	99	13	0	8	0	2	0	0	0	0	0	380	4271
8:30 AM	5	197	0	0	0	70	8	0	15	0	3	0	0	0	0	0	298	4204
8:35 AM	11	172	0	0	0	92	15	0	17	0	3	0	0	0	0	0	310	4170
8:40 AM	14	259	0	1	0	86	16	0	8	0	3	0	0	0	0	0	387	4236
8:45 AM	10	176	0	0	0	97	16	0	8	0	1	0	0	0	0	0	308	4193
8:50 AM	17	267	0	0	0	80	12	0	14	0	3	0	0	0	0	0	393	4191
8:55 AM	8	148	0	0	0	100	15	0	16	0	4	0	0	0	0	0	291	4150

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	176	2876	0	0	0	1128	188	0	132	0	40	0	0	0	0	0	4540
Heavy Trucks	4	116	0		0	56	16		8	0	12		0	0	0		212
Pedestrians		4				4				0				4			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

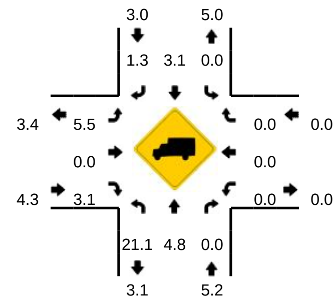
Comments: none

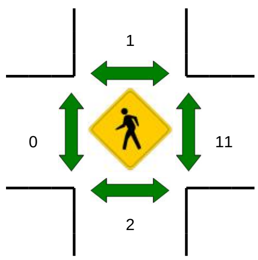
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

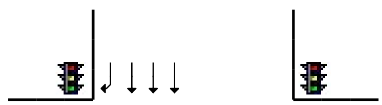
LOCATION: Bayfront Expressway -- Chilco St | **QC JOB #:** 12899582
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

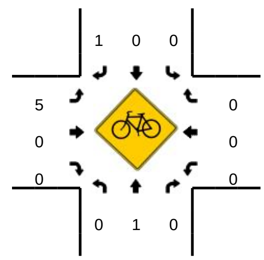


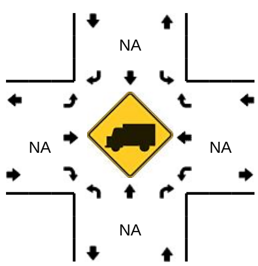
Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:35 PM -- 4:50 PM

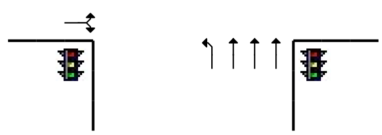


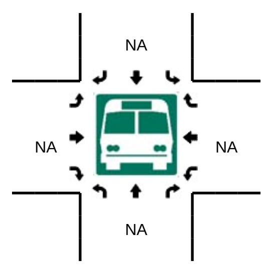












5-Min Count Period Beginning At	Bayfront Expressway (Northbound)				Bayfront Expressway (Southbound)				Chilco St (Eastbound)				Chilco St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	65	0	0	0	204	5	0	13	0	21	0	0	0	0	0	308	
4:05 PM	2	47	0	1	0	158	15	0	14	0	18	0	0	0	0	0	255	
4:10 PM	0	70	0	0	0	206	12	0	13	0	14	0	0	0	0	0	315	
4:15 PM	1	55	0	0	0	213	13	0	16	0	10	0	0	0	0	0	308	
4:20 PM	0	54	0	1	0	231	10	0	14	0	16	0	0	0	0	0	326	
4:25 PM	1	92	0	0	0	198	13	0	17	0	14	0	0	0	0	0	335	
4:30 PM	1	57	0	0	0	172	11	0	16	0	18	0	0	0	0	0	275	
4:35 PM	2	74	0	0	0	250	16	0	22	0	25	0	0	0	0	0	389	
4:40 PM	2	59	0	0	0	200	5	0	19	0	23	0	0	0	0	0	308	
4:45 PM	2	61	0	0	0	196	16	0	22	0	13	0	0	0	0	0	310	
4:50 PM	3	76	0	0	0	188	20	0	11	0	18	0	0	0	0	0	316	
4:55 PM	1	60	0	0	0	170	10	0	13	0	11	0	0	0	0	0	265	3710
5:00 PM	1	58	0	0	0	225	13	0	13	0	8	0	0	0	0	0	318	3720
5:05 PM	4	51	0	0	0	167	17	0	25	0	26	0	0	0	0	0	290	3755
5:10 PM	0	55	0	0	0	177	11	0	19	0	14	0	0	0	0	0	276	3716
5:15 PM	2	69	0	0	0	167	7	0	28	0	23	0	0	0	0	0	296	3704
5:20 PM	2	66	0	0	0	195	11	0	15	0	13	0	0	0	0	0	302	3680
5:25 PM	1	62	0	0	0	154	11	0	22	0	20	0	0	0	0	0	270	3615
5:30 PM	2	61	0	0	0	196	12	0	22	0	20	0	0	0	0	0	313	3653
5:35 PM	1	61	0	0	0	168	7	0	19	0	25	0	0	0	0	0	281	3545
5:40 PM	0	45	0	0	0	137	10	0	16	0	14	0	0	0	0	0	222	3459
5:45 PM	1	77	0	0	0	178	5	0	18	0	21	0	0	0	0	0	300	3449
5:50 PM	0	62	0	0	0	189	14	0	13	0	11	0	0	0	0	0	289	3422
5:55 PM	2	60	0	0	0	98	23	0	16	0	10	0	0	0	0	0	209	3366

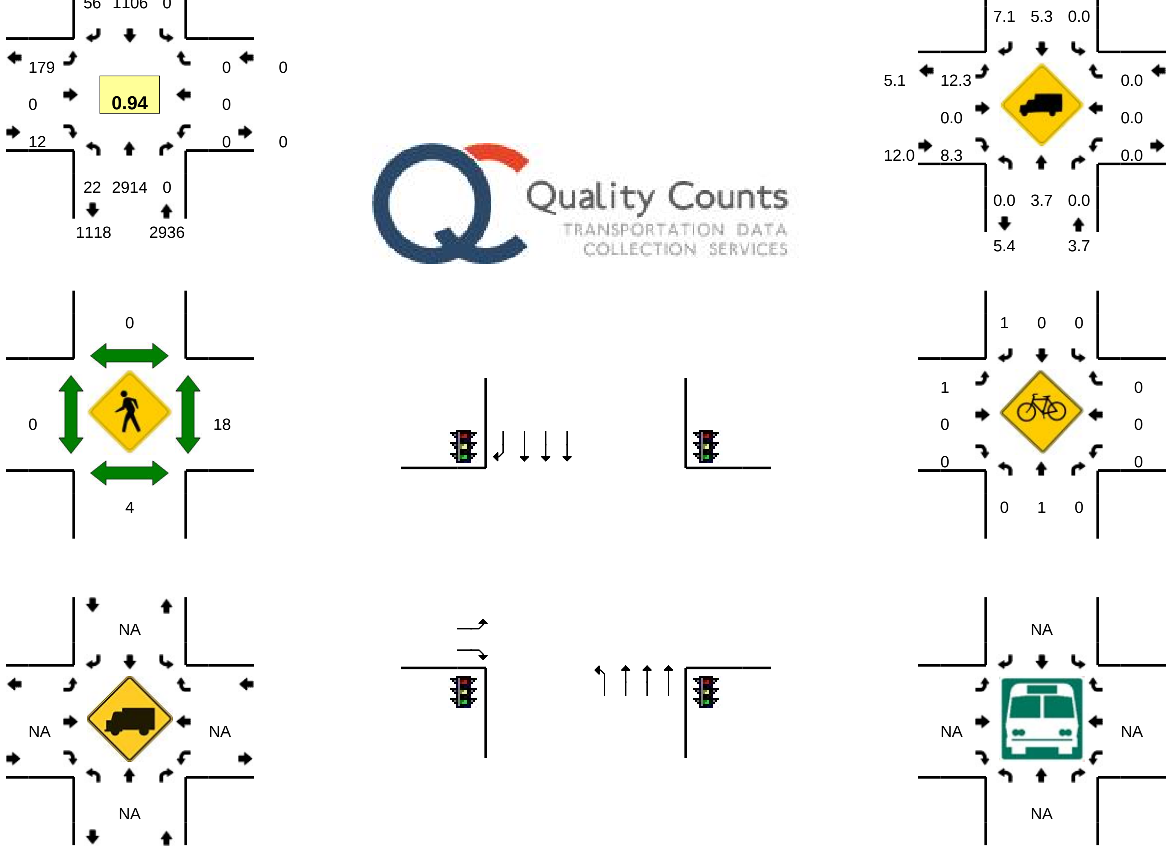
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	776	0	0	0	2584	148	0	252	0	244	0	0	0	0	0	4028
Heavy Trucks	8	56	0		0	80	0		12	0	4		0	0	0		160
Pedestrians		0				0				0				4			4
Bicycles	0	1	0		0	0	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Bayfront Expwy -- Chrysler Dr | **QC JOB #:** 12899583
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:40 AM -- 7:55 AM



5-Min Count Period Beginning At	Bayfront Expwy (Northbound) Left	Thru	Right	U	Bayfront Expwy (Southbound) Left	Thru	Right	U	Chrysler Dr (Eastbound) Left	Thru	Right	U	Chrysler Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	191	0	0	0	57	5	0	3	0	0	0	0	0	0	0	256	
7:05 AM	4	210	0	0	0	60	2	0	4	0	0	0	0	0	0	0	280	
7:10 AM	3	191	0	0	0	67	0	0	15	0	1	0	0	0	0	0	277	
7:15 AM	1	219	0	0	0	65	2	0	7	0	1	0	0	0	0	0	295	
7:20 AM	1	217	0	0	0	61	1	0	8	0	1	0	0	0	0	0	289	
7:25 AM	2	244	0	0	0	74	7	0	16	0	1	0	0	0	0	0	344	
7:30 AM	1	235	0	0	0	78	6	0	14	0	1	0	0	0	0	0	335	
7:35 AM	1	234	0	0	0	64	5	0	15	0	1	0	0	0	0	0	320	
7:40 AM	1	271	0	0	0	94	4	0	16	0	0	0	0	0	0	0	386	
7:45 AM	0	249	0	0	0	81	3	0	18	0	1	0	0	0	0	0	352	
7:50 AM	4	280	0	0	0	104	2	0	14	0	0	0	0	0	0	0	404	
7:55 AM	2	223	0	0	0	77	5	0	19	0	2	0	0	0	0	0	328	3866
8:00 AM	1	227	0	0	0	96	4	0	13	0	0	0	0	0	0	0	341	3951
8:05 AM	3	236	0	0	0	96	7	0	25	0	1	0	0	0	0	0	368	4039
8:10 AM	2	213	0	0	0	95	4	0	13	0	0	0	0	0	0	0	327	4089
8:15 AM	3	282	0	0	0	85	7	0	11	0	3	0	0	0	0	0	391	4185
8:20 AM	0	231	0	0	0	124	6	0	13	0	1	0	0	0	0	0	375	4271
8:25 AM	4	233	0	0	0	112	3	0	8	0	2	0	0	0	0	0	362	4289
8:30 AM	2	214	0	0	0	83	4	0	11	0	0	0	0	0	0	0	314	4268
8:35 AM	1	219	0	0	0	100	2	0	16	0	1	0	0	0	0	0	339	4287
8:40 AM	0	243	0	0	0	102	5	0	10	0	0	0	0	0	0	0	360	4261
8:45 AM	2	214	0	0	0	112	5	0	8	0	1	0	0	0	0	0	342	4251
8:50 AM	3	238	0	0	0	103	3	0	6	0	0	0	0	0	0	0	353	4200
8:55 AM	6	201	0	0	0	117	6	0	13	0	1	0	0	0	0	0	344	4216

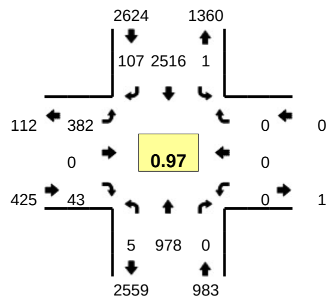
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	20	3200	0	0	0	1116	36	0	192	0	4	0	0	0	0	0	4568
Heavy Trucks	0	72	0		0	96	4		40	0	0		0	0	0		212
Pedestrians		0				0				0				16			16
Bicycles	0	0	0		0	0	1		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

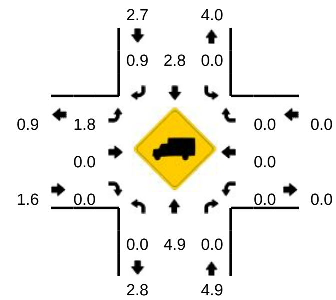
Comments: none

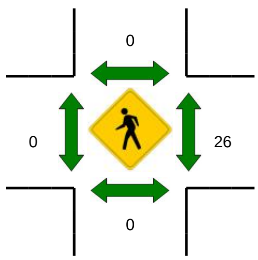
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

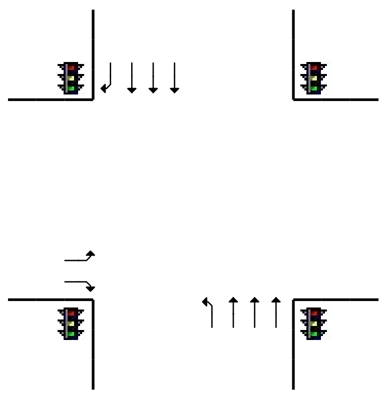
LOCATION: Bayfront Expressway -- Chrysler Dr — **QC JOB #:** 12899584
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

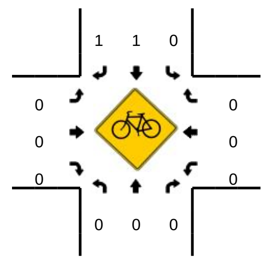
Peak-Hour: 4:25 PM -- 5:25 PM
Peak 15-Min: 4:35 PM -- 4:50 PM

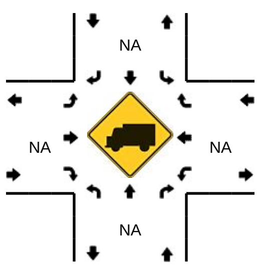


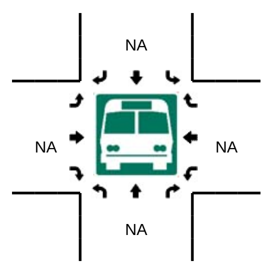












5-Min Count Period Beginning At	Bayfront Expressway (Northbound) Left	Thru	Right	U	Bayfront Expressway (Southbound) Left	Thru	Right	U	Chrysler Dr (Eastbound) Left	Thru	Right	U	Chrysler Dr (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	1	71	0	0	0	204	1	0	20	0	2	0	0	0	0	0	299	
4:05 PM	1	74	0	0	0	179	2	0	39	0	10	0	0	0	0	0	305	
4:10 PM	0	66	0	0	0	211	3	0	16	0	3	0	0	0	0	0	299	
4:15 PM	1	74	0	0	0	220	6	0	27	0	4	0	0	0	0	0	332	
4:20 PM	1	76	0	0	0	230	1	0	26	0	2	0	0	0	0	0	336	
4:25 PM	1	100	0	0	0	214	3	0	23	0	3	0	0	0	0	0	344	
4:30 PM	2	71	0	0	0	179	4	0	33	0	6	0	0	0	0	0	295	
4:35 PM	0	80	0	0	0	249	4	0	25	0	5	0	0	0	0	0	363	
4:40 PM	1	98	0	0	0	208	2	0	34	0	3	0	0	0	0	0	346	
4:45 PM	0	74	0	0	0	229	2	0	18	0	5	0	0	0	0	0	328	
4:50 PM	0	94	0	0	0	215	5	0	24	0	2	0	0	0	0	0	340	
4:55 PM	0	75	0	0	0	203	5	0	41	0	3	0	0	0	0	0	327	3914
5:00 PM	0	64	0	0	0	233	3	0	27	0	4	0	0	0	0	0	331	3946
5:05 PM	0	73	0	0	0	185	12	0	50	0	4	0	0	0	0	0	324	3965
5:10 PM	1	80	0	0	1	228	13	0	32	0	1	0	0	0	0	0	356	4022
5:15 PM	0	90	0	0	0	186	21	0	37	0	6	0	0	0	0	0	340	4030
5:20 PM	0	79	0	0	0	187	33	0	38	0	1	0	0	0	0	0	338	4032
5:25 PM	0	95	0	0	0	186	16	0	24	0	2	0	0	0	0	0	323	4011
5:30 PM	0	69	0	0	0	179	15	0	13	0	1	0	0	0	0	0	277	3993
5:35 PM	0	91	0	0	0	166	17	0	37	0	5	0	0	0	0	0	316	3946
5:40 PM	0	71	0	0	0	168	22	0	27	0	0	0	0	0	0	0	288	3888
5:45 PM	1	84	0	0	0	168	28	0	11	0	2	0	0	0	0	0	294	3854
5:50 PM	0	67	0	0	0	163	8	0	26	0	4	0	0	0	0	0	268	3782
5:55 PM	0	90	0	0	0	157	10	0	23	0	3	0	0	0	0	0	283	3738

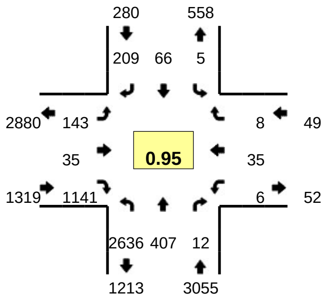
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	4	1008	0	0	0	2744	32	0	308	0	52	0	0	0	0	0	4148
Heavy Trucks	0	64	0		0	88	0		4	0	0		0	0	0		156
Pedestrians		0				0				0				12			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments: none

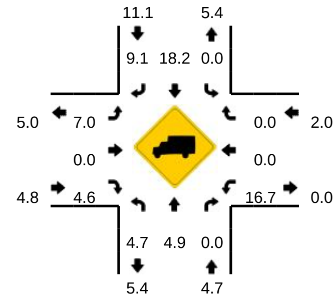
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

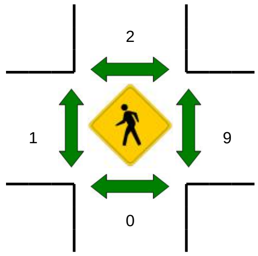
LOCATION: Bayfront Expressway -- Marsh Rd | **QC JOB #:** 12899585

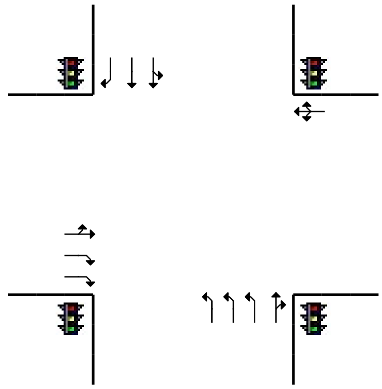
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

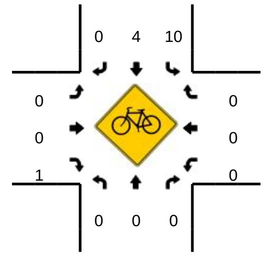


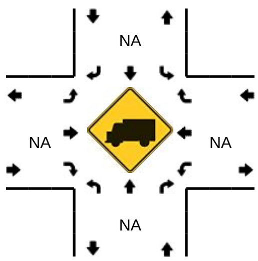
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

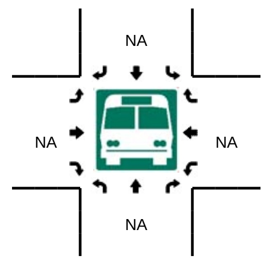












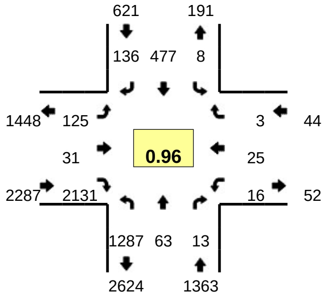
5-Min Count Period Beginning At	Bayfront Expressway (Northbound)				Bayfront Expressway (Southbound)				Marsh Rd (Eastbound)				Marsh Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	188	20	0	0	2	3	9	0	14	3	61	0	1	1	0	0	302	
7:05 AM	211	11	1	0	0	6	9	0	10	2	61	0	0	0	0	0	311	
7:10 AM	185	22	2	0	1	4	11	0	11	3	54	1	1	0	0	0	295	
7:15 AM	236	16	1	0	0	6	12	0	7	4	70	0	0	2	0	0	354	
7:20 AM	224	16	2	0	0	0	12	0	6	1	31	0	1	3	0	0	296	
7:25 AM	257	12	2	0	1	2	15	0	8	2	73	0	1	2	0	0	375	
7:30 AM	186	31	1	0	0	5	23	0	19	3	71	0	0	2	0	0	341	
7:35 AM	210	29	1	0	0	9	26	0	12	6	73	0	0	2	0	0	368	
7:40 AM	222	27	1	0	0	5	19	0	13	1	91	0	2	5	0	0	386	
7:45 AM	262	20	1	0	1	6	21	0	9	1	72	0	2	2	1	0	398	
7:50 AM	253	37	0	0	1	6	17	0	10	3	102	0	0	0	1	0	430	
7:55 AM	239	34	0	0	0	5	22	0	8	0	93	0	2	2	0	0	405	4261
8:00 AM	227	31	1	0	1	5	13	0	12	3	93	0	1	2	1	0	390	4349
8:05 AM	204	35	0	0	0	7	28	0	12	2	93	0	0	2	1	0	384	4422
8:10 AM	194	30	0	0	0	4	18	0	11	4	84	0	0	3	1	0	349	4476
8:15 AM	195	32	3	0	0	6	14	0	15	3	94	0	0	2	0	0	364	4486
8:20 AM	221	32	1	0	1	4	11	0	11	5	125	0	0	5	0	0	416	4606
8:25 AM	189	31	2	0	0	7	16	0	11	4	102	0	0	4	0	0	366	4597
8:30 AM	205	36	2	0	1	3	17	0	12	4	76	0	0	3	0	0	359	4615
8:35 AM	239	49	2	0	0	8	9	0	17	1	106	0	0	6	1	0	438	4685
8:40 AM	208	40	0	0	0	5	23	0	15	5	101	0	1	4	2	0	404	4703
8:45 AM	178	25	4	0	0	4	30	0	12	8	98	0	0	3	0	0	362	4667
8:50 AM	160	38	3	0	1	6	25	0	12	7	102	0	0	4	0	0	358	4595
8:55 AM	194	45	3	0	0	6	18	0	17	5	123	0	0	7	1	0	419	4609

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	3016	364	4	0	8	68	240	0	108	16	1068	0	16	16	8	0	4932
Heavy Trucks	88	12	0		0	16	8		8	0	44		4	0	0		180
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	1	0		0	0	1		0	0	0		2
Railroad																	
Stopped Buses																	

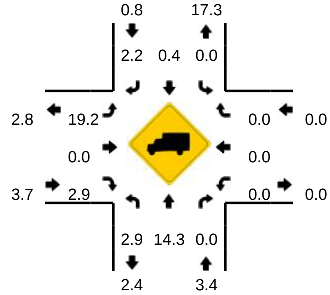
Comments: none

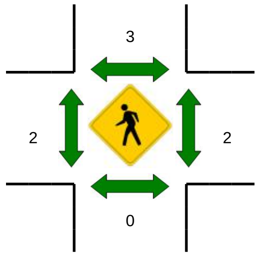
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

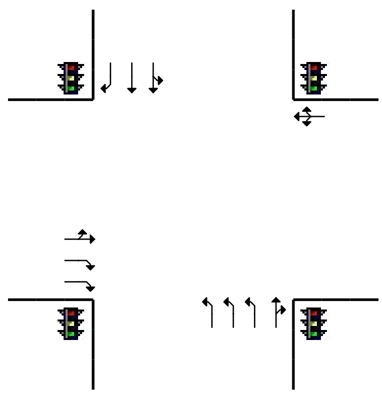
LOCATION: Bayfront Expressway -- Marsh Rd | **QC JOB #:** 12899586
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

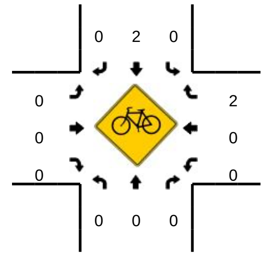


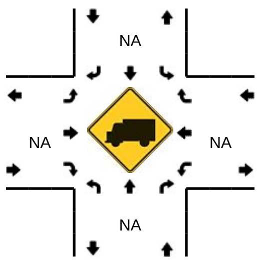
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

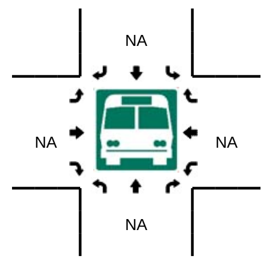












5-Min Count Period Beginning At	Bayfront Expressway (Northbound) Left	Thru	Right	U	Bayfront Expressway (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	83	6	1	0	1	13	16	0	8	4	177	0	0	2	0	0	311	
4:05 PM	100	5	0	0	2	30	27	0	16	4	176	0	0	1	0	0	361	
4:10 PM	80	3	4	0	0	42	17	0	6	7	173	0	1	0	1	0	334	
4:15 PM	75	4	3	0	0	41	15	0	12	2	193	0	0	4	0	0	349	
4:20 PM	99	3	5	0	0	33	16	0	12	1	178	0	1	1	0	0	349	
4:25 PM	100	7	1	0	0	26	10	0	10	3	185	0	0	0	0	0	342	
4:30 PM	116	4	1	0	0	36	8	0	12	0	184	0	0	0	0	0	361	
4:35 PM	113	7	1	0	0	14	16	0	6	1	199	0	3	2	1	0	363	
4:40 PM	122	7	2	0	1	45	8	0	10	1	192	0	2	1	0	0	391	
4:45 PM	90	4	1	0	0	56	17	0	6	1	159	0	3	4	0	0	341	
4:50 PM	96	3	1	0	1	44	14	0	4	3	168	0	1	1	0	0	336	
4:55 PM	127	7	0	0	0	25	9	0	9	2	191	0	1	3	1	0	375	4213
5:00 PM	78	2	1	0	1	46	8	0	12	2	177	0	0	1	1	0	329	4231
5:05 PM	120	9	2	0	0	29	15	0	14	4	190	0	0	4	0	0	387	4257
5:10 PM	98	3	2	0	0	57	18	0	4	3	168	0	1	0	0	0	354	4277
5:15 PM	120	8	0	0	1	32	10	0	19	6	183	0	3	4	0	0	386	4314
5:20 PM	96	3	1	0	2	56	8	0	6	4	162	0	1	2	0	0	341	4306
5:25 PM	111	6	1	0	2	37	5	0	23	4	158	0	1	3	0	0	351	4315
5:30 PM	91	3	1	0	0	45	21	0	10	2	161	0	0	0	1	0	335	4289
5:35 PM	124	13	0	0	0	20	12	0	12	7	155	0	1	1	1	0	346	4272
5:40 PM	96	2	0	0	0	45	14	0	5	2	150	0	1	1	3	0	319	4200
5:45 PM	93	8	0	0	0	14	26	0	15	6	180	0	0	2	0	0	344	4203
5:50 PM	83	5	1	0	1	31	14	0	9	2	130	0	0	4	0	0	280	4147
5:55 PM	110	5	0	0	2	15	12	0	12	11	152	0	0	1	1	0	321	4093

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	1352	80	16	0	4	472	172	0	148	52	2164	0	16	32	0	0	4508
Heavy Trucks	16	16	0		0	0	8		24	0	56		0	0	0		120
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	1		1
Railroad																	
Stopped Buses																	

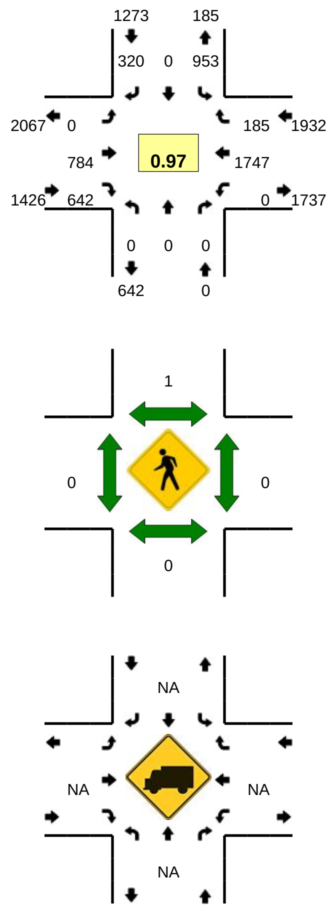
Comments: none

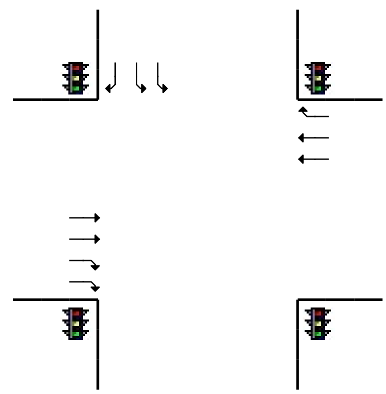
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

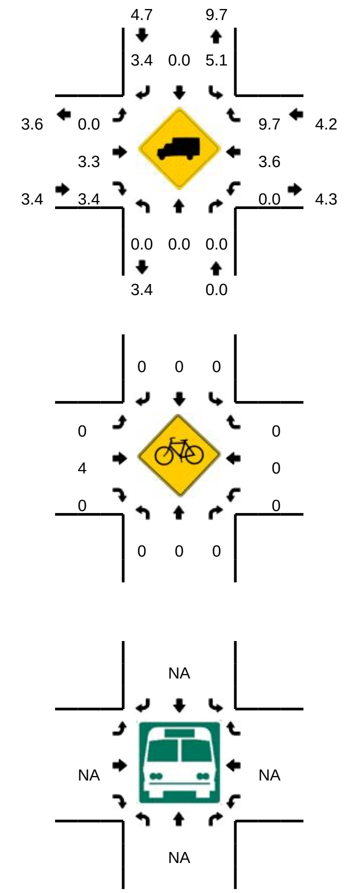
LOCATION: US-101 SB -- Marsh Rd | **QC JOB #:** 12899587

CITY/STATE: Menlo Park, CA | **DATE:** Tue, Oct 14 2014

Peak-Hour: 7:25 AM -- 8:25 AM
Peak 15-Min: 7:25 AM -- 7:40 AM







5-Min Count Period Beginning At	US-101 SB (Northbound) Left	Thru	Right	U	US-101 SB (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	54	0	21	0	0	51	46	0	0	100	10	0	282	
7:05 AM	0	0	0	0	51	0	39	0	0	41	35	0	0	88	4	0	258	
7:10 AM	0	0	0	0	57	0	33	0	0	53	46	0	0	150	13	0	352	
7:15 AM	0	0	0	0	69	0	40	0	0	56	47	0	0	117	15	0	344	
7:20 AM	0	0	0	0	72	0	38	0	0	56	44	0	0	133	14	0	357	
7:25 AM	0	0	0	0	79	0	35	0	0	66	55	0	0	128	15	0	378	
7:30 AM	0	0	0	0	56	0	27	0	0	68	72	0	0	168	16	0	407	
7:35 AM	0	0	0	0	72	0	18	0	0	58	64	0	0	166	25	0	403	
7:40 AM	0	0	0	0	78	0	27	0	0	65	51	0	0	137	18	0	376	
7:45 AM	0	0	0	0	75	0	26	0	0	48	45	0	0	154	14	0	362	
7:50 AM	0	0	0	0	81	0	20	0	0	67	57	0	0	153	11	0	389	
7:55 AM	0	0	0	0	82	0	19	0	0	66	54	0	0	166	14	0	401	4309
8:00 AM	0	0	0	0	82	0	34	0	0	63	61	0	0	144	12	0	396	4423
8:05 AM	0	0	0	0	86	0	27	0	0	51	46	0	0	159	11	0	380	4545
8:10 AM	0	0	0	0	81	0	32	0	0	69	44	0	0	149	22	0	397	4590
8:15 AM	0	0	0	0	83	0	22	0	0	93	42	0	0	118	18	0	376	4622
8:20 AM	0	0	0	0	98	0	33	0	0	70	51	0	0	105	9	0	366	4631
8:25 AM	0	0	0	0	90	0	43	0	0	56	41	0	0	103	17	0	350	4603
8:30 AM	0	0	0	0	70	0	30	0	0	77	44	0	0	127	10	0	358	4554
8:35 AM	0	0	0	0	79	0	23	0	0	71	44	0	0	152	8	0	377	4528
8:40 AM	0	0	0	0	78	0	31	0	0	70	51	0	0	99	12	0	341	4493
8:45 AM	0	0	0	0	89	0	46	0	0	69	43	0	0	124	10	0	381	4512
8:50 AM	0	0	0	0	91	0	46	0	0	79	42	0	0	120	19	0	397	4520
8:55 AM	0	0	0	0	98	0	33	0	0	68	32	0	0	131	11	0	373	4492

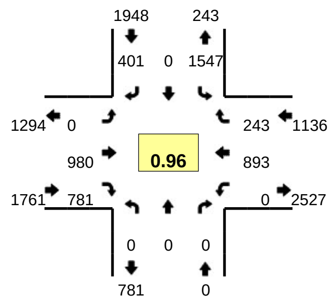
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	828	0	320	0	0	768	764	0	0	1848	224	0	4752
Heavy Trucks	0	0	0		28	0	16		0	36	24		0	72	4		180
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments: none

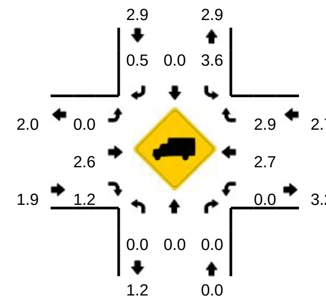
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

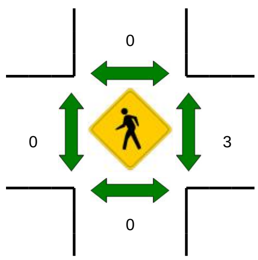
LOCATION: US-101 SB -- Marsh Rd | **QC JOB #:** 12899588

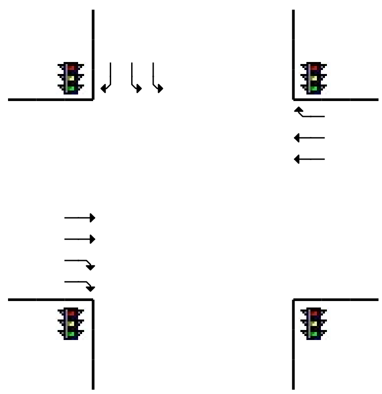
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Oct 14 2014

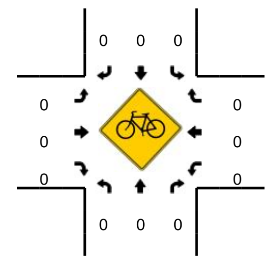


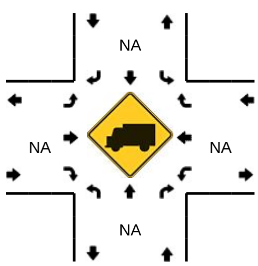
Peak-Hour: 4:55 PM -- 5:55 PM
Peak 15-Min: 5:05 PM -- 5:20 PM

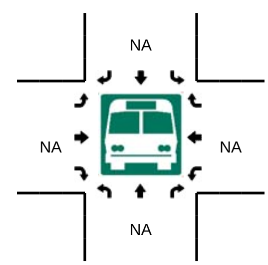












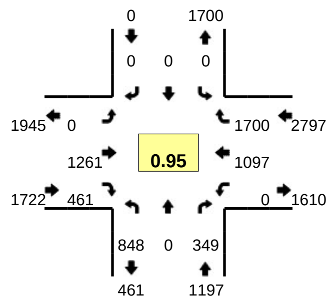
5-Min Count Period Beginning At	US-101 SB (Northbound) Left	Thru	Right	U	US-101 SB (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	103	0	42	0	0	94	63	0	0	58	16	0	376	
4:05 PM	0	0	0	0	112	0	32	0	0	81	52	0	0	68	31	0	376	
4:10 PM	0	0	0	0	149	0	20	0	0	94	62	0	0	63	21	0	409	
4:15 PM	0	0	0	0	140	0	48	0	0	89	73	0	0	64	16	0	430	
4:20 PM	0	0	0	0	121	0	36	0	0	99	69	0	0	75	33	0	433	
4:25 PM	0	0	0	0	123	0	25	0	0	93	62	0	0	69	15	0	387	
4:30 PM	0	0	0	0	148	0	31	0	0	66	55	0	0	68	17	0	385	
4:35 PM	0	0	0	0	146	0	31	0	0	86	76	0	0	71	29	0	439	
4:40 PM	0	0	0	0	122	0	25	0	0	72	72	0	0	85	31	0	407	
4:45 PM	0	0	0	0	102	0	22	0	0	86	70	0	0	61	19	0	360	
4:50 PM	0	0	0	0	128	0	17	0	0	79	76	0	0	62	28	0	390	
4:55 PM	0	0	0	0	128	0	20	0	0	76	58	0	0	66	26	0	374	4766
5:00 PM	0	0	0	0	132	0	30	0	0	80	55	0	0	75	16	0	388	4778
5:05 PM	0	0	0	0	128	0	35	0	0	82	76	0	0	77	33	0	431	4833
5:10 PM	0	0	0	0	127	0	26	0	0	81	71	0	0	73	30	0	408	4832
5:15 PM	0	0	0	0	130	0	39	0	0	81	81	0	0	73	19	0	423	4825
5:20 PM	0	0	0	0	150	0	49	0	0	85	65	0	0	34	18	0	401	4793
5:25 PM	0	0	0	0	108	0	24	0	0	80	61	0	0	79	4	0	356	4762
5:30 PM	0	0	0	0	134	0	32	0	0	77	71	0	0	81	8	0	403	4780
5:35 PM	0	0	0	0	121	0	32	0	0	76	69	0	0	85	16	0	399	4740
5:40 PM	0	0	0	0	126	0	44	0	0	74	56	0	0	84	29	0	413	4746
5:45 PM	0	0	0	0	141	0	36	0	0	82	64	0	0	78	25	0	426	4812
5:50 PM	0	0	0	0	122	0	34	0	0	106	54	0	0	88	19	0	423	4845
5:55 PM	0	0	0	0	110	0	30	0	0	68	52	0	0	78	23	0	361	4832

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	1540	0	400	0	0	976	912	0	0	892	328	0	5048
Heavy Trucks	0	0	0		64	0	0		0	12	20		0	32	4		132
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

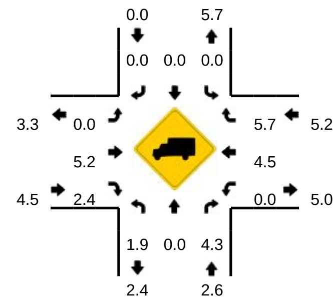
Comments: none

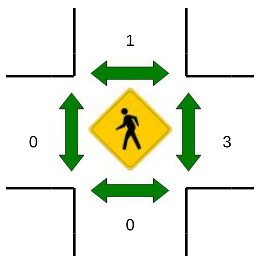
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

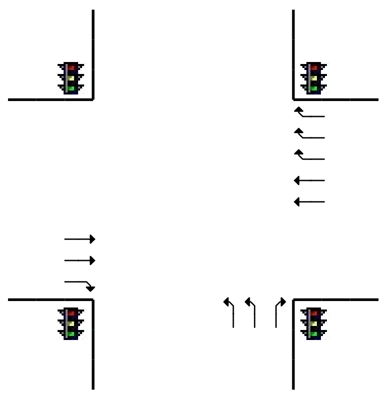
LOCATION: US-101 NB -- Marsh Rd — **QC JOB #:** 12899589
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Oct 14 2014

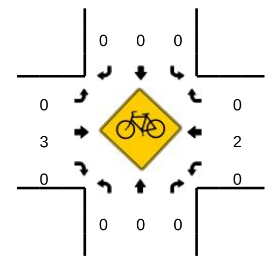


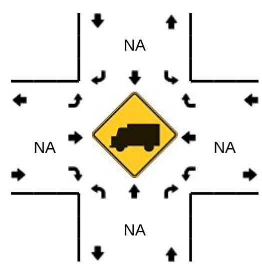
Peak-Hour: 7:20 AM -- 8:20 AM
Peak 15-Min: 7:50 AM -- 8:05 AM

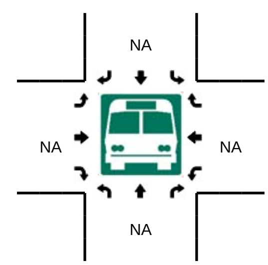












5-Min Count Period Beginning At	US-101 NB (Northbound) Left	Thru	Right	U	US-101 NB (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	47	0	31	0	0	0	0	0	0	69	32	0	0	74	122	0	375	
7:05 AM	54	0	26	0	0	0	0	0	0	73	32	0	0	50	136	0	371	
7:10 AM	81	0	21	0	0	0	0	0	0	84	30	0	0	78	133	0	427	
7:15 AM	52	0	26	0	0	0	0	0	0	80	40	0	0	75	129	0	402	
7:20 AM	65	0	35	0	0	0	0	0	0	87	37	0	0	107	135	0	466	
7:25 AM	63	0	19	0	0	0	0	0	0	111	40	0	0	95	124	0	452	
7:30 AM	76	0	27	0	0	0	0	0	0	93	38	0	0	92	138	0	464	
7:35 AM	73	0	21	0	0	0	0	0	0	94	45	0	0	105	144	0	482	
7:40 AM	63	0	25	0	0	0	0	0	0	99	42	0	0	100	142	0	471	
7:45 AM	79	0	27	0	0	0	0	0	0	103	33	0	0	96	142	0	480	
7:50 AM	74	0	40	0	0	0	0	0	0	117	40	0	0	88	138	0	497	
7:55 AM	82	0	32	0	0	0	0	0	0	95	34	0	0	87	154	0	484	5371
8:00 AM	83	0	31	0	0	0	0	0	0	111	39	0	0	88	168	0	520	5516
8:05 AM	67	0	26	0	0	0	0	0	0	111	30	0	0	96	147	0	477	5622
8:10 AM	63	0	36	0	0	0	0	0	0	119	32	0	0	83	132	0	465	5660
8:15 AM	60	0	30	0	0	0	0	0	0	121	51	0	0	60	136	0	458	5716
8:20 AM	51	0	35	0	0	0	0	0	0	133	38	0	0	71	111	0	439	5689
8:25 AM	52	0	32	0	0	0	0	0	0	116	33	0	0	78	138	0	449	5686
8:30 AM	74	0	36	0	0	0	0	0	0	117	34	0	0	70	80	0	411	5633
8:35 AM	73	0	35	0	0	0	0	0	0	107	34	0	0	66	131	0	446	5597
8:40 AM	58	0	29	0	0	0	0	0	0	105	42	0	0	73	152	0	459	5585
8:45 AM	54	0	32	0	0	0	0	0	0	128	40	0	0	76	141	0	471	5576
8:50 AM	64	0	26	0	0	0	0	0	0	125	48	0	0	72	140	0	475	5554
8:55 AM	66	0	37	0	0	0	0	0	0	116	40	0	0	60	103	0	422	5492

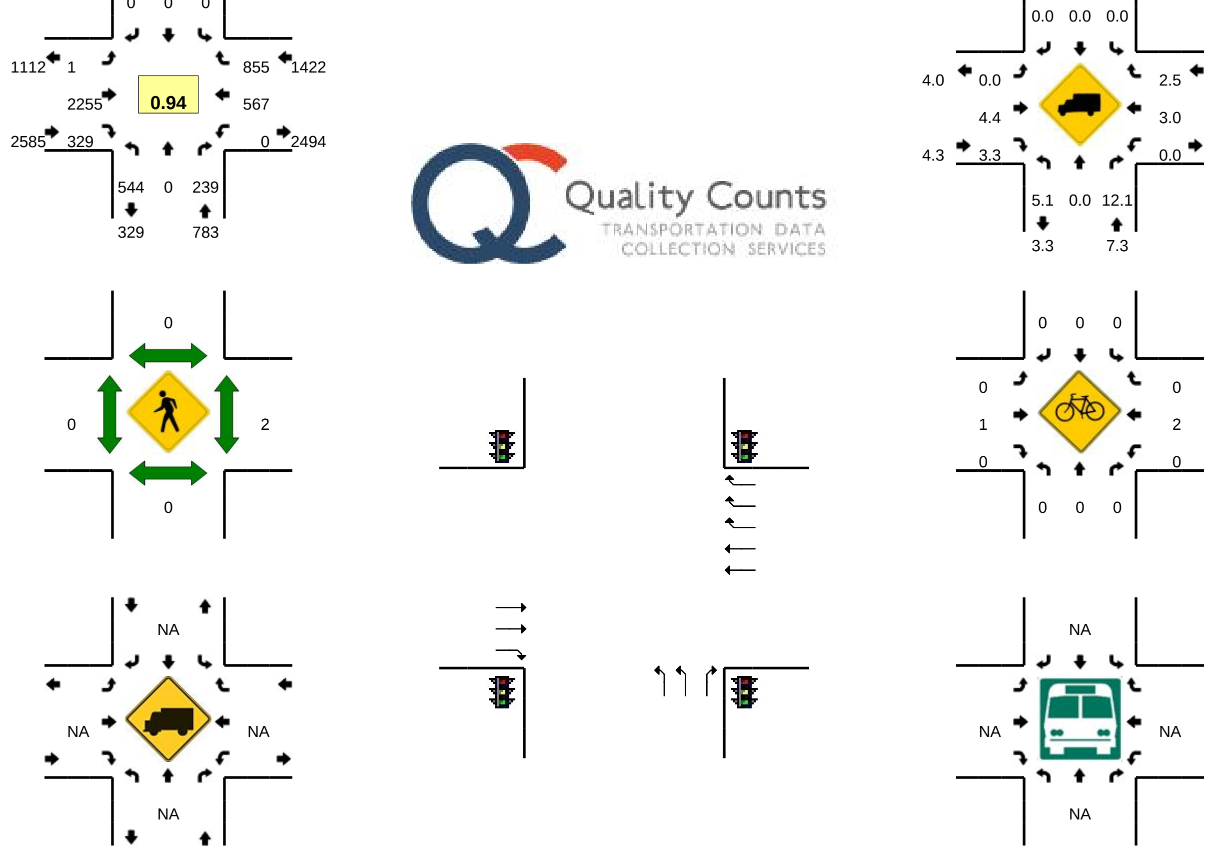
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	956	0	412	0	0	0	0	0	0	1292	452	0	0	1052	1840	0	6004
Heavy Trucks	20	0	12		0	0	0		0	68	16		0	40	132		288
Pedestrians		0				0				0				8			8
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

LOCATION: US-101 NB -- Marsh Rd — **QC JOB #:** 12899590
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Oct 14 2014

Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:10 PM -- 4:25 PM



5-Min Count Period Beginning At	US-101 NB (Northbound) Left	Thru	Right	U	US-101 NB (Southbound) Left	Thru	Right	U	Marsh Rd (Eastbound) Left	Thru	Right	U	Marsh Rd (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	34	0	23	0	0	0	0	0	0	172	38	0	0	59	91	0	417	
4:05 PM	47	0	21	0	0	0	0	0	0	162	25	0	0	50	58	0	363	
4:10 PM	48	0	23	0	0	0	0	0	0	203	42	0	0	67	82	0	465	
4:15 PM	30	0	22	0	0	0	0	0	0	202	30	0	0	35	51	0	370	
4:20 PM	43	0	22	0	0	0	0	0	0	196	33	0	0	49	92	0	435	
4:25 PM	41	0	27	0	0	0	0	0	0	184	30	0	0	33	74	0	389	
4:30 PM	55	0	16	0	0	0	0	0	0	187	20	0	0	54	85	0	417	
4:35 PM	38	0	23	0	0	0	0	0	0	194	39	0	0	35	59	0	388	
4:40 PM	46	0	19	0	0	0	0	0	0	172	19	0	0	63	75	0	394	
4:45 PM	48	0	14	0	0	0	0	0	0	170	27	1	0	42	67	0	369	
4:50 PM	45	0	18	0	0	0	0	0	0	187	17	0	0	44	81	0	392	
4:55 PM	47	0	20	0	0	0	0	0	0	177	20	0	0	53	58	0	375	4774
5:00 PM	50	0	20	0	0	0	0	0	0	192	28	0	0	44	65	0	399	4756
5:05 PM	53	0	15	0	0	0	0	0	0	191	24	0	0	48	66	0	397	4790
5:10 PM	50	0	15	0	0	0	0	0	0	184	21	0	0	56	66	0	392	4717
5:15 PM	48	0	15	0	0	0	0	0	0	191	25	0	0	41	59	0	379	4726
5:20 PM	44	0	15	0	0	0	0	0	0	197	13	0	0	48	66	0	383	4674
5:25 PM	31	0	13	0	0	0	0	0	0	179	27	0	0	44	61	0	355	4640
5:30 PM	44	0	15	0	0	0	0	0	0	192	15	0	0	45	58	0	369	4592
5:35 PM	52	0	16	0	0	0	0	0	0	176	17	0	0	45	55	0	361	4565
5:40 PM	55	0	15	0	0	0	0	0	0	182	24	0	0	51	68	0	395	4566
5:45 PM	56	0	18	0	0	0	0	0	0	210	23	0	0	42	63	0	412	4609
5:50 PM	49	0	21	0	0	0	0	0	0	194	31	0	0	29	56	0	380	4597
5:55 PM	41	0	11	0	0	0	0	0	0	163	25	0	0	36	53	0	329	4551

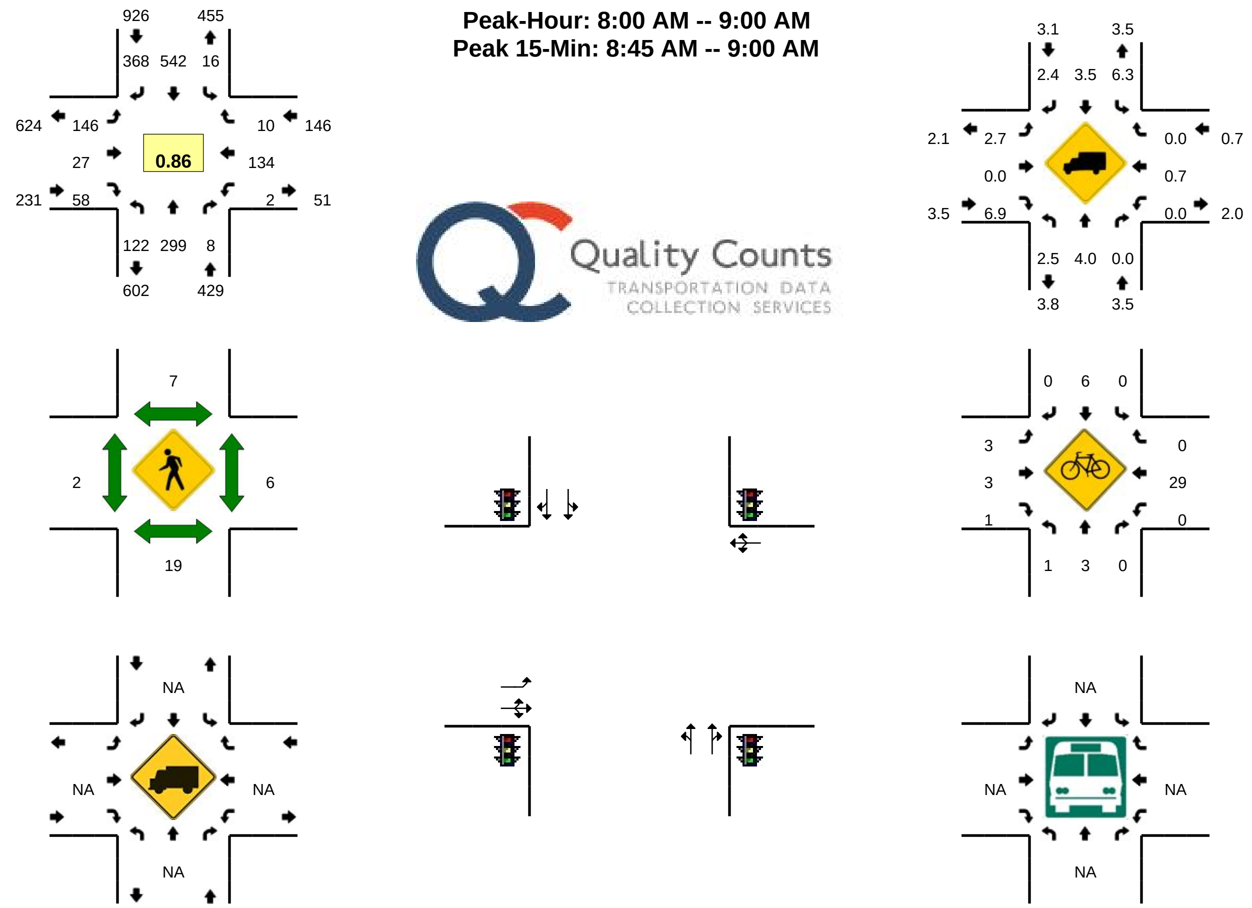
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	484	0	268	0	0	0	0	0	0	2404	420	0	0	604	900	0	5080
Heavy Trucks	28	0	40		0	0	0		0	72	20		0	8	16		184
Pedestrians		0				0				0				4			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments: none

Type of peak hour being reported: Intersection Peak　　　Method for determining peak hour: Total Entering Volume

LOCATION: Middlefield Rd -- Lytton Ave　　　**QC JOB #:** 12899591
CITY/STATE: Menlo Park, CA　　　**DATE:** Tue, Sep 30 2014

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM



5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Lytton Ave (Eastbound) Left	Thru	Right	U	Lytton Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	4	10	0	0	0	13	27	0	8	1	2	0	0	2	0	0	67	
7:05 AM	6	13	0	0	0	17	15	0	6	2	4	0	0	5	0	0	68	
7:10 AM	11	20	0	0	0	19	40	0	6	0	0	0	0	1	1	0	98	
7:15 AM	3	13	0	0	0	16	23	0	9	3	2	0	0	8	1	0	78	
7:20 AM	9	22	0	0	3	18	25	0	6	0	5	0	1	5	1	0	95	
7:25 AM	6	18	0	0	1	24	28	0	12	1	2	0	1	10	1	0	104	
7:30 AM	5	16	0	0	0	20	21	0	8	1	3	0	0	3	1	0	78	
7:35 AM	3	21	0	0	0	42	31	0	8	1	4	0	0	8	0	0	118	
7:40 AM	6	20	2	0	0	35	24	0	12	1	3	0	0	9	2	0	114	
7:45 AM	6	25	0	0	0	48	31	0	20	2	4	0	2	16	2	0	156	
7:50 AM	10	23	1	0	1	36	32	0	13	1	6	0	3	9	0	0	135	
7:55 AM	14	21	0	0	3	44	30	0	11	0	4	0	0	8	0	0	135	1246
8:00 AM	5	17	2	0	5	46	36	0	10	1	5	0	0	19	0	0	146	1325
8:05 AM	7	27	1	0	2	53	29	0	12	2	7	0	0	11	0	0	151	1408
8:10 AM	10	17	1	0	0	39	30	0	8	2	7	0	0	16	0	0	130	1440
8:15 AM	11	22	0	0	0	50	26	0	12	5	7	0	0	8	1	0	142	1504
8:20 AM	9	16	2	0	1	33	27	0	14	4	3	0	0	6	1	0	116	1525
8:25 AM	11	27	0	0	0	37	24	0	18	4	3	0	0	10	0	0	134	1555
8:30 AM	10	29	2	0	0	45	28	0	9	1	6	0	0	15	2	0	147	1624
8:35 AM	8	20	0	0	2	28	30	0	8	2	4	0	0	9	3	0	114	1620
8:40 AM	11	29	0	0	1	48	33	0	15	0	3	0	0	9	1	0	150	1656
8:45 AM	11	27	0	0	1	54	29	0	12	3	3	0	2	12	0	0	154	1654
8:50 AM	15	31	0	0	2	55	42	0	10	1	5	0	0	8	2	0	171	1690
8:55 AM	14	37	0	0	2	54	34	0	18	2	5	0	0	11	0	0	177	1732

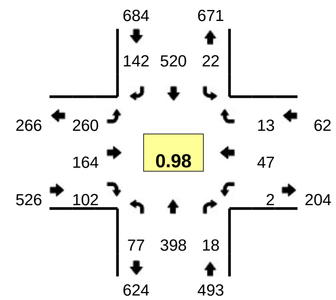
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	160	380	0	0	20	652	420	0	160	24	52	0	8	124	8	0	2008
Heavy Trucks	0	4	0		4	24	8		0	0	4		0	0	0		44
Pedestrians		28				20				0				8			56
Bicycles	0	1	0		0	1	0		1	1	0		0	3	0		7
Railroad																	
Stopped Buses																	

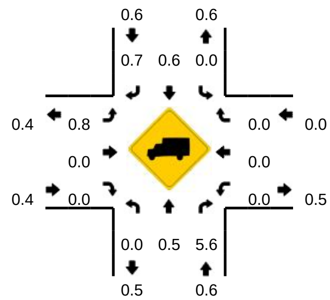
Comments: none

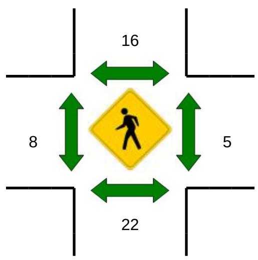
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

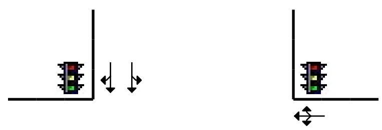
LOCATION: Middlefield Rd -- Lytton Ave | **QC JOB #:** 12899592
CITY/STATE: Menlo Park, CA | **DATE:** Tue, Sep 30 2014

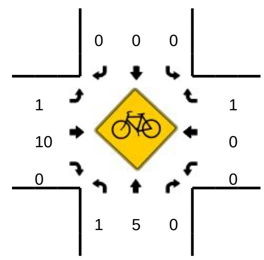
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

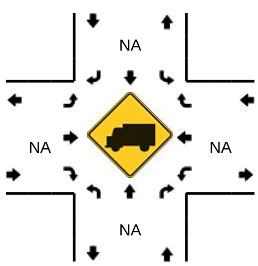


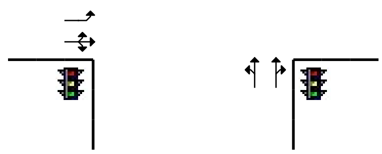


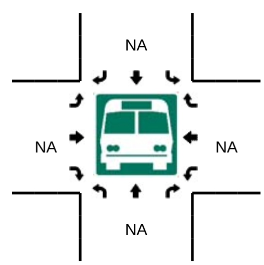












5-Min Count Period Beginning At	Middlefield Rd (Northbound) Left	Thru	Right	U	Middlefield Rd (Southbound) Left	Thru	Right	U	Lytton Ave (Eastbound) Left	Thru	Right	U	Lytton Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	7	34	1	0	1	27	8	0	20	9	4	0	0	3	2	0	116	
4:05 PM	7	30	1	0	2	38	8	0	22	10	8	0	1	3	2	0	132	
4:10 PM	5	35	1	0	2	28	8	0	30	15	6	0	0	3	0	0	133	
4:15 PM	5	24	0	0	0	40	14	0	28	14	8	0	0	2	0	0	135	
4:20 PM	14	28	2	0	3	31	15	0	25	7	12	0	0	4	4	0	145	
4:25 PM	4	30	1	0	1	29	15	0	22	12	7	0	1	4	1	0	127	
4:30 PM	7	43	1	0	2	42	11	0	20	13	11	0	0	2	0	0	152	
4:35 PM	8	33	0	0	0	44	12	0	22	12	10	0	0	3	0	0	144	
4:40 PM	3	41	1	0	1	46	8	0	27	14	6	0	0	2	3	0	152	
4:45 PM	4	34	4	0	1	41	14	0	28	14	3	0	0	6	0	0	149	
4:50 PM	10	26	1	0	4	41	16	0	22	14	2	0	0	9	1	0	146	
4:55 PM	5	31	1	0	6	49	15	0	19	8	14	0	0	5	1	0	154	1685
5:00 PM	8	28	1	0	2	40	9	0	21	17	13	0	0	3	1	0	143	1712
5:05 PM	8	32	4	0	1	42	8	0	21	9	9	0	0	2	0	0	136	1716
5:10 PM	5	30	4	0	2	38	10	0	17	19	14	0	0	7	4	0	150	1733
5:15 PM	8	37	0	0	2	44	11	0	22	17	5	0	0	5	1	0	152	1750
5:20 PM	5	35	1	0	1	48	13	0	20	12	5	0	1	1	2	0	144	1749
5:25 PM	6	28	0	0	0	45	15	0	21	15	10	0	1	2	0	0	143	1765
5:30 PM	5	19	0	0	1	42	13	0	19	18	4	0	0	8	1	0	130	1743
5:35 PM	11	29	0	0	1	41	16	0	22	16	11	0	0	7	0	0	154	1753
5:40 PM	3	35	1	0	3	40	12	0	23	17	9	0	0	9	0	0	152	1753
5:45 PM	8	31	1	0	1	44	17	0	21	14	9	0	0	4	1	0	151	1755
5:50 PM	9	33	4	0	2	43	9	0	20	18	10	0	1	3	2	0	154	1763
5:55 PM	14	26	2	0	3	41	11	0	21	14	7	0	0	3	1	0	143	1752

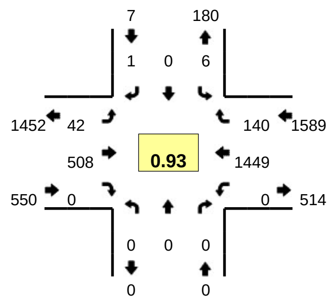
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	76	364	24	0	44	524	180	0	276	144	76	0	0	80	8	0	1796
Heavy Trucks	0	0	0		0	4	4		4	0	0		0	0	0		12
Pedestrians		16				16				4				4			40
Bicycles	0	2	0		0	0	0		1	4	0		0	0	0		7
Railroad																	
Stopped Buses																	

Comments: none

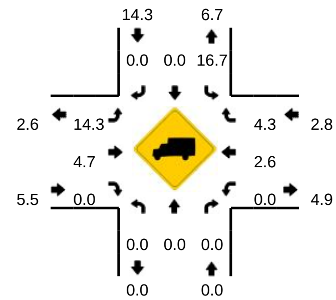
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

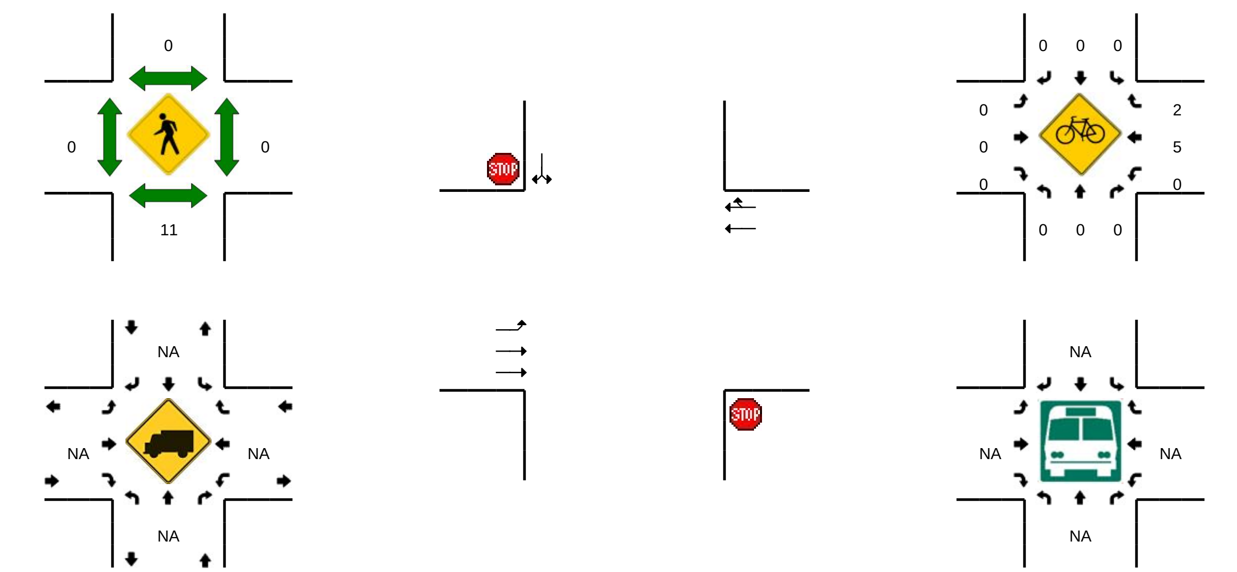
LOCATION: Adams Ave -- University Ave
CITY/STATE: Menlo Park, CA

QC JOB #: 12899597
DATE: Tue, Sep 30 2014



Peak-Hour: 7:40 AM -- 8:40 AM
Peak 15-Min: 8:00 AM -- 8:15 AM





5-Min Count Period Beginning At	Adams Ave (Northbound) Left	Thru	Right	U	Adams Ave (Southbound) Left	Thru	Right	U	University Ave (Eastbound) Left	Thru	Right	U	University Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
7:00 AM	0	0	0	0	2	0	0	0	2	33	0	0	0	117	6	0	160	
7:05 AM	0	0	0	0	1	0	0	0	3	35	0	0	0	96	8	0	143	
7:10 AM	0	0	0	0	0	0	0	0	2	36	0	0	0	122	5	0	165	
7:15 AM	0	0	0	0	2	0	0	0	4	34	0	0	0	108	4	0	152	
7:20 AM	0	0	0	0	1	0	0	0	0	40	0	0	0	134	7	0	182	
7:25 AM	0	0	0	0	1	0	0	0	1	48	0	1	0	125	5	0	181	
7:30 AM	0	0	0	0	1	0	0	0	3	43	0	0	0	113	9	0	169	
7:35 AM	0	0	0	0	1	0	0	0	6	38	0	1	0	92	5	0	143	
7:40 AM	0	0	0	0	1	0	0	0	2	42	0	0	0	120	13	0	178	
7:45 AM	0	0	0	0	1	0	0	0	2	53	0	0	0	123	9	0	188	
7:50 AM	0	0	0	0	0	0	0	0	4	45	0	1	0	97	5	0	152	
7:55 AM	0	0	0	0	0	0	0	0	3	35	0	0	0	117	21	0	176	1989
8:00 AM	0	0	0	0	0	0	0	0	3	44	0	0	0	109	15	0	171	2000
8:05 AM	0	0	0	0	0	0	0	0	5	49	0	0	0	142	16	0	212	2069
8:10 AM	0	0	0	0	0	0	1	0	3	41	0	0	0	135	15	0	195	2099
8:15 AM	0	0	0	0	1	0	0	0	5	44	0	0	0	87	8	0	145	2092
8:20 AM	0	0	0	0	1	0	0	0	2	47	0	1	0	116	14	0	181	2091
8:25 AM	0	0	0	0	1	0	0	0	5	46	0	0	0	139	13	0	204	2114
8:30 AM	0	0	0	0	0	0	0	0	6	34	0	0	0	136	3	0	179	2124
8:35 AM	0	0	0	0	1	0	0	0	0	28	0	0	0	128	8	0	165	2146
8:40 AM	0	0	0	0	1	0	2	0	1	34	0	0	0	78	3	0	119	2087
8:45 AM	0	0	0	0	1	0	1	0	7	41	0	0	0	105	7	0	162	2061
8:50 AM	0	0	0	0	1	0	0	0	4	39	0	0	0	130	13	0	187	2096
8:55 AM	0	0	0	0	3	0	0	0	2	34	0	0	0	114	12	0	165	2085

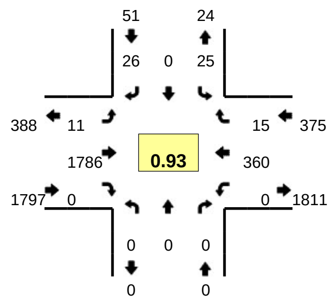
Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	0	0	4	0	44	536	0	0	0	1544	184	0	2312
Heavy Trucks	0	0	0		0	0	0		4	24	0		0	72	8		108
Pedestrians		12				0				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments: none

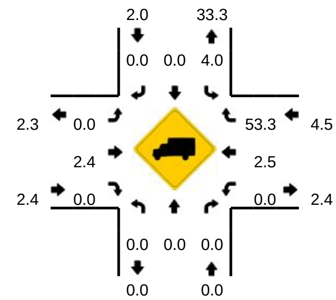
Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

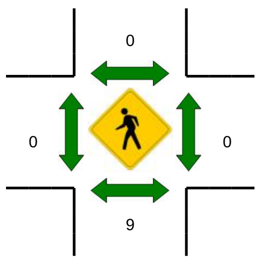
LOCATION: Adams Ave -- University Ave — **QC JOB #:** 12899598

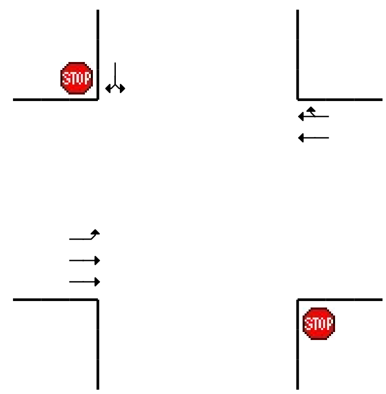
CITY/STATE: Menlo Park, CA — **DATE:** Tue, Sep 30 2014

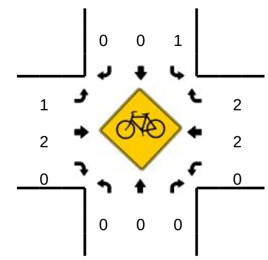


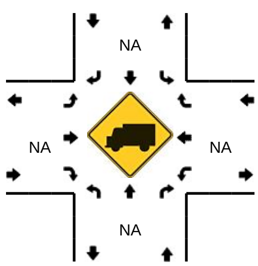
Peak-Hour: 4:10 PM -- 5:10 PM
Peak 15-Min: 4:20 PM -- 4:35 PM

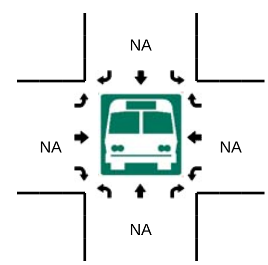












5-Min Count Period Beginning At	Adams Ave (Northbound) Left	Thru	Right	U	Adams Ave (Southbound) Left	Thru	Right	U	University Ave (Eastbound) Left	Thru	Right	U	University Ave (Westbound) Left	Thru	Right	U	Total	Hourly Totals
4:00 PM	0	0	0	0	1	0	4	0	0	119	0	0	0	24	4	0	152	
4:05 PM	0	0	0	0	6	0	3	0	1	114	0	0	0	26	1	0	151	
4:10 PM	0	0	0	0	3	0	1	0	0	123	0	0	0	35	0	0	162	
4:15 PM	0	0	0	0	1	0	3	0	2	136	0	0	0	31	2	0	175	
4:20 PM	0	0	0	0	1	0	1	0	0	145	0	1	0	32	2	0	182	
4:25 PM	0	0	0	0	3	0	3	0	0	177	0	0	0	31	2	0	216	
4:30 PM	0	0	0	0	0	0	2	0	1	158	0	0	0	38	0	0	199	
4:35 PM	0	0	0	0	1	0	1	0	1	142	0	0	0	31	0	0	176	
4:40 PM	0	0	0	0	3	0	1	0	0	160	0	0	0	20	1	0	185	
4:45 PM	0	0	0	0	3	0	4	0	0	154	0	0	0	25	1	0	187	
4:50 PM	0	0	0	0	2	0	1	0	2	136	0	1	0	32	2	0	176	
4:55 PM	0	0	0	0	2	0	2	0	0	162	0	0	0	22	1	0	189	2150
5:00 PM	0	0	0	0	3	0	3	0	3	163	0	0	0	27	0	0	199	2197
5:05 PM	0	0	0	0	3	0	4	0	0	130	0	0	0	36	4	0	177	2223
5:10 PM	0	0	0	0	4	0	0	0	0	94	0	0	0	27	2	0	127	2188
5:15 PM	0	0	0	0	4	0	2	0	0	132	0	0	0	26	3	0	167	2180
5:20 PM	0	0	0	0	5	0	1	0	0	171	0	1	0	28	0	0	206	2204
5:25 PM	0	0	0	0	2	0	3	0	0	144	0	1	0	23	1	0	174	2162
5:30 PM	0	0	0	0	2	0	3	0	0	127	0	0	0	31	0	0	163	2126
5:35 PM	0	0	0	0	4	0	1	0	0	131	0	2	0	27	0	0	165	2115
5:40 PM	0	0	0	0	5	0	2	0	1	107	0	0	0	22	1	0	138	2068
5:45 PM	0	0	0	0	4	0	2	0	0	101	0	0	0	41	0	0	148	2029
5:50 PM	0	0	0	0	0	0	3	0	1	87	0	0	0	41	0	0	132	1985
5:55 PM	0	0	0	0	3	0	3	0	0	107	0	1	0	34	2	0	150	1946

Peak 15-Min Flowrates	Northbound Left	Thru	Right	U	Southbound Left	Thru	Right	U	Eastbound Left	Thru	Right	U	Westbound Left	Thru	Right	U	Total
All Vehicles	0	0	0	0	16	0	24	0	4	1920	0	4	0	404	16	0	2388
Heavy Trucks	0	0	0		0	0	0		0	52	0		0	8	4		64
Pedestrians		12				0				0				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	1	0		1
Railroad																	
Stopped Buses																	

Comments: none

ConnectMenlo: General Plan Land Use & Circulation Elements and Bayfront Area Zoning Update

Appendix K-4:
Intersection Level of Service Reports

June 1, 2016

TJKM

Existing Conditions – AM Peak Hour

Table of Contents

General Plan & Facebook Expansion

Vistro File: J:\...\Existing Conditions_AM.vistro — Scenario 1: Existing AM

Report File: J:\...\Existing Conditions AM.pdf — 5/19/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM 2010	SEB Left	0.887	19.6	B
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM 2010	NEB Left	0.761	29.1	C
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM 2010	NB Left	0.745	33.9	C
4	Marsh Rd/Bay Rd	Signalized	HCM 2010	SB Left	0.659	19.1	B
5	Middlefield Rd/Marsh Rd	Signalized	HCM 2010	EB Left	0.912	45.0	D
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM 2010	NWB Left	0.747	53.1	D
10	Middlefield Rd/Ringswood Ave	Signalized	HCM 2010	SEB Left	0.456	23.1	C
13	Middlefield Rd/Lytton Ave	Signalized	HCM 2010	SEB Left	0.633	41.6	D
14	Middlefield Rd/University Ave	Signalized	HCM 2010	SEB Left	0.523	36.4	D
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM 2010	NWB Left	0.966	19.7	B
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM 2010	NB Thru	0.848	31.5	C
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM 2010	SB Left	0.699	9.3	A
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM 2010	NB Left	0.549	18.1	B
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM 2010	WB Right	0.544	14.2	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM 2010	NB Left	0.772	41.0	D
21	Willow Rd/Bay Rd	Signalized	HCM 2010	NEB Left	0.735	12.5	B
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM 2010	SB Left	0.694	15.6	B
23	Willow Rd/Coleman Ave	Signalized	HCM 2010	EB Left	0.775	21.1	C
24	Willow Rd/Gilbert Ave	Signalized	HCM 2010	EB Left	0.634	20.7	C
25	Middlefield Rd-Willow Rd	Signalized	HCM 2010	NWB Right	0.591	61.9	E
26	Ravenswood Ave/Laurel St	Signalized	HCM 2010	NWB Left	0.704	17.4	B
28	Oak Grove Ave/Laurel St	Signalized	HCM 2010	SEB Thru	0.612	9.5	A

29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM 2010	SWB Left	45.457	87.6	F
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM 2010	SWB Thru	0.741	30.2	C
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM 2010	NEB Left	0.660	24.9	C
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM 2010	SWB Thru	0.616	10.4	B
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM 2010	NEB Right	0.751	37.0	D
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM 2010	SEB Left	0.519	6.1	A
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM 2010	NWB Left	0.679	13.6	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM 2010	SEB Left	0.531	4.8	A
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM 2010	SWB Left	0.562	10.2	B
39	Santa Cruz Ave/Sand Hill Rd	Signalized	HCM 2010	SEB Left	0.755	45.4	D
58	University Avenue and Adams Drive	Two-way stop	HCM 2010	EB Left	0.138	100.9	F
71	Chilco Street/Terminal Avenue	All-way stop	HCM 2010	NB Thru		10.0	A
74	University Ave/O'Brien Dr	Signalized	HCM 2010	NB Left	0.529	9.2	A
77	University Avenue/Donohoe Street	Signalized	HCM 2010	NB Left	1.015	115.5	F
88	Valparaiso Ave/ University Dr	Signalized	HCM 2010	SWB Thru	0.666	24.7	C
103	Addison Wesley/Sand Hill Rd	Signalized	HCM 2010	EB Left	0.742	13.6	B
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM 2010	WB Right	0.783	44.6	D
110	Marsh Road and US 101 NB Ramps	Signalized	HCM 2010	NWB Left	0.746	13.1	B
111	University Avenue / Woodland Avenue	Signalized	HCM 2010	NWB Right	0.850	58.6	E
131	Chilco Street/Hamilton Avenue	All-way stop	HCM 2010	SB Thru		9.2	A
132	Oak Ave/Sand Hill Rd	Signalized	HCM 2000	SEB Right	0.800	17.2	B
156	Saga Ln/Sand Hill Rd	Signalized	HCM 2010	WB Left	0.588	15.6	B

157	Branner Dr/Sand Hill Rd	Signalized	HCM 2010	WB Left	0.613	7.5	A
162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM 2010	SEB Left	1.260	36.7	D
163	Bayfront Expy/Marsh Rd	Signalized	HCM 2010	WB Left	1.023	65.0	E
181	Santa Cruz Ave/Elder Ave	Signalized	HCM 2010	NEB Left	0.643	9.8	A
195	Bayfront Expy/Chilco St	Signalized	HCM 2010	NB Left	1.065	30.9	C
196	Bayfront Expy/Chrysler Drive	Signalized	HCM 2010	NB Left	0.930	10.1	B
204	Chilco Street/Newbridge Street	All-way stop	HCM 2010	WB Thru		9.2	A
206	Chilco Street/Ivy Drive	All-way stop	HCM 2010	SB Thru		9.1	A
207	Chilco St/Constitution Dr	All-way stop	HCM 2010	SB Thru		11.6	B
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM 2000	NEB Thru	0.000	9.6	A
213	Chrysler Dr/Independence Dr	Two-way stop	HCM 2010	NWB Thru	0.016	10.1	B
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM 2010	NWB Thru	0.000	12.2	B
215	Chrysler Dr/Constitution Dr	All-way stop	HCM 2010	EB Thru		8.8	A
233	Sand Hill Road and Sand Hill Circle	Signalized	HCM 2010	NB Thru	0.576	14.5	B
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM 2010	NB Right	0.755	43.9	D
243	University Avenue/US 101 SB Ramps	Signalized	HCM 2010	WB Right	0.759	30.9	C
245	University Avenue/Runnymede Street	Signalized	HCM 2010	WB Thru	0.506	11.3	B
246	University Avenue/Bell Street	Signalized	HCM 2010	WB Thru	0.528	10.8	B
247	University Avenue/Bay Road	Signalized	HCM 2010	NEB Left	0.641	38.0	D
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	Signalized	HCM 2010	NB Right	0.369	40.7	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	19.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.887

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	784	1747	279	953	320
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	3.60	2.15	5.10	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	784	1747	279	953	320
Peak Hour Factor	1.0000	0.9700	0.9700	1.0000	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	202	450	70	246	82
Total Analysis Volume [veh/h]	0	808	1801	279	982	330
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	4		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	52.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	0	6	2	0	4	5
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	32	32	0	32	10
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	45	45	0	35	8
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	7	0	0	5	0
Pedestrian Clearance [s]	0	16	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	2.1	0.0	0.0	1.1
Minimum Recall		Yes	Yes		No	No
Maximum Recall		No	No		No	No
Pedestrian Recall		No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	4.10	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.10	0.00	0.00
g_i, Effective Green Time [s]	48	46	28	28
g / C, Green / Cycle	0.60	0.58	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.20	0.52	0.29	0.21
s, saturation flow rate [veh/h]	4000	3492	3344	1562
c, Capacity [veh/h]	2412	2014	1159	542
d1, Uniform Delay [s]	7.87	14.75	24.09	21.57
k, delay calibration	0.50	0.50	0.04	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.38	6.64	0.68	0.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

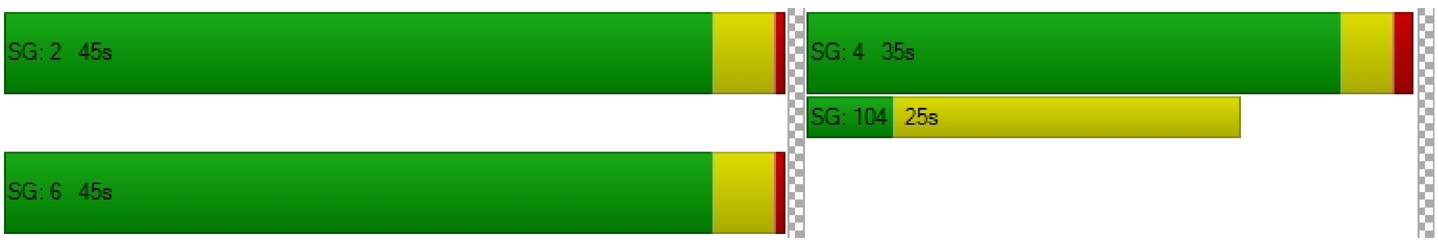
X, volume / capacity	0.33	0.89	0.85	0.61
d, Delay for Lane Group [s/veh]	8.25	21.39	24.77	22.42
Lane Group LOS	A	C	C	C
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	3.01	13.55	8.17	4.98
50th-Percentile Queue Length [ft]	75.35	338.74	204.34	124.51
95th-Percentile Queue Length [veh]	5.43	19.59	12.86	8.64
95th-Percentile Queue Length [ft]	135.63	489.67	321.56	216.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	8.25	21.39	0.00	24.77	22.42
Movement LOS		A	C		C	C
d_A, Approach Delay [s/veh]	8.25		21.39		24.18	
Approach LOS	A		C		C	
d_I, Intersection Delay [s/veh]	19.62					
Intersection LOS	B					
Intersection V/C	0.887					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	29.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.761

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Base Volume Input [veh/h]	28	1184	14	439	1422	296	15	4	71	239	12	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	3.00	7.10	3.90	4.00	1.00	0.00	0.00	12.70	1.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	59	0	0	0
Total Hourly Volume [veh/h]	28	1184	14	439	1422	296	15	4	12	239	12	5
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	312	4	116	374	78	4	1	3	63	3	1
Total Analysis Volume [veh/h]	29	1246	15	462	1497	312	16	4	13	252	13	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			1			2		
Bicycle Volume [bicycles/h]	2			0			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	70.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	0	6	0	4	4	4
Maximum Green [s]	15	40	40	15	40	40	0	20	0	20	20	20
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	12	51	51	31	70	70	0	41	0	37	37	37
Vehicle Extension [s]	2.5	3.5	3.5	2.0	3.5	3.5	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	0	7	7	0	7	7	0	8	0	8	8	8
Pedestrian Clearance [s]	0	21	21	0	21	21	0	28	0	24	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	5	93	93	26	113	113	7	7	27	27
g / C, Green / Cycle	0.03	0.58	0.58	0.16	0.71	0.71	0.04	0.04	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.24	0.24	0.14	0.50	0.53	0.01	0.01	0.14	0.01
s, saturation flow rate [veh/h]	1747	3512	1832	3382	1827	1721	1827	2536	1779	1803
c, Capacity [veh/h]	59	2043	1066	540	1293	1218	78	109	295	299
d1, Uniform Delay [s]	75.90	18.30	18.30	65.35	13.51	14.37	74.01	73.57	64.81	56.19
k, delay calibration	0.08	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.24	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.74	0.60	1.15	1.55	3.16	4.11	1.26	0.36	14.19	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

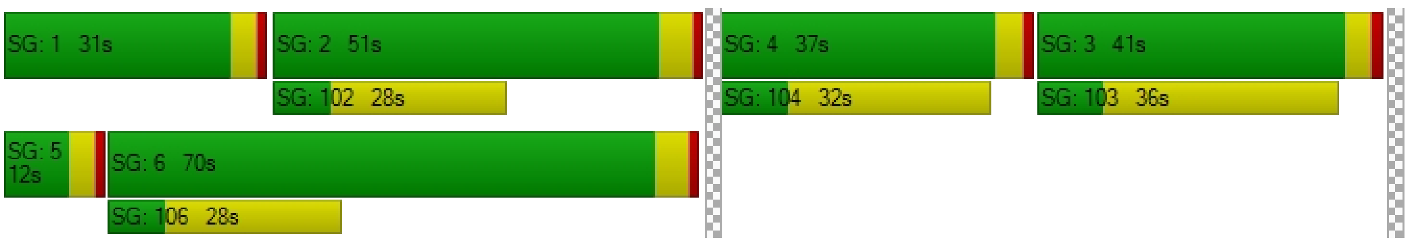
X, volume / capacity	0.50	0.41	0.41	0.86	0.70	0.74	0.26	0.12	0.86	0.06
d, Delay for Lane Group [s/veh]	80.63	18.90	19.45	66.90	16.67	18.49	75.26	73.93	78.99	56.25
Lane Group LOS	F	B	B	E	B	B	E	E	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.25	8.57	9.11	9.27	18.81	20.20	0.83	0.27	11.26	0.63
50th-Percentile Queue Length [ft]	31.28	214.16	227.71	231.67	470.36	505.07	20.83	6.65	281.43	15.76
95th-Percentile Queue Length [veh]	2.25	13.37	14.06	14.26	25.93	27.57	1.50	0.48	16.76	1.13
95th-Percentile Queue Length [ft]	56.31	334.16	351.45	356.47	648.21	689.35	37.50	11.96	419.00	28.37

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	80.63	19.08	19.45	66.90	17.39	18.49	75.26	75.26	73.93	78.99	56.25	56.25
Movement LOS	F	B	B	E	B	B	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	20.47			27.61			74.74			77.48		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	29.11											
Intersection LOS	C											
Intersection V/C	0.761											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	33.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.745

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Base Volume Input [veh/h]	99	767	90	27	1068	435	447	47	198	27	16	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	1.60	5.60	7.40	5.10	3.00	6.50	8.50	4.50	25.90	37.50	28.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	15	0	0	0
Total Hourly Volume [veh/h]	99	767	90	27	1068	435	447	47	183	27	16	25
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	202	24	7	281	114	118	12	48	7	4	7
Total Analysis Volume [veh/h]	104	807	95	28	1124	458	471	49	193	28	17	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			5			3			3		
Bicycle Volume [bicycles/h]	10			5			2			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	50.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	15	76	76	12	72	72	37	36	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	12	12	0	16	16	25	25	25	0	25	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	13	108	108	5	101	101	29	29	29	9	9
g / C, Green / Cycle	0.08	0.68	0.68	0.03	0.63	0.63	0.18	0.18	0.18	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.06	0.25	0.25	0.02	0.45	0.48	0.15	0.15	0.13	0.02	0.04
s, saturation flow rate [veh/h]	1740	1870	1789	1685	1808	1609	1699	1683	1508	1437	1214
c, Capacity [veh/h]	141	1266	1212	55	1137	1012	312	309	277	81	68
d1, Uniform Delay [s]	71.78	11.04	11.07	76.02	20.02	21.05	62.96	62.94	61.09	72.61	73.81
k, delay calibration	0.38	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	22.75	0.81	0.85	2.63	3.87	5.33	4.51	4.50	2.35	1.88	6.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

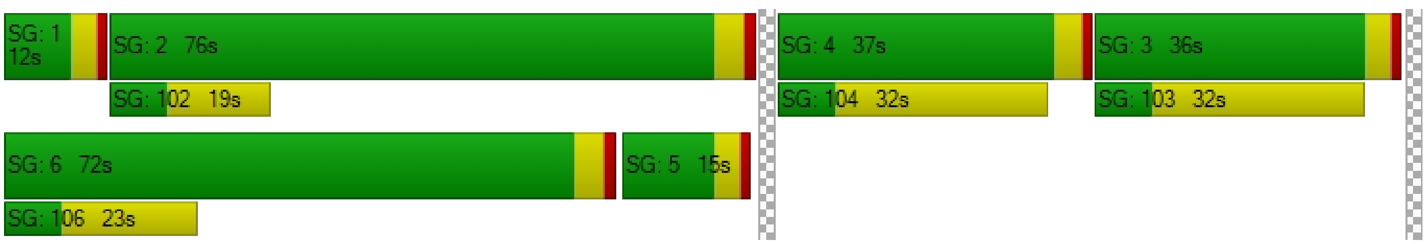
X, volume / capacity	0.74	0.36	0.37	0.51	0.72	0.76	0.84	0.84	0.70	0.35	0.63
d, Delay for Lane Group [s/veh]	94.53	11.85	11.92	78.65	23.89	26.38	67.47	67.44	63.44	74.49	80.70
Lane Group LOS	F	B	B	E	C	C	E	E	E	E	F
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	5.06	7.13	6.90	1.18	21.05	21.17	10.77	10.65	7.62	1.16	1.88
50th-Percentile Queue Length [ft]	126.56	178.35	172.56	29.38	526.37	529.19	269.33	266.18	190.40	29.09	47.03
95th-Percentile Queue Length [veh]	8.75	11.51	11.21	2.12	28.58	28.71	16.16	16.00	12.14	2.09	3.39
95th-Percentile Queue Length [ft]	218.81	287.86	280.27	52.88	714.50	717.83	403.90	399.96	303.55	52.36	84.66

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	94.53	11.88	11.92	78.65	24.57	26.38	67.45	67.44	63.44	74.49	80.70	80.70
Movement LOS	F	B	B	E	C	C	E	E	E	E	F	F
d_A, Approach Delay [s/veh]	20.43			26.03			66.37			78.25		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	33.92											
Intersection LOS	C											
Intersection V/C	0.745											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	19.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.659

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	1	803	82	268	867	31	114	78	7	45	19	173
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.20	2.40	7.10	6.20	3.20	3.50	2.60	0.00	0.00	5.30	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	803	82	268	867	31	114	78	7	45	19	173
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	211	22	71	228	8	30	21	2	12	5	46
Total Analysis Volume [veh/h]	1	845	86	282	913	33	120	82	7	47	20	182
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			4			0		
Bicycle Volume [bicycles/h]	4			4			6			8		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	40	60	40	25	40	60	31	31	31	0	31	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	48	29	48	19	48	29	32	32	32	0	32	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	35	35	17	54	54	22	22
g / C, Green / Cycle	0.44	0.44	0.21	0.67	0.67	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.26	0.27	0.17	0.27	0.27	0.19	0.16
s, saturation flow rate [veh/h]	1876	1642	1690	1789	1763	1078	1558
c, Capacity [veh/h]	868	720	355	1205	1188	369	484
d1, Uniform Delay [s]	17.16	17.20	30.00	5.82	5.82	26.85	24.91
k, delay calibration	0.50	0.50	0.41	0.50	0.50	0.14	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.73	3.76	13.83	0.97	0.99	1.72	0.63
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.57	0.61	0.79	0.39	0.40	0.57	0.51
d, Delay for Lane Group [s/veh]	19.89	20.96	43.83	6.79	6.81	28.57	25.54
Lane Group LOS	B	C	D	A	A	C	C
Critical Lane Group	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	6.96	6.32	6.26	3.01	2.98	3.82	3.99
50th-Percentile Queue Length [ft]	174.10	157.90	156.46	75.25	74.59	95.38	99.82
95th-Percentile Queue Length [veh]	11.29	10.44	10.36	5.42	5.37	6.87	7.19
95th-Percentile Queue Length [ft]	282.30	260.94	259.03	135.44	134.26	171.69	179.67

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	19.89	20.33	20.96	43.83	6.80	6.81	28.57	28.57	28.57	25.54	25.54	25.54
Movement LOS	B	C	C	D	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	20.39			15.30			28.57			25.54		
Approach LOS	C			B			C			C		
d_I, Intersection Delay [s/veh]	19.15											
Intersection LOS	B											
Intersection V/C	0.659											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Middlefield Rd/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	45.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.912

Intersection Setup

Name	Marsh Road		Middlefield Road		Middlefield Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	225.00	150.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	485	295	374	391	225	455
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	242	0	0	0	427
Total Hourly Volume [veh/h]	485	53	374	391	225	28
Peak Hour Factor	0.9510	0.9510	0.9280	0.9280	0.9440	0.9440
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	127	14	101	105	60	7
Total Analysis Volume [veh/h]	510	56	403	421	238	30
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	9		0		0	
Bicycle Volume [bicycles/h]	1		28		19	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Overlap	Protected	Permissive	Permissive	Permissive
Signal group	3	1	1	2	2	2
Auxiliary Signal Groups		1,3				4,6
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	20	20	20	20	20
Maximum Green [s]	53	23	23	17	17	17
Amber [s]	3.2	3.0	3.0	3.2	3.2	3.2
All red [s]	2.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	0	0	30	30	30
Vehicle Extension [s]	2.5	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	0	0	8	8	8
Pedestrian Clearance [s]	0	0	0	12	12	12
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	3.2	2.0	2.0	2.2	2.2	2.2
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	5.20	4.00	4.00	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.20	0.00	2.00	2.20	2.20	2.20
g_i, Effective Green Time [s]	21	39	13	17	17	17
g / C, Green / Cycle	0.33	0.61	0.20	0.27	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.29	0.04	0.23	0.23	0.13	0.02
s, saturation flow rate [veh/h]	1774	1551	1774	1863	1863	1524
c, Capacity [veh/h]	578	940	352	495	495	405
d1, Uniform Delay [s]	20.38	5.15	25.62	22.26	19.75	17.57
k, delay calibration	0.08	0.04	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.50	0.01	73.08	16.54	3.31	0.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.06	1.14	0.85	0.48	0.07
d, Delay for Lane Group [s/veh]	23.88	5.16	98.70	38.80	23.07	17.93
Lane Group LOS	C	A	F	D	C	B
Critical Lane Group	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	7.06	0.24	12.13	7.78	3.22	0.35
50th-Percentile Queue Length [ft]	176.41	6.04	303.28	194.54	80.45	8.74
95th-Percentile Queue Length [veh]	11.41	0.43	19.05	12.36	5.79	0.63
95th-Percentile Queue Length [ft]	285.32	10.87	476.15	308.91	144.81	15.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	23.88	5.16	98.70	38.80	23.07	17.93
Movement LOS	C	A	F	D	C	B
d_A, Approach Delay [s/veh]	22.03		68.10		22.49	
Approach LOS	C		E		C	
d_I, Intersection Delay [s/veh]	45.00					
Intersection LOS	D					
Intersection V/C	0.912					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	53.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.747

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	85	522	446	364	420	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	11.80	4.20	3.10	2.50	3.30	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	85	0	446	364	420	75
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	24	0	124	101	117	21
Total Analysis Volume [veh/h]	94	0	496	404	467	83
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2		21		0	
Bicycle Volume [bicycles/h]	22		39		37	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	10	10	0
Maximum Green [s]	50	35	35	70	35	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	50	35	35	70	35	0
Vehicle Extension [s]	2.5	3.6	3.0	3.6	3.6	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	10	12	0	12	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	2.6	0.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	Yes	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	4.60	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	2.60	0.00
g_i, Effective Green Time [s]	12	12	33	102	70
g / C, Green / Cycle	0.10	0.10	0.28	0.85	0.58
(v / s)_i Volume / Saturation Flow Rate	0.06	0.00	0.31	0.24	0.34
s, saturation flow rate [veh/h]	1457	1395	1580	1668	1599
c, Capacity [veh/h]	140	134	434	1416	925
d1, Uniform Delay [s]	52.40	0.00	43.52	1.81	16.24
k, delay calibration	0.08	0.08	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.06	0.00	87.99	0.51	2.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

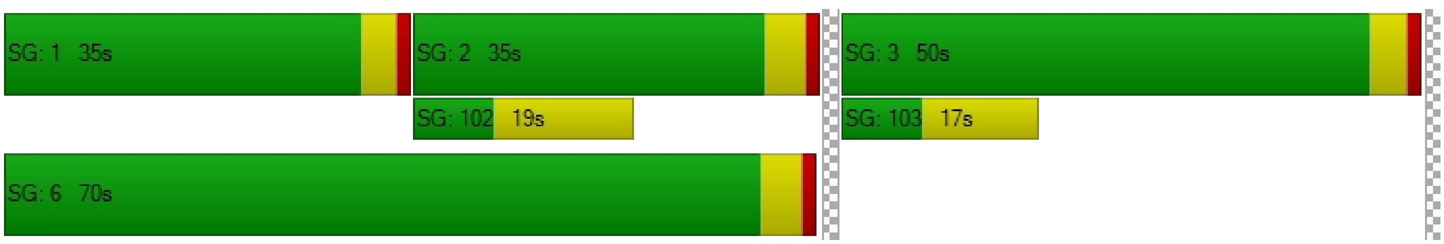
X, volume / capacity	0.67	0.00	1.14	0.29	0.59
d, Delay for Lane Group [s/veh]	56.46	0.00	131.51	2.32	19.05
Lane Group LOS	E	A	F	A	B
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	2.90	0.00	23.24	1.22	9.88
50th-Percentile Queue Length [ft]	72.44	0.00	580.94	30.56	246.91
95th-Percentile Queue Length [veh]	5.22	0.00	33.67	2.20	15.03
95th-Percentile Queue Length [ft]	130.38	0.00	841.86	55.00	375.76

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.46	0.00	131.51	2.32	19.05	19.05
Movement LOS	E	A	F	A	B	B
d_A, Approach Delay [s/veh]	56.46		73.52		19.05	
Approach LOS	E		E		B	
d_I, Intersection Delay [s/veh]	53.07					
Intersection LOS	D					
Intersection V/C	0.747					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Middlefield Rd/Ringswood Ave

Control Type:	Signalized	Delay (sec / veh):	23.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.456

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	5	3	12	136	44	251	55	559	84	216	653	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	8.30	4.40	0.00	4.00	0.00	3.20	0.00	4.60	4.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	222	0	0	96	0	0	0
Total Hourly Volume [veh/h]	5	3	12	136	44	29	55	559	0	216	653	62
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	3	36	12	8	14	147	0	57	172	16
Total Analysis Volume [veh/h]	5	3	13	143	46	31	58	588	0	227	687	65
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			27			5			11		
Bicycle Volume [bicycles/h]	6			23			39			34		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	2	8	2	6	8	6	1	6	8	5	2	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	35	35	35	50	35	50	50	50	35	35	35	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.0	3.6	3.2	3.5	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	35	35	35	50	35	50	50	50	35	35	35	0
Vehicle Extension [s]	3.6	2.9	3.6	3.6	2.9	3.6	3.0	3.6	2.9	3.0	3.6	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	12	12	12	12	12	0	12	12	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.6	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.6	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.50	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.60	2.60
g_i, Effective Green Time [s]	25	25	25	25	7	69	69	18	79	79
g / C, Green / Cycle	0.21	0.21	0.21	0.21	0.06	0.57	0.57	0.15	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.00	0.01	0.14	0.02	0.03	0.17	0.00	0.13	0.21	0.21
s, saturation flow rate [veh/h]	1381	1626	1337	1473	1810	3505	1615	1730	1827	1758
c, Capacity [veh/h]	120	339	332	307	106	2003	923	258	1208	1162
d1, Uniform Delay [s]	55.13	37.96	45.42	38.39	54.92	13.25	0.00	49.98	8.71	8.73
k, delay calibration	0.10	0.10	0.14	0.10	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	0.05	2.04	0.14	4.31	0.37	0.00	9.32	0.69	0.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

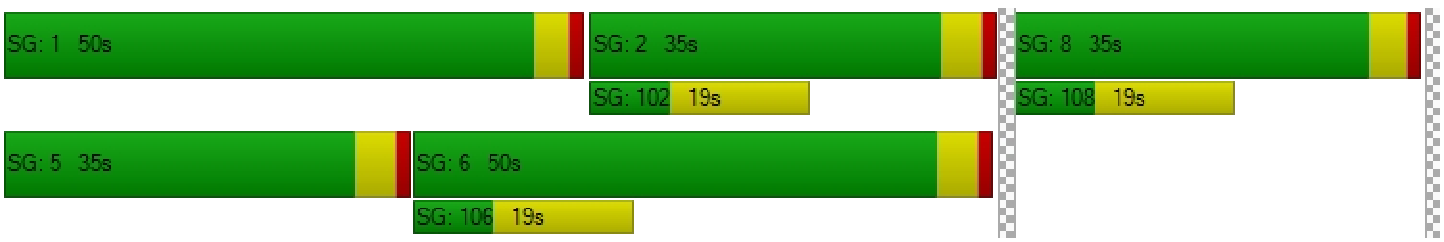
X, volume / capacity	0.04	0.05	0.57	0.10	0.55	0.29	0.00	0.88	0.32	0.32
d, Delay for Lane Group [s/veh]	55.27	38.01	47.47	38.53	59.23	13.62	0.00	59.30	9.40	9.45
Lane Group LOS	E	D	D	D	E	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.15	0.39	5.44	0.76	1.82	4.05	0.00	7.26	4.17	4.06
50th-Percentile Queue Length [ft]	3.81	9.81	135.97	18.91	45.53	101.16	0.00	181.62	104.28	101.60
95th-Percentile Queue Length [veh]	0.27	0.71	9.26	1.36	3.28	7.28	0.00	11.69	7.51	7.31
95th-Percentile Queue Length [ft]	6.86	17.66	231.59	34.03	81.95	182.09	0.00	292.13	187.71	182.87

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.27	38.01	38.01	47.47	47.47	38.53	59.23	13.62	0.00	59.30	9.42	9.45
Movement LOS	E	D	D	D	D	D	E	B	A	E	A	A
d_A, Approach Delay [s/veh]	42.12			46.21			17.72			20.99		
Approach LOS	D			D			B			C		
d_I, Intersection Delay [s/veh]	23.07											
Intersection LOS	C											
Intersection V/C	0.456											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Middlefield Rd/Lytton Ave

Control Type:	Signalized	Delay (sec / veh):	41.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.633

Intersection Setup

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	118	39	71	4	111	6	129	273	7	5	464	337
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	118	39	71	4	111	6	129	273	7	5	464	337
Peak Hour Factor	0.8380	0.8380	0.8380	0.9170	0.9170	0.9170	0.8810	0.8810	0.8810	0.9160	0.9160	0.9160
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	12	21	1	30	2	37	77	2	1	127	92
Total Analysis Volume [veh/h]	141	47	85	4	121	7	146	310	8	5	507	368
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			3			7			7		
Bicycle Volume [bicycles/h]	4			28			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	32.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	4	0	0	1	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	4	0	0	12	0	0	12	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	22	0	0	21	0	0	22	0	0	35	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	6	0	0	5	0	0	6	0	0	6	0
Pedestrian Clearance [s]	0	10	0	0	9	0	0	10	0	0	8	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	9	35	35	30	30
g / C, Green / Cycle	0.10	0.10	0.09	0.35	0.35	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.08	0.08	0.08	0.13	0.12	0.27	0.21
s, saturation flow rate [veh/h]	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	180	180	163	620	620	539	539
d1, Uniform Delay [s]	43.75	43.57	44.45	24.80	24.52	33.85	31.25
k, delay calibration	0.08	0.08	0.08	0.50	0.50	0.41	0.31
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.32	4.43	6.86	1.83	1.62	19.87	5.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

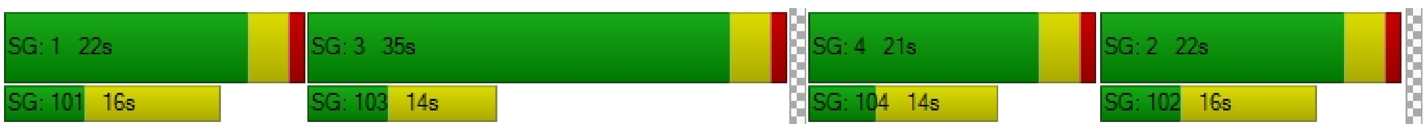
X, volume / capacity	0.78	0.74	0.81	0.39	0.36	0.92	0.72
d, Delay for Lane Group [s/veh]	49.07	48.00	51.31	26.63	26.14	53.71	36.30
Lane Group LOS	D	D	D	C	C	D	D
Critical Lane Group	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	3.65	3.43	3.53	4.63	4.23	14.43	9.01
50th-Percentile Queue Length [ft]	91.23	85.84	88.23	115.86	105.80	360.65	225.15
95th-Percentile Queue Length [veh]	6.57	6.18	6.35	8.16	7.61	20.66	13.93
95th-Percentile Queue Length [ft]	164.22	154.52	158.81	204.12	190.15	516.38	348.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.04	48.00	48.00	51.31	51.31	51.31	26.63	26.29	26.14	53.71	53.11	36.30
Movement LOS	D	D	D	D	D	D	C	C	C	D	D	D
d_A, Approach Delay [s/veh]	48.55			51.31			26.39			46.08		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	41.64											
Intersection LOS	D											
Intersection V/C	0.633											

Sequence

Ring 1	1	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Middlefield Rd/University Ave

Control Type:	Signalized	Delay (sec / veh):	36.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.523

Intersection Setup

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	140.00	100.00	100.00	180.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	25	240	25	113	497	143	34	240	65	110	352	67
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	240	25	113	497	143	34	240	65	110	352	67
Peak Hour Factor	0.9180	0.9180	0.9180	0.9460	0.9460	0.9460	0.9110	0.9110	0.9110	0.9380	0.9380	0.9380
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	65	7	30	131	38	9	66	18	29	94	18
Total Analysis Volume [veh/h]	27	261	27	119	525	151	37	263	71	117	375	71
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			5			14			29		
Bicycle Volume [bicycles/h]	3			23			4			10		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	16.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	2	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	8	0	0	8	0	0	8	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	44	0	0	44	0	0	24	0	0	32	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	12	0	0	11	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	23	23	23	23	44	44	21	21
g / C, Green / Cycle	0.23	0.23	0.23	0.23	0.23	0.44	0.44	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.02	0.16	0.07	0.20	0.19	0.11	0.10	0.17	0.15
s, saturation flow rate [veh/h]	1750	1750	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	118	404	189	404	404	791	791	378	378
d1, Uniform Delay [s]	30.06	35.42	31.75	37.01	36.34	17.64	17.38	37.42	36.62
k, delay calibration	0.08	0.08	0.08	0.08	0.08	0.50	0.50	0.26	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.72	1.76	2.55	4.42	2.86	0.76	0.64	8.48	5.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.71	0.63	0.87	0.81	0.25	0.22	0.79	0.70
d, Delay for Lane Group [s/veh]	30.78	37.18	34.30	41.43	39.21	18.40	18.01	45.90	41.64
Lane Group LOS	C	D	C	D	D	B	B	D	D
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	0.54	6.65	2.50	8.61	7.71	3.03	2.61	7.78	6.53
50th-Percentile Queue Length [ft]	13.43	166.26	62.38	215.29	192.65	75.77	65.30	194.46	163.18
95th-Percentile Queue Length [veh]	0.97	10.88	4.49	13.42	12.26	5.46	4.70	12.35	10.72
95th-Percentile Queue Length [ft]	24.17	271.99	112.29	335.61	306.46	136.38	117.53	308.80	267.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.78	37.18	37.18	34.30	40.69	39.21	18.40	18.25	18.01	45.90	43.69	41.64
Movement LOS	C	D	D	C	D	D	B	B	B	D	D	D
d_A, Approach Delay [s/veh]	36.63			39.45			18.22			43.89		
Approach LOS	D			D			B			D		
d_I, Intersection Delay [s/veh]	36.39											
Intersection LOS	D											
Intersection V/C	0.523											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	19.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.966

Intersection Setup

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	873	85	1495	3915	185	359
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	3.50	1.60	3.10	2.20	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	873	85	1495	3915	185	359
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	227	22	389	1020	48	93
Total Analysis Volume [veh/h]	909	89	1557	4078	193	374
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal group	6	2	5	2	4	4
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	4
Maximum Green [s]	35	110	75	110	15	15
Amber [s]	5.0	5.4	3.0	5.4	3.0	3.0
All red [s]	1.0	0.5	0.5	0.5	1.0	1.0
Split [s]	30	0	0	0	30	30
Vehicle Extension [s]	3.5	3.5	2.0	3.5	2.0	2.0
Walk [s]	5	0	0	0	5	5
Pedestrian Clearance [s]	35	0	0	0	29	29
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	4.0	3.9	1.5	3.9	2.0	2.0
Minimum Recall	Yes		No	Yes	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	6.00	6.00	3.50	5.90	4.00	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	1.50	3.90	2.00	0.00
g_i, Effective Green Time [s]	29	29	48	81	8	60
g / C, Green / Cycle	0.29	0.29	0.49	0.82	0.08	0.61
(v / s)_i Volume / Saturation Flow Rate	0.19	0.06	0.45	0.81	0.06	0.09
s, saturation flow rate [veh/h]	4910	1540	3459	5020	3438	4139
c, Capacity [veh/h]	1436	450	1687	4099	287	2531
d1, Uniform Delay [s]	30.41	26.30	23.61	8.87	44.05	8.21
k, delay calibration	0.13	0.13	0.04	0.13	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.56	0.26	1.00	6.09	1.03	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

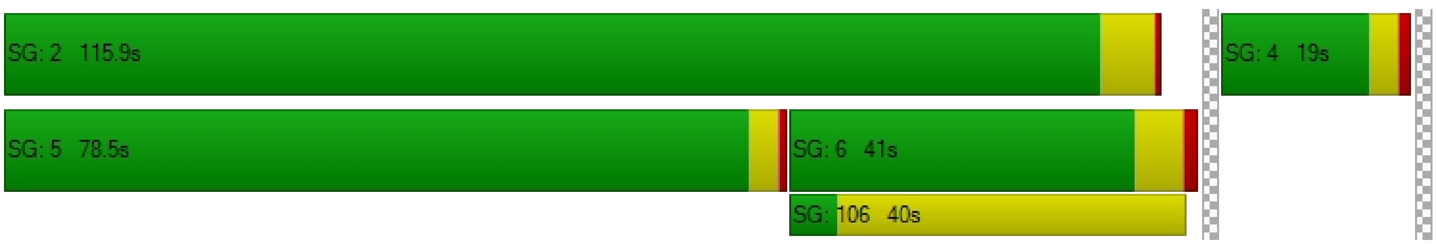
X, volume / capacity	0.63	0.20	0.92	0.99	0.67	0.15
d, Delay for Lane Group [s/veh]	30.97	26.56	24.61	14.96	45.08	8.22
Lane Group LOS	C	C	C	B	D	A
Critical Lane Group	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	5.81	1.49	14.47	9.70	2.30	1.04
50th-Percentile Queue Length [ft]	145.19	37.21	361.68	242.46	57.44	25.97
95th-Percentile Queue Length [veh]	9.76	2.68	20.71	14.81	4.14	1.87
95th-Percentile Queue Length [ft]	243.99	66.98	517.63	370.15	103.39	46.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.97	26.56	24.61	14.96	45.08	8.22
Movement LOS	C	C	C	B	D	A
d_A, Approach Delay [s/veh]	30.58		17.63		20.77	
Approach LOS	C		B		C	
d_I, Intersection Delay [s/veh]	19.67					
Intersection LOS	B					
Intersection V/C	0.966					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	31.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.848

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Base Volume Input [veh/h]	128	380	361	16	59	42	217	713	155	732	2780	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	10.90	4.20	10.20	37.50	30.50	40.50	4.60	6.20	12.30	6.70	3.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	16	0	0	106	0	0	0
Total Hourly Volume [veh/h]	128	380	361	16	59	26	217	713	49	732	2780	24
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	104	99	4	16	7	60	196	13	201	764	7
Total Analysis Volume [veh/h]	141	418	397	18	65	29	238	784	54	804	3055	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	17			6			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	68
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Split	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	7	7	4	8	4	1	6	2	5	2	6
Auxiliary Signal Groups			5,7									
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	6	8	8	0	6	0	6	10	10	6	10	10
Maximum Green [s]	18	15	15	0	18	0	16	40	90	65	90	40
Amber [s]	3.0	3.9	3.9	0.0	3.0	0.0	3.5	5.0	5.0	3.6	5.0	5.0
All red [s]	1.5	0.5	0.5	0.0	1.5	0.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	0	0	0	0	0	30	30	0	0	0	30
Vehicle Extension [s]	2.0	2.2	2.2	0.0	2.0	0.0	2.0	3.0	3.0	2.0	3.0	3.0
Walk [s]	5	0	0	0	5	0	0	5	0	0	0	5
Pedestrian Clearance [s]	29	0	0	0	29	0	0	35	0	0	0	35
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.5	2.4	2.4	0.0	2.5	0.0	1.5	4.0	4.0	2.6	4.0	4.0
Minimum Recall		No	No		No		No	Yes		No	Yes	
Maximum Recall		No	No		No		No	No		No	No	
Pedestrian Recall		No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.40	4.40	4.40	4.40	4.50	4.50	4.50	3.50	6.00	6.00	4.60	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.40	2.40	2.40	0.00	2.50	2.50	2.50	1.50	4.00	4.00	2.60	4.00	4.00
g_i, Effective Green Time [s]	15	15	15	65	6	6	6	9	18	18	45	55	55
g / C, Green / Cycle	0.14	0.14	0.14	0.63	0.05	0.05	0.05	0.09	0.17	0.17	0.44	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.09	0.13	0.11	0.12	0.01	0.02	0.03	0.07	0.13	0.04	0.24	0.52	0.02
s, saturation flow rate [veh/h]	1632	1823	1659	3362	1316	2772	1107	3360	5836	1438	3293	5846	1615
c, Capacity [veh/h]	236	264	240	2109	71	150	60	307	1021	252	1444	3114	860
d1, Uniform Delay [s]	41.54	43.61	42.60	8.17	47.05	47.52	47.65	46.09	40.78	36.68	21.64	23.73	11.52
k, delay calibration	0.07	0.30	0.19	0.06	0.04	0.04	0.04	0.04	0.11	0.11	0.04	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.60	23.68	8.29	0.02	0.69	0.74	2.24	1.60	1.24	0.42	0.13	4.31	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.60	0.90	0.76	0.19	0.25	0.43	0.48	0.78	0.77	0.21	0.56	0.98	0.03
d, Delay for Lane Group [s/veh]	43.14	67.29	50.90	8.19	47.74	48.26	49.90	47.69	42.02	37.10	21.77	28.05	11.53
Lane Group LOS	D	E	D	A	D	D	D	D	D	D	C	C	B
Critical Lane Group	No	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	3.39	7.52	4.88	1.67	0.47	0.84	0.78	3.05	6.42	1.20	7.09	23.80	0.28
50th-Percentile Queue Length [ft]	84.72	188.0	122.1	41.75	11.65	21.01	19.39	76.22	160.42	30.00	177.30	595.05	7.07
95th-Percentile Queue Length [veh]	6.10	12.02	8.51	3.01	0.84	1.51	1.40	5.49	10.57	2.16	11.46	31.80	0.51
95th-Percentile Queue Length [ft]	152.5	300.4	212.7	75.15	20.97	37.82	34.90	137.19	264.28	54.01	286.48	795.08	12.73

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.14	60.17	8.19	47.74	48.26	49.90	47.69	42.02	37.10	21.77	28.05	11.53
Movement LOS	D	E	A	D	D	D	D	D	D	C	C	B
d_A, Approach Delay [s/veh]	36.08			48.60			43.03			26.64		
Approach LOS	D			D			D			C		
d_I, Intersection Delay [s/veh]	31.47											
Intersection LOS	C											
Intersection V/C	0.848											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	9.3
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.699

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	124	807	71	88	795	57	78	22	50	26	24	23
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	6.30	7.00	9.10	8.40	10.50	1.30	4.50	6.00	23.10	12.50	30.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	124	807	71	88	795	57	78	22	50	26	24	23
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	237	21	26	234	17	23	6	15	8	7	7
Total Analysis Volume [veh/h]	146	949	84	104	935	67	92	26	59	31	28	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			16			10			7		
Bicycle Volume [bicycles/h]	15			7			8			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	1	6	2	5	2	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	4	4	4	4	4	4
Maximum Green [s]	21	30	70	16	70	30	26	26	26	26	26	26
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.2	3.2	3.2
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	30	30	0	0	0	30	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	7	7	0	7	7	5	5	5	5	5	5
Pedestrian Clearance [s]	0	19	15	0	15	19	25	25	25	25	25	25
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.2	1.2	1.2
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	6.0	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	1.00	2.00	2.00	0.00	1.20
g_i, Effective Green Time [s]	4	16	16	3	15	15	4	4
g / C, Green / Cycle	0.11	0.49	0.49	0.08	0.46	0.46	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.08	0.29	0.30	0.06	0.29	0.29	0.10	0.06
s, saturation flow rate [veh/h]	1781	1787	1724	1659	1753	1702	1695	1506
c, Capacity [veh/h]	192	877	846	129	808	784	290	339
d1, Uniform Delay [s]	14.59	6.17	6.20	15.26	6.88	6.90	13.88	13.54
k, delay calibration	0.04	0.15	0.15	0.04	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.33	0.93	0.99	4.36	1.15	1.20	0.77	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

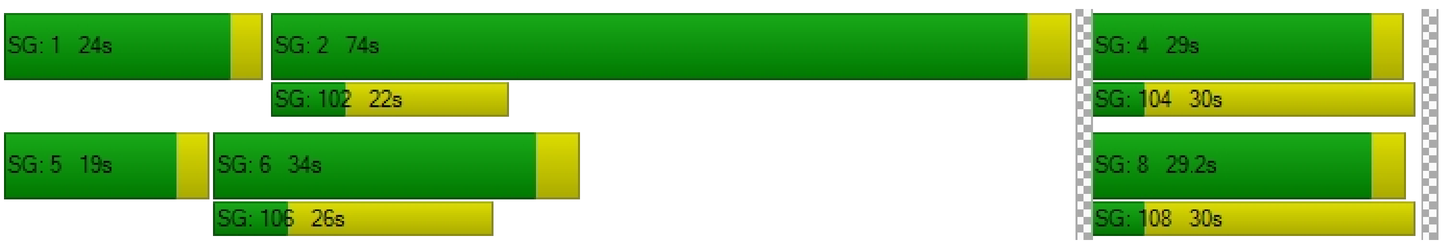
X, volume / capacity	0.76	0.60	0.60	0.80	0.63	0.63	0.61	0.25
d, Delay for Lane Group [s/veh]	16.91	7.10	7.18	19.62	8.03	8.10	14.65	13.69
Lane Group LOS	B	A	A	B	A	A	B	B
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.92	1.27	1.25	0.79	1.78	1.76	1.13	0.51
50th-Percentile Queue Length [ft]	22.89	31.73	31.24	19.75	44.56	43.89	28.32	12.78
95th-Percentile Queue Length [veh]	1.65	2.28	2.25	1.42	3.21	3.16	2.04	0.92
95th-Percentile Queue Length [ft]	41.20	57.11	56.23	35.55	80.21	79.00	50.98	23.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	16.91	7.14	7.18	19.62	8.06	8.10	14.65	14.65	14.65	13.69	13.69	13.69
Movement LOS	B	A	A	B	A	A	B	B	B	B	B	B
d_A, Approach Delay [s/veh]	8.35			9.15			14.65			13.69		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	9.32											
Intersection LOS	A											
Intersection V/C	0.699											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	18.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.549

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration	┓‖		‖┣		┓┏	
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	135.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	129	1141	842	9	17	147
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	5.70	10.30	22.20	0.00	6.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	129	1141	842	9	17	147
Peak Hour Factor	0.8500	0.8500	0.8500	0.8500	0.8500	0.8500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	336	248	3	5	43
Total Analysis Volume [veh/h]	152	1342	991	11	20	173
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14		18		7	
Bicycle Volume [bicycles/h]	16		6		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	90.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lag	-
Minimum Green [s]	4	15	10	10	11	11
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	4.0	3.0	3.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	20	128	108	108	32	32
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	5	5
Pedestrian Clearance [s]	0	0	22	22	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	2.0	1.0	1.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	2.00	1.00	1.00
g_i, Effective Green Time [s]	16	132	113	113	21	21
g / C, Green / Cycle	0.10	0.82	0.71	0.71	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.09	0.39	0.29	0.29	0.01	0.12
s, saturation flow rate [veh/h]	1769	3423	1723	1715	1810	1449
c, Capacity [veh/h]	172	2825	1222	1216	237	190
d1, Uniform Delay [s]	71.32	4.01	9.53	9.55	61.09	68.61
k, delay calibration	0.28	0.50	0.50	0.50	0.04	0.17
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	28.94	0.58	1.02	1.03	0.06	21.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.48	0.41	0.41	0.08	0.91
d, Delay for Lane Group [s/veh]	100.25	4.59	10.55	10.58	61.15	89.88
Lane Group LOS	F	A	B	B	E	F
Critical Lane Group	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	7.50	5.13	7.13	7.14	0.73	8.14
50th-Percentile Queue Length [ft]	187.46	128.18	178.20	178.59	18.15	203.47
95th-Percentile Queue Length [veh]	11.99	8.84	11.51	11.53	1.31	12.82
95th-Percentile Queue Length [ft]	299.74	221.02	287.66	288.17	32.68	320.44

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	100.25	4.59	10.57	10.58	61.15	89.88
Movement LOS	F	A	B	B	E	F
d_A, Approach Delay [s/veh]	14.32		10.57		86.90	
Approach LOS	B		B		F	
d_I, Intersection Delay [s/veh]	18.13					
Intersection LOS	B					
Intersection V/C	0.549					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	14.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.544

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1201	304	54	969	195	58
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	5.30	7.40	9.70	10.30	8.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1201	304	54	969	195	58
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	330	84	15	266	54	16
Total Analysis Volume [veh/h]	1320	334	59	1065	214	64
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		21	
Bicycle Volume [bicycles/h]	27		1		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	93.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	5	15	8	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	4.0	4.0	3.0	4.0	3.2	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	117	117	20	137	23	0
Vehicle Extension [s]	4.0	4.0	2.0	4.0	2.0	0.0
Walk [s]	7	7	0	0	0	0
Pedestrian Clearance [s]	17	17	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	1.0	2.0	1.2	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	3.00	4.00	3.20	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	1.00	2.00	1.20	1.20
g_i, Effective Green Time [s]	127	127	7	137	16	16
g / C, Green / Cycle	0.79	0.79	0.04	0.86	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.38	0.23	0.04	0.32	0.09	0.09
s, saturation flow rate [veh/h]	3432	1464	1685	3298	1641	1577
c, Capacity [veh/h]	2725	1163	74	2825	162	155
d1, Uniform Delay [s]	5.51	4.40	75.77	2.43	71.11	71.17
k, delay calibration	0.50	0.50	0.04	0.50	0.18	0.19
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.62	0.62	7.27	0.39	20.60	22.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.48	0.29	0.80	0.38	0.87	0.88
d, Delay for Lane Group [s/veh]	6.13	5.02	83.05	2.82	91.70	93.93
Lane Group LOS	A	A	F	A	F	F
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	6.49	2.72	2.54	2.55	6.66	6.55
50th-Percentile Queue Length [ft]	162.23	68.12	63.56	63.77	166.49	163.85
95th-Percentile Queue Length [veh]	10.67	4.90	4.58	4.59	10.89	10.75
95th-Percentile Queue Length [ft]	266.67	122.62	114.41	114.78	272.30	268.82

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.13	5.02	83.05	2.82	92.47	93.93
Movement LOS	A	A	F	A	F	F
d_A, Approach Delay [s/veh]	5.91		7.03		92.80	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	14.22					
Intersection LOS	B					
Intersection V/C	0.544					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	41.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.772

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	151	1407	166	51	1132	10	37	169	281	273	120	42
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	5.70	6.60	2.00	10.00	30.00	10.80	4.10	1.80	2.90	7.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	44	0	0	34
Total Hourly Volume [veh/h]	151	1407	166	51	1132	10	37	169	237	273	120	8
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	378	45	14	304	3	10	45	64	73	32	2
Total Analysis Volume [veh/h]	162	1513	178	55	1217	11	40	182	255	294	129	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			39			14			15		
Bicycle Volume [bicycles/h]	11			5			6			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	97.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	4	4	8	3	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	4	4	4	0	4	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0
Split [s]	22	91	91	21	90	90	27	27	27	0	21	0
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	0.0	2.0	0.0
Walk [s]	0	5	5	0	7	7	5	5	5	0	0	0
Pedestrian Clearance [s]	0	19	19	0	16	16	23	23	23	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	3.0	3.0	1.0	3.0	3.0	2.0	2.0	2.0	0.0	1.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	6.0	6.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	5.00	5.00	3.00	5.00	5.00	4.00	4.00	4.00	3.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	3.00	3.00	1.00	3.00	3.00	2.00	2.00	2.00	1.00	1.00	1.00
g_i, Effective Green Time [s]	16	93	93	6	83	83	29	29	29	16	16	16
g / C, Green / Cycle	0.10	0.58	0.58	0.04	0.52	0.52	0.18	0.18	0.18	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.09	0.33	0.34	0.03	0.36	0.36	0.02	0.10	0.17	0.09	0.07	0.01
s, saturation flow rate [veh/h]	1774	3423	1678	1774	1727	1720	1633	1825	1496	3415	1767	1592
c, Capacity [veh/h]	182	1992	977	70	896	892	299	335	274	346	179	161
d1, Uniform Delay [s]	70.86	20.85	21.04	76.14	28.77	28.79	54.69	59.26	64.32	70.70	69.70	64.98
k, delay calibration	0.25	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.23	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	25.99	1.17	2.48	6.87	4.27	4.30	0.07	0.51	23.30	2.29	2.05	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

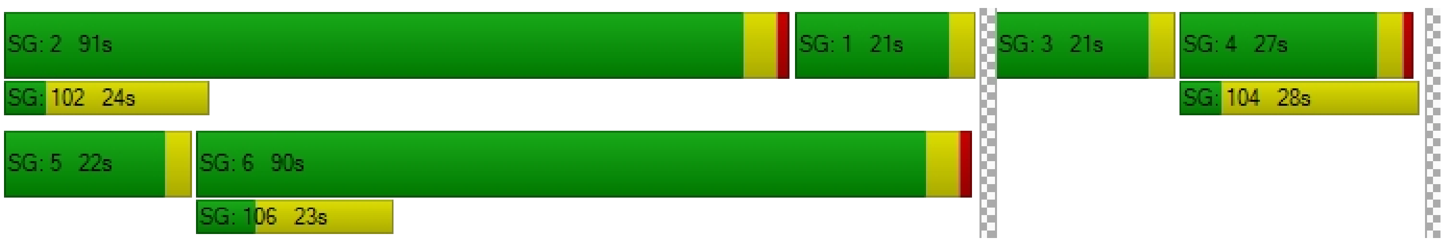
X, volume / capacity	0.89	0.57	0.58	0.78	0.69	0.69	0.13	0.54	0.93	0.85	0.72	0.06
d, Delay for Lane Group [s/veh]	96.85	22.03	23.52	83.01	33.04	33.08	54.76	59.77	87.61	72.99	71.75	65.03
Lane Group LOS	F	C	C	F	C	C	D	E	F	E	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	7.83	13.16	13.61	2.41	18.96	18.92	1.38	6.80	12.04	6.07	5.26	0.34
50th-Percentile Queue Length [ft]	195.76	328.90	340.13	60.15	473.97	473.07	34.39	169.98	301.03	151.76	131.46	8.44
95th-Percentile Queue Length [veh]	12.42	19.10	19.65	4.33	26.10	26.06	2.48	11.08	17.73	10.11	9.02	0.61
95th-Percentile Queue Length [ft]	310.50	477.62	491.36	108.27	652.50	651.42	61.90	276.89	443.31	252.78	225.48	15.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	96.85	22.41	23.52	83.01	33.06	33.08	54.76	59.77	87.61	72.99	71.75	65.03
Movement LOS	F	C	C	F	C	C	D	E	F	E	E	E
d_A, Approach Delay [s/veh]	29.02			35.20			74.24			72.45		
Approach LOS	C			D			E			E		
d_I, Intersection Delay [s/veh]	40.95											
Intersection LOS	D											
Intersection V/C	0.772											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	12.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	80.00	100.00	100.00	100.00	100.00	175.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	67	1278	1161	445	363	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	2.40	3.00	1.80	3.30	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	299	0	77
Total Hourly Volume [veh/h]	67	1278	1161	146	363	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	329	299	38	94	0
Total Analysis Volume [veh/h]	69	1318	1197	151	374	0
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		9	
Bicycle Volume [bicycles/h]	14		6		2	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	10	20	20	4	4
Maximum Green [s]	16	36	36	36	36	36
Amber [s]	3.0	4.5	4.5	4.5	3.2	3.2
All red [s]	0.5	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	0	0
Pedestrian Clearance [s]	0	0	18	18	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.5	3.5	3.5	3.5	2.2	2.2
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	5.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	3.50	2.20	2.20
g_i, Effective Green Time [s]	3	33	27	27	14	14
g / C, Green / Cycle	0.05	0.58	0.47	0.47	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.04	0.37	0.34	0.10	0.21	0.00
s, saturation flow rate [veh/h]	1783	3533	3512	1547	1752	1593
c, Capacity [veh/h]	89	2050	1647	725	437	398
d1, Uniform Delay [s]	26.77	8.01	12.20	8.91	20.41	0.00
k, delay calibration	0.04	0.15	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.31	0.49	0.89	0.20	1.89	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

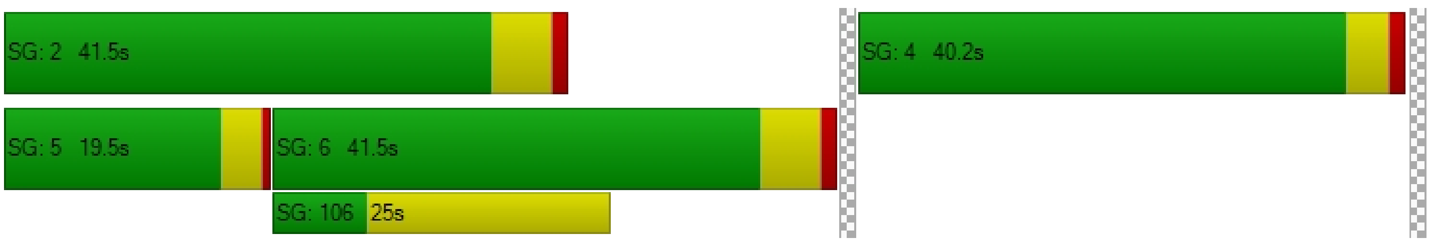
X, volume / capacity	0.77	0.64	0.73	0.21	0.86	0.00
d, Delay for Lane Group [s/veh]	32.08	8.50	13.09	9.11	22.30	0.00
Lane Group LOS	C	A	B	A	C	A
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.00	4.08	5.00	0.92	4.50	0.00
50th-Percentile Queue Length [ft]	25.05	101.97	124.94	23.10	112.47	0.00
95th-Percentile Queue Length [veh]	1.80	7.34	8.66	1.66	7.98	0.00
95th-Percentile Queue Length [ft]	45.09	183.55	216.60	41.58	199.43	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	32.08	8.50	13.09	9.11	22.30	0.00
Movement LOS	C	A	B	A	C	A
d_A, Approach Delay [s/veh]	9.67		12.64		22.30	
Approach LOS	A		B		C	
d_I, Intersection Delay [s/veh]	12.48					
Intersection LOS	B					
Intersection V/C	0.735					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.694

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	26	1040	16	36	925	89	40	3	10	48	12	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	6	0	0	0
Total Hourly Volume [veh/h]	26	1040	16	36	925	89	40	3	4	48	12	70
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	274	4	9	243	23	11	1	1	13	3	18
Total Analysis Volume [veh/h]	27	1095	17	38	974	94	42	3	4	51	13	74
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			10			10			20		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	30	30	4	30	30	4	4	4	4	4	4
Maximum Green [s]	30	100	100	20	100	100	30	30	30	30	30	30
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	30	30	0	30	30	30	30	30	30	30	30
Vehicle Extension [s]	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	7	7	7	7	7	7
Pedestrian Clearance [s]	0	11	11	0	15	15	15	15	15	15	15	15
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
g_i, Effective Green Time [s]	2	60	60	2	61	16	16	16	16
g / C, Green / Cycle	0.02	0.66	0.66	0.03	0.66	0.17	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.01	0.29	0.29	0.02	0.57	0.05	0.00	0.04	0.05
s, saturation flow rate [veh/h]	1810	1900	1889	1810	1869	821	1615	1400	1627
c, Capacity [veh/h]	39	1248	1240	49	1238	215	274	151	276
d1, Uniform Delay [s]	44.77	7.69	7.69	44.56	12.28	37.90	31.85	43.01	33.56
k, delay calibration	0.11	0.23	0.23	0.11	0.24	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.08	0.54	0.54	22.44	4.10	0.48	0.02	1.32	0.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.69	0.45	0.45	0.78	0.86	0.21	0.01	0.34	0.32
d, Delay for Lane Group [s/veh]	63.85	8.23	8.23	67.00	16.38	38.37	31.87	44.33	34.21
Lane Group LOS	E	A	A	E	B	D	C	D	C
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.82	5.02	4.99	1.17	16.33	1.00	0.08	1.20	1.76
50th-Percentile Queue Length [ft]	20.53	125.45	124.86	29.20	408.13	25.08	1.97	29.95	43.92
95th-Percentile Queue Length [veh]	1.48	8.69	8.66	2.10	22.95	1.81	0.14	2.16	3.16
95th-Percentile Queue Length [ft]	36.96	217.30	216.49	52.56	573.78	45.15	3.55	53.92	79.05

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.85	8.23	8.23	67.00	16.38	16.38	38.37	38.37	31.87	44.33	34.21	34.21
Movement LOS	E	A	A	E	B	B	D	D	C	D	C	C
d_A, Approach Delay [s/veh]	9.55			18.12			37.84			37.95		
Approach LOS	A			B			D			D		
d_I, Intersection Delay [s/veh]	15.63											
Intersection LOS	B											
Intersection V/C	0.694											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	21.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.775

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Base Volume Input [veh/h]	22	864	3	1	805	120	191	6	51	4	4	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	4.70	0.00	0.00	3.90	3.30	1.00	0.00	0.00	0.00	0.00	20.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	22	864	3	1	805	120	191	6	51	4	4	5
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	227	1	0	212	32	50	2	13	1	1	1
Total Analysis Volume [veh/h]	23	909	3	1	847	126	201	6	54	4	4	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			64			10			11		
Bicycle Volume [bicycles/h]	24			12			10			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	30.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	10	10	10	10	10	4	4	4	0	4	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	109	109	109	109	109	109	41	41	41	0	41	0
Vehicle Extension [s]	6.0	6.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	11	11	11	13	13	13	15	15	15	0	15	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	0.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	111	111	111	111	31	31
g / C, Green / Cycle	0.74	0.74	0.74	0.74	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.04	0.50	0.00	0.55	0.19	0.01
s, saturation flow rate [veh/h]	562	1813	622	1779	1361	1731
c, Capacity [veh/h]	279	1342	336	1317	322	387
d1, Uniform Delay [s]	27.04	10.19	21.67	11.18	58.56	47.73
k, delay calibration	0.50	0.50	0.50	0.50	0.29	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.58	2.79	0.02	3.75	12.33	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.08	0.68	0.00	0.74	0.81	0.03
d, Delay for Lane Group [s/veh]	27.61	12.98	21.69	14.93	70.90	47.77
Lane Group LOS	C	B	C	B	E	D
Critical Lane Group	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.57	16.00	0.02	18.40	10.87	0.40
50th-Percentile Queue Length [ft]	14.21	400.11	0.53	460.09	271.68	10.07
95th-Percentile Queue Length [veh]	1.02	22.57	0.04	25.44	16.27	0.73
95th-Percentile Queue Length [ft]	25.57	564.13	0.95	635.98	406.84	18.13

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.61	12.98	12.98	21.69	14.93	14.93	70.90	70.90	70.90	47.77	47.77	47.77
Movement LOS	C	B	B	C	B	B	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	13.34			14.94			70.90			47.77		
Approach LOS	B			B			E			D		
d_I, Intersection Delay [s/veh]	21.14											
Intersection LOS	C											
Intersection V/C	0.775											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	20.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.634

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	3	745	40	27	826	4	37	70	17	78	112	100
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.20	10.00	7.40	3.60	0.00	2.70	0.00	0.00	2.60	0.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	745	40	27	826	4	37	70	17	78	112	100
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	194	10	7	215	1	10	18	4	20	29	26
Total Analysis Volume [veh/h]	3	776	42	28	860	4	39	73	18	81	117	104
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			20			4			5		
Bicycle Volume [bicycles/h]	23			28			16			15		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	68.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	12	12	12	12	12	12	5	5	5	0	5	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	116	116	116	116	116	116	34	34	34	0	34	0
Vehicle Extension [s]	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	14	14	14	14	14	14	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	113	113	113	113	29	29	29	29
g / C, Green / Cycle	0.75	0.75	0.75	0.75	0.19	0.19	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.00	0.46	0.04	0.47	0.03	0.05	0.06	0.13
s, saturation flow rate [veh/h]	650	1786	632	1832	1146	1811	1286	1661
c, Capacity [veh/h]	393	1347	391	1382	104	346	216	317
d1, Uniform Delay [s]	16.55	8.34	16.42	8.56	70.25	51.65	60.49	56.58
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.20
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	2.04	0.35	2.14	2.25	0.40	1.08	5.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.61	0.07	0.63	0.38	0.26	0.38	0.70
d, Delay for Lane Group [s/veh]	16.59	10.38	16.78	10.70	72.50	52.05	61.58	61.73
Lane Group LOS	B	B	B	B	E	D	E	E
Critical Lane Group	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.05	12.19	0.52	13.21	1.56	3.01	2.97	8.37
50th-Percentile Queue Length [ft]	1.37	304.85	12.98	330.18	38.94	75.31	74.15	209.13
95th-Percentile Queue Length [veh]	0.10	17.92	0.93	19.17	2.80	5.42	5.34	13.11
95th-Percentile Queue Length [ft]	2.46	448.03	23.36	479.18	70.09	135.56	133.47	327.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	16.59	10.38	10.38	16.78	10.70	10.70	72.50	52.05	52.05	61.58	61.73	61.73
Movement LOS	B	B	B	B	B	B	E	D	D	E	E	E
d_A, Approach Delay [s/veh]	10.41			10.89			58.19			61.69		
Approach LOS	B			B			E			E		
d_I, Intersection Delay [s/veh]	20.73											
Intersection LOS	C											
Intersection V/C	0.634											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	61.9
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.591

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	28	201	139	458	75	391	80	368	256	320	356	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	3.60	2.60	2.70	3.80	2.50	0.50	5.50	5.30	3.70	13.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	119	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	28	201	20	458	75	0	80	368	256	320	356	15
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	53	5	122	20	0	21	98	68	85	95	4
Total Analysis Volume [veh/h]	30	214	21	487	80	0	85	391	272	340	379	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			11			3		
Bicycle Volume [bicycles/h]	33			43			24			24		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	8	1	8	4	4	4	6	3	6	2	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	Lag	-	-
Minimum Green [s]	0	3	0	3	3	3	0	3	0	3	3	3
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.3	0.0	3.7	3.7	3.7	0.0	3.7	0.0	3.7	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	0	33	0	46	46	46	0	32	0	39	39	39
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	8	0	8	8	8	0	8	0	8	8	8
Pedestrian Clearance [s]	0	20	0	22	22	22	0	17	0	18	18	18
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.3	0.0	2.7	2.7	2.7	0.0	2.7	0.0	2.7	2.7	2.7
Minimum Recall		No			No			No			Yes	
Maximum Recall		No			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.30	4.30	4.30	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.30	2.30	2.30	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	20	20	20	63	63	63	23	23	23	23	25	25	25
g / C, Green / Cycle	0.13	0.13	0.13	0.42	0.42	0.42	0.16	0.16	0.16	0.16	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.12	0.01	0.16	0.16	0.00	0.05	0.13	0.13	0.14	0.14	0.14	0.14
s, saturation flow rate [veh/h]	1810	1810	1420	1764	1786	1556	1765	1891	1731	1413	1718	1799	1636
c, Capacity [veh/h]	240	240	188	744	753	656	275	295	270	220	287	300	273
d1, Uniform Delay [s]	57.37	63.98	57.26	29.83	29.82	0.00	56.12	61.18	61.49	62.01	60.70	60.68	60.75
k, delay calibration	0.11	0.16	0.11	0.50	0.50	0.50	0.11	0.21	0.23	0.26	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.23	15.46	0.26	1.47	1.45	0.00	0.63	10.15	13.68	23.12	7.16	6.80	7.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.13	0.89	0.11	0.38	0.38	0.00	0.31	0.81	0.84	0.89	0.85	0.85	0.86
d, Delay for Lane Group [s/veh]	57.60	79.44	57.52	31.29	31.27	0.00	56.75	71.33	75.16	85.14	67.86	67.48	68.45
Lane Group LOS	E	E	E	C	C	A	E	E	E	F	E	E	E
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	1.03	9.10	0.72	7.49	7.58	0.00	2.93	9.70	9.47	8.75	9.66	10.06	9.28
50th-Percentile Queue Length [ft]	25.74	227.47	18.05	187.36	189.54	0.00	73.26	242.5	236.6	218.8	241.45	251.50	232.12
95th-Percentile Queue Length [veh]	1.85	14.05	1.30	11.98	12.10	0.00	5.27	14.81	14.51	13.61	14.75	15.26	14.28
95th-Percentile Queue Length [ft]	46.33	351.15	32.50	299.60	302.43	0.00	131.8	370.2	362.8	340.1	368.87	381.54	357.05

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.60	79.44	57.52	31.28	31.27	0.00	56.75	72.81	83.03	67.75	68.04	68.45
Movement LOS	E	E	E	C	C	A	E	E	F	E	E	E
d_A, Approach Delay [s/veh]	75.23			31.28			74.45			67.92		
Approach LOS	E			C			E			E		
d_I, Intersection Delay [s/veh]	61.89											
Intersection LOS	E											
Intersection V/C	0.591											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	17.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	15	618	67	20	471	11	138	113	13	136	188	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.30	3.00	0.00	4.90	0.00	6.50	0.90	7.70	11.00	2.10	3.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	618	67	20	471	11	138	113	13	136	188	65
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	159	17	5	121	3	36	29	3	35	48	17
Total Analysis Volume [veh/h]	15	637	69	21	486	11	142	116	13	140	194	67
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	36			37			51			41		
Bicycle Volume [bicycles/h]	52			17			11			37		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	8	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	0	4	0	4	4	4	4	4	4
Maximum Green [s]	60	60	60	0	60	0	35	35	35	35	35	35
Amber [s]	3.1	3.1	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1	3.1	3.1
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	30	30	30	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	7	7	7	0	7	0	7	7	7	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	13	13	13	13	13	13
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	0.0	2.1	0.0	2.1	2.1	2.1	2.1	2.1	2.1
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	33	33	33	33	28	28	28
g / C, Green / Cycle	0.48	0.48	0.48	0.48	0.40	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.02	0.39	0.03	0.28	0.13	0.07	0.28
s, saturation flow rate [veh/h]	909	1818	754	1800	1064	1833	1456
c, Capacity [veh/h]	334	866	195	858	251	744	661
d1, Uniform Delay [s]	19.70	15.58	27.61	13.17	29.79	13.20	17.21
k, delay calibration	0.11	0.11	0.11	0.11	0.04	0.04	0.05
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.05	1.94	0.24	0.62	0.75	0.04	0.46
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.82	0.11	0.58	0.57	0.17	0.61
d, Delay for Lane Group [s/veh]	19.75	17.52	27.85	13.79	30.55	13.24	17.67
Lane Group LOS	B	B	C	B	C	B	B
Critical Lane Group	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.18	8.79	0.32	5.10	2.31	1.20	5.06
50th-Percentile Queue Length [ft]	4.52	219.78	7.92	127.51	57.75	30.08	126.39
95th-Percentile Queue Length [veh]	0.33	13.65	0.57	8.80	4.16	2.17	8.74
95th-Percentile Queue Length [ft]	8.13	341.34	14.26	220.11	103.94	54.14	218.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	19.75	17.52	17.52	27.85	13.79	13.79	30.55	13.24	13.24	17.67	17.67	17.67
Movement LOS	B	B	B	C	B	B	C	B	B	B	B	B
d_A, Approach Delay [s/veh]	17.56			14.36			22.31			17.67		
Approach LOS	B			B			C			B		
d_I, Intersection Delay [s/veh]	17.39											
Intersection LOS	B											
Intersection V/C	0.704											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	9.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.612

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	11	258	85	30	345	61	30	107	16	72	200	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	3.10	16.50	0.00	1.40	0.00	0.00	2.00	3.80	6.70	3.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	258	85	30	345	61	30	107	16	72	200	52
Peak Hour Factor	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200	0.8200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	79	26	9	105	19	9	33	5	22	61	16
Total Analysis Volume [veh/h]	13	315	104	37	421	74	37	130	20	88	244	63
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			51			27			65		
Bicycle Volume [bicycles/h]	28			39			21			32		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	4	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	8	8	8	0	8	0	0	4	0	4	4	4
Maximum Green [s]	30	30	30	0	30	0	0	30	0	30	30	30
Amber [s]	3.2	3.2	3.2	0.0	3.2	0.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	30	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	12	0	12	12	12
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	2.2	2.2	0.0	2.2	0.0	0.0	2.2	0.0	2.2	2.2	2.2
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	16	16	13	13
g / C, Green / Cycle	0.43	0.43	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.25	0.30	0.11	0.24
s, saturation flow rate [veh/h]	1714	1745	1701	1633
c, Capacity [veh/h]	843	860	697	676
d1, Uniform Delay [s]	8.02	8.56	9.08	10.54
k, delay calibration	0.11	0.11	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.48	0.73	0.15	0.60
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.62	0.27	0.58
d, Delay for Lane Group [s/veh]	8.50	9.29	9.23	11.14
Lane Group LOS	A	A	A	B
Critical Lane Group	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	1.97	2.62	0.90	2.13
50th-Percentile Queue Length [ft]	49.30	65.48	22.62	53.35
95th-Percentile Queue Length [veh]	3.55	4.71	1.63	3.84
95th-Percentile Queue Length [ft]	88.74	117.86	40.71	96.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	8.50	8.50	8.50	9.29	9.29	9.29	9.23	9.23	9.23	11.14	11.14	11.14
Movement LOS	A	A	A	A	A	A	A	A	A	B	B	B
d_A, Approach Delay [s/veh]	8.50			9.29			9.23			11.14		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	9.53											
Intersection LOS	A											
Intersection V/C	0.612											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	87.6
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	45.457

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	8	57	9	156	14	149	16	840	113	169	1838	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	3.20	0.00	2.70	0.00	3.60	0.90	0.60	3.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	124	0	0	0
Total Hourly Volume [veh/h]	8	57	9	156	14	149	16	840	0	169	1838	71
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	15	2	42	4	40	4	228	0	46	499	19
Total Analysis Volume [veh/h]	9	62	10	170	15	162	17	913	0	184	1998	77
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			2			0			11		
Bicycle Volume [bicycles/h]	0			4			2			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	84.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	0	10	10	0	10	10	0
Maximum Green [s]	0	30	0	0	30	0	25	35	0	25	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	0	40	0	0	40	0	25	85	0	25	85	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	37	5	86	86	17	98	98
g / C, Green / Cycle	0.25	0.25	0.25	0.25	0.03	0.57	0.57	0.11	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.11	0.01	43.84	0.11	0.01	0.26	0.00	0.10	0.39	0.39
s, saturation flow rate [veh/h]	653	1615	4	1527	1810	3492	1601	1799	3502	1799
c, Capacity [veh/h]	188	397	47	375	61	2000	917	207	2289	1176
d1, Uniform Delay [s]	46.26	42.92	74.97	47.71	69.81	9.25	0.00	62.58	4.34	4.36
k, delay calibration	0.11	0.11	0.50	0.11	0.11	0.50	0.50	0.24	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.26	0.03	1366.70	0.78	2.41	0.75	0.00	23.12	1.16	2.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.38	0.03	3.93	0.43	0.28	0.46	0.00	0.89	0.60	0.60
d, Delay for Lane Group [s/veh]	47.52	42.94	1441.67	48.49	72.22	10.01	0.00	85.70	5.50	6.65
Lane Group LOS	D	D	F	D	E	B	A	F	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	2.22	0.30	19.71	5.25	0.67	4.63	0.00	8.02	3.81	4.32
50th-Percentile Queue Length [ft]	55.47	7.41	492.75	131.25	16.87	115.70	0.00	200.59	95.18	107.94
95th-Percentile Queue Length [veh]	3.99	0.53	35.35	9.01	1.21	8.16	0.00	12.67	6.85	7.73
95th-Percentile Queue Length [ft]	99.84	13.34	883.81	225.19	30.36	203.90	0.00	316.72	171.33	193.14

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.52	47.52	42.94	1441.67	1441.67	48.49	72.22	10.01	0.00	85.70	5.87	6.65
Movement LOS	D	D	D	F	F	D	E	B	A	F	A	A
d_A, Approach Delay [s/veh]	46.95			791.25			11.15			12.39		
Approach LOS	D			F			B			B		
d_I, Intersection Delay [s/veh]	87.57											
Intersection LOS	F											
Intersection V/C	45.457											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	30.2
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.741

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	255	126	124	84	177	16	101	700	35	54	1349	547
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	2.40	1.60	0.00	2.80	0.00	0.00	3.90	0.00	1.90	3.90	3.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	74	0	0	0	0	0	29	0	0	285
Total Hourly Volume [veh/h]	255	126	50	84	177	16	101	700	6	54	1349	262
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	35	14	23	49	4	28	192	2	15	371	72
Total Analysis Volume [veh/h]	280	138	55	92	195	18	111	769	7	59	1482	288
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			12			10			5		
Bicycle Volume [bicycles/h]	18			15			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	106.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	3	0	0	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	8	10	0	8	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	40	0	0	25	0	22	63	0	22	63	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	2.0	2.2	0.0	2.0	2.2	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	4.00	4.20	4.20	4.00	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	2.00	2.20	2.20	2.00	2.20	2.20
g_i, Effective Green Time [s]	21	21	21	20	20	11	87	87	7	83	83
g / C, Green / Cycle	0.14	0.14	0.14	0.13	0.13	0.07	0.58	0.58	0.05	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.04	0.05	0.12	0.06	0.22	0.00	0.03	0.43	0.19
s, saturation flow rate [veh/h]	1767	1824	1525	1810	1814	1810	3482	1579	1776	3482	1523
c, Capacity [veh/h]	245	253	212	235	236	133	2023	917	86	1936	847
d1, Uniform Delay [s]	62.93	62.93	57.69	59.77	64.27	66.69	8.27	7.09	68.96	13.54	9.87
k, delay calibration	0.11	0.11	0.11	0.11	0.32	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.49	7.28	0.64	1.06	27.43	12.43	0.54	0.02	9.07	2.95	1.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

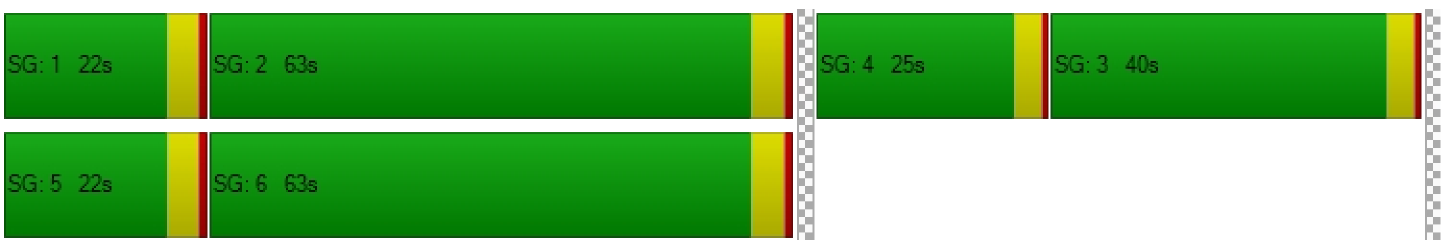
X, volume / capacity	0.84	0.84	0.26	0.39	0.90	0.83	0.38	0.01	0.68	0.77	0.34
d, Delay for Lane Group [s/veh]	70.42	70.21	58.33	60.82	91.70	79.12	8.81	7.11	78.03	16.49	10.97
Lane Group LOS	E	E	E	E	F	E	A	A	E	B	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	8.19	8.44	1.92	3.32	9.90	4.54	3.53	0.06	2.42	12.71	3.21
50th-Percentile Queue Length [ft]	204.76	210.92	48.00	83.06	247.47	113.41	88.22	1.45	60.52	317.87	80.23
95th-Percentile Queue Length [veh]	12.88	13.20	3.46	5.98	15.06	8.03	6.35	0.10	4.36	18.56	5.78
95th-Percentile Queue Length [ft]	322.10	330.01	86.40	149.51	376.47	200.74	158.79	2.62	108.93	464.06	144.42

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.37	70.21	58.33	60.82	91.70	91.70	79.12	8.81	7.11	78.03	16.49	10.97
Movement LOS	E	E	E	E	F	F	E	A	A	E	B	B
d_A, Approach Delay [s/veh]	68.92			82.39			17.60			17.61		
Approach LOS	E			F			B			B		
d_I, Intersection Delay [s/veh]	30.21											
Intersection LOS	C											
Intersection V/C	0.741											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.660

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	57	196	53	117	254	63	89	731	73	125	1365	85
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	8.80	1.00	1.90	0.90	2.80	3.20	4.50	5.20	4.10	1.60	4.30	9.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	58	0	0	50	0	0	69	0	0	69
Total Hourly Volume [veh/h]	57	196	0	117	254	13	89	731	4	125	1365	16
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	51	0	30	66	3	23	190	1	33	355	4
Total Analysis Volume [veh/h]	59	204	0	122	265	14	93	761	4	130	1422	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			4			25			11		
Bicycle Volume [bicycles/h]	19			38			0			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	136.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	7	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	0	4	4	0	4	10	0	4	10	0
Maximum Green [s]	16	25	0	16	25	0	18	20	0	18	20	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	23	38	0	23	38	0	25	64	0	25	64	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	1.5	0.0	1.0	1.5	0.0	1.5	2.2	0.0	1.5	2.2	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	3.50	3.50	3.00	3.50	3.50	3.50	4.20	4.20	3.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.50	1.50	1.00	1.50	1.50	1.50	2.20	2.20	1.50	2.20	2.20
g_i, Effective Green Time [s]	7	22	22	12	27	27	10	89	89	13	92	92
g / C, Green / Cycle	0.04	0.14	0.14	0.08	0.18	0.18	0.07	0.59	0.59	0.09	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate	0.04	0.11	0.00	0.07	0.14	0.01	0.05	0.22	0.00	0.07	0.41	0.01
s, saturation flow rate [veh/h]	1663	1881	1585	1793	1848	1447	1732	3439	1546	1781	3468	1436
c, Capacity [veh/h]	74	272	229	144	334	261	113	2044	919	152	2132	882
d1, Uniform Delay [s]	70.86	61.44	0.00	67.93	58.69	50.76	65.92	0.28	0.28	65.45	7.41	5.23
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.09	4.11	0.00	12.40	4.28	0.08	13.76	0.52	0.01	12.61	1.67	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

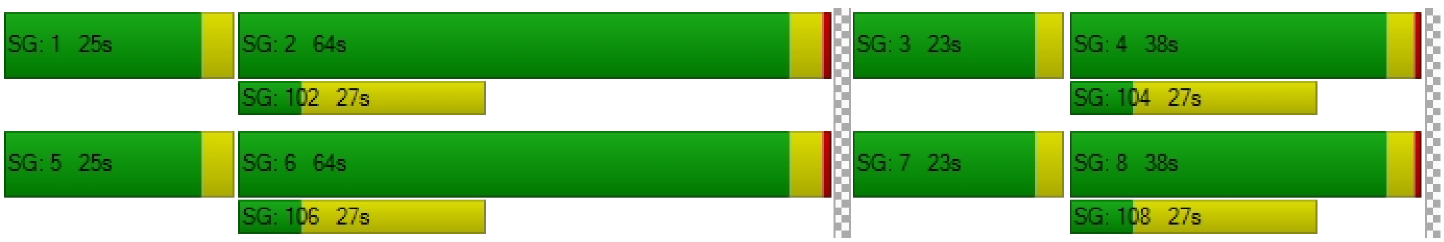
X, volume / capacity	0.79	0.75	0.00	0.84	0.79	0.05	0.82	0.37	0.00	0.85	0.67	0.02
d, Delay for Lane Group [s/veh]	87.95	65.55	0.00	80.33	62.97	50.85	79.68	0.80	0.29	78.06	9.08	5.27
Lane Group LOS	F	E	A	F	E	D	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	2.62	7.85	0.00	5.16	10.12	0.45	3.80	0.28	0.00	5.30	6.28	0.12
50th-Percentile Queue Length [ft]	65.57	196.22	0.00	129.00	253.08	11.26	94.97	7.04	0.09	132.54	157.09	2.89
95th-Percentile Queue Length [veh]	4.72	12.44	0.00	8.89	15.34	0.81	6.84	0.51	0.01	9.08	10.39	0.21
95th-Percentile Queue Length [ft]	118.03	311.08	0.00	222.13	383.53	20.28	170.95	12.67	0.16	226.95	259.87	5.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	87.95	65.55	0.00	80.33	62.97	50.85	79.68	0.80	0.29	78.06	9.08	5.27
Movement LOS	F	E	A	F	E	D	E	A	A	E	A	A
d_A, Approach Delay [s/veh]		70.58			67.83			9.35			14.76	
Approach LOS		E			E			A			B	
d_I, Intersection Delay [s/veh]						24.89						
Intersection LOS						C						
Intersection V/C						0.660						

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	10.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.616

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	78	54	76	41	44	30	0	818	39	0	1420	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.80	18.50	7.90	2.40	20.50	3.30	0.00	3.80	5.10	0.00	3.50	8.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	53	0	0	84
Total Hourly Volume [veh/h]	78	54	76	41	44	30	0	818	0	0	1420	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	1.0000	0.9700	0.9700	1.0000	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	14	20	11	11	8	0	211	0	0	366	0
Total Analysis Volume [veh/h]	80	56	78	42	45	31	0	843	0	0	1464	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	19			15			43			20		
Bicycle Volume [bicycles/h]	14			36			2			4		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	137.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	3	0	0	4	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	10	0	0	10	0
Maximum Green [s]	0	24	0	0	24	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.7	0.0	0.0	3.7	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	37	0	0	37	0	0	76	0	0	76	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.2	0.0	0.0	2.2	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	13	13	13	11	11	113	113	113	113
g / C, Green / Cycle	0.09	0.09	0.09	0.07	0.07	0.76	0.76	0.76	0.76
(v / s)_i Volume / Saturation Flow Rate	0.05	0.04	0.07	0.03	0.06	0.27	0.00	0.47	0.00
s, saturation flow rate [veh/h]	1569	1443	1098	1590	1203	3137	1383	3146	1346
c, Capacity [veh/h]	136	125	95	119	90	2375	1047	2382	1019
d1, Uniform Delay [s]	65.82	64.98	67.24	65.87	68.46	0.00	0.00	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.00	2.49	15.54	1.79	18.87	0.42	0.00	1.20	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

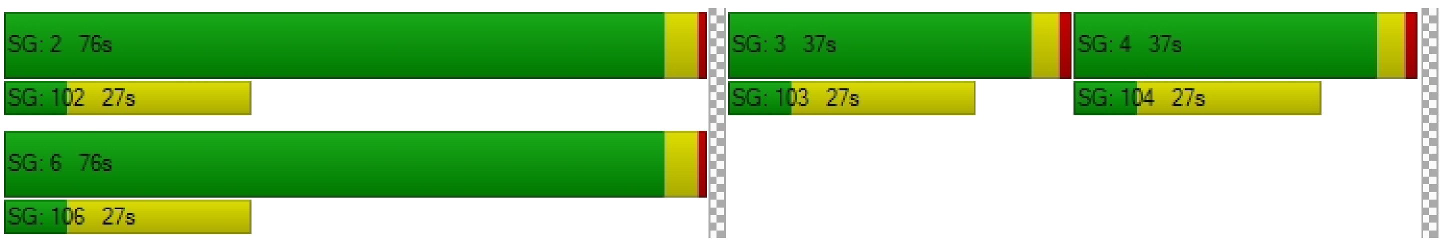
X, volume / capacity	0.59	0.45	0.82	0.35	0.85	0.35	0.00	0.61	0.00
d, Delay for Lane Group [s/veh]	69.81	67.48	82.78	67.66	87.33	0.42	0.00	1.20	0.00
Lane Group LOS	E	E	F	E	F	A	A	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	3.11	2.13	3.36	1.61	3.38	0.14	0.00	0.40	0.00
50th-Percentile Queue Length [ft]	77.82	53.34	84.03	40.15	84.50	3.43	0.00	9.90	0.00
95th-Percentile Queue Length [veh]	5.60	3.84	6.05	2.89	6.08	0.25	0.00	0.71	0.00
95th-Percentile Queue Length [ft]	140.07	96.01	151.25	72.27	152.09	6.18	0.00	17.82	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.81	67.48	82.78	67.66	87.33	87.33	0.00	0.42	0.00	0.00	1.20	0.00
Movement LOS	E	E	F	E	F	F		A	A		A	A
d_A, Approach Delay [s/veh]	73.93			80.33			0.42			1.20		
Approach LOS	E			F			A			A		
d_I, Intersection Delay [s/veh]	10.38											
Intersection LOS	B											
Intersection V/C	0.616											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	37.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.751

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	24	345	60	417	214	44	88	779	396	161	1420	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	1.20	1.70	2.20	1.40	6.80	10.20	3.10	2.50	3.10	3.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	58	0	0	377	0	0	14
Total Hourly Volume [veh/h]	24	345	60	417	214	0	88	779	19	161	1420	2
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	89	15	107	55	0	23	201	5	41	366	1
Total Analysis Volume [veh/h]	25	356	62	430	221	0	91	803	20	166	1464	2
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23			0			0			20		
Bicycle Volume [bicycles/h]	41			11			1			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	3	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	4	4	4	8	10	10	8	10	10
Maximum Green [s]	0	30	0	16	16	16	4	16	16	4	16	16
Amber [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.2	3.7	3.7	3.2	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	25	0	30	30	30	25	70	70	25	70	70
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	0	0	7	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	0	0	20	20	20	0	20	20	0	20	20
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.2	2.7	2.7	2.2	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.70	4.70	4.20	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.70	2.70	2.20	2.70	2.70
g_i, Effective Green Time [s]	21	21	22	22	22	10	75	75	16	80	80
g / C, Green / Cycle	0.14	0.14	0.14	0.14	0.14	0.07	0.50	0.50	0.11	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.13	0.13	0.13	0.12	0.00	0.06	0.23	0.01	0.09	0.42	0.00
s, saturation flow rate [veh/h]	1868	1579	3438	1874	1512	1642	3509	1556	1755	3495	1544
c, Capacity [veh/h]	261	221	494	269	217	110	1746	774	186	1877	829
d1, Uniform Delay [s]	63.43	63.81	62.82	62.32	0.00	67.42	15.46	12.78	60.83	4.80	3.65
k, delay calibration	0.36	0.39	0.11	0.21	0.11	0.11	0.50	0.50	0.20	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	27.82	39.65	4.92	11.36	0.00	14.50	0.87	0.06	21.81	3.29	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

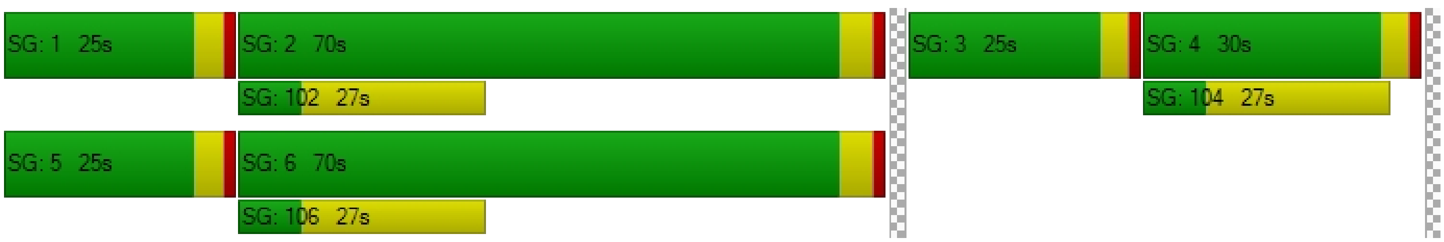
X, volume / capacity	0.90	0.94	0.87	0.82	0.00	0.83	0.46	0.03	0.89	0.78	0.00
d, Delay for Lane Group [s/veh]	91.25	103.46	67.74	73.67	0.00	81.92	16.34	12.84	82.64	8.09	3.65
Lane Group LOS	F	F	E	E	A	F	B	B	F	A	A
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	10.90	10.30	8.39	9.06	0.00	3.80	5.93	0.25	6.86	3.85	0.01
50th-Percentile Queue Length [ft]	272.43	257.49	209.79	226.53	0.00	94.97	148.23	6.36	171.45	96.13	0.21
95th-Percentile Queue Length [veh]	16.31	15.56	13.14	14.00	0.00	6.84	9.92	0.46	11.15	6.92	0.02
95th-Percentile Queue Length [ft]	407.78	389.07	328.56	349.94	0.00	170.95	248.06	11.45	278.82	173.04	0.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	91.25	96.24	103.46	67.74	73.67	0.00	81.92	16.34	12.84	82.64	8.09	3.65
Movement LOS	F	F	F	E	E	A	F	B	B	F	A	A
d_A, Approach Delay [s/veh]	96.97			69.75			22.79			15.67		
Approach LOS	F			E			C			B		
d_I, Intersection Delay [s/veh]	37.02											
Intersection LOS	D											
Intersection V/C	0.751											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	6.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.519

Intersection Setup

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	65	8	68	6	3	10	43	1188	25	43	1755	43
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	10.00	0.00	2.90	0.00	2.30	2.60	2.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	9	0	0	0	0	0	0
Total Hourly Volume [veh/h]	65	8	68	6	3	1	43	1188	25	43	1755	43
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	2	18	2	1	0	11	313	7	11	462	11
Total Analysis Volume [veh/h]	68	8	72	6	3	1	45	1251	26	45	1847	45
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			0			2		
Bicycle Volume [bicycles/h]	16			0			3			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	19.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	8	8	4	8	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	8	8	0	8	0	4	10	10	4	10	10
Maximum Green [s]	30	30	30	0	30	0	20	40	40	20	40	40
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.7	3.7	3.0	3.7	3.7
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	40	40	40	0	40	0	25	85	85	25	85	85
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	7	7	0	7	0	0	7	7	0	7	7
Pedestrian Clearance [s]	20	20	20	0	20	0	0	20	20	0	20	20
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.7	2.7	2.0	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.70	4.70	4.00	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.70	2.70	2.00	2.70	2.70
g_i, Effective Green Time [s]	18	18	18	5	114	114	5	114	114
g / C, Green / Cycle	0.12	0.12	0.12	0.03	0.76	0.76	0.03	0.76	0.76
(v / s)_i Volume / Saturation Flow Rate	0.10	0.01	0.00	0.02	0.24	0.24	0.03	0.35	0.35
s, saturation flow rate [veh/h]	1415	1129	1461	1810	3516	1824	1769	3526	1825
c, Capacity [veh/h]	208	178	179	59	2672	1386	58	2681	1388
d1, Uniform Delay [s]	64.97	58.01	57.77	71.14	0.00	0.00	71.10	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.45	0.12	0.01	18.41	0.31	0.60	19.05	0.58	1.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.05	0.01	0.77	0.31	0.32	0.77	0.46	0.47
d, Delay for Lane Group [s/veh]	69.42	58.12	57.79	89.55	0.31	0.60	90.15	0.58	1.13
Lane Group LOS	E	E	E	F	A	A	F	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	5.87	0.32	0.03	2.00	0.11	0.23	2.00	0.22	0.43
50th-Percentile Queue Length [ft]	146.80	7.91	0.87	49.93	2.86	5.74	50.12	5.41	10.86
95th-Percentile Queue Length [veh]	9.85	0.57	0.06	3.59	0.21	0.41	3.61	0.39	0.78
95th-Percentile Queue Length [ft]	246.15	14.24	1.57	89.87	5.16	10.33	90.22	9.73	19.55

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.42	69.42	69.42	58.12	58.12	57.79	89.55	0.40	0.60	90.15	0.76	1.13
Movement LOS	E	E	E	E	E	E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]		69.42			58.09			3.44			2.84	
Approach LOS		E			E			A			A	
d_I, Intersection Delay [s/veh]	6.12											
Intersection LOS	A											
Intersection V/C	0.519											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	13.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.679

Intersection Setup

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound				Northwestbound			Southeastbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	55.00	100.0	100.0	100.0	100.0	275.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				30.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Crosswalk	Yes			Yes				No			Yes		

volumes

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	185	0	285	0	0	0	0	182	1040	0	0	1753	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	0.00	0.70	0.00	0.00	0.00	0.00	2.20	4.80	0.00	0.00	3.60	2.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	183	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	185	0	102	0	0	0	0	182	1040	0	0	1753	68
Peak Hour Factor	0.9200	1.0000	0.9200	1.000	1.000	1.000	1.000	0.9200	0.9200	1.0000	1.0000	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	0	28	0	0	0	0	49	283	0	0	476	18
Total Analysis Volume [veh/h]	201	0	111	0	0	0	0	198	1130	0	0	1905	74
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			0				0			8		
Bicycle Volume [bicycles/h]	5			0				3			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	34.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Permi	Permi	Permi	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	4	0	0	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	10	0	0	0	0	10	0	10	10	0	0	10	0
Maximum Green [s]	25	0	0	0	0	25	0	30	45	0	0	45	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	40	0	0	0	0	40	0	35	75	0	0	75	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	25	0	0	0	0	25	0	0	20	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No					No		No	No			No	
Maximum Recall	No					No		No	No			No	
Pedestrian Recall	No					No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	L	C	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	27	27	27	19	116	94	94
g / C, Green / Cycle	0.18	0.18	0.18	0.13	0.77	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.14	0.07	0.00	0.11	0.23	0.38	0.37
s, saturation flow rate [veh/h]	1391	1575	1900	1771	4939	3492	1793
c, Capacity [veh/h]	280	283	365	222	3821	2193	1126
d1, Uniform Delay [s]	60.90	54.30	0.00	61.42	0.00	6.04	5.96
k, delay calibration	0.16	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.16	0.89	0.00	12.09	0.20	1.23	2.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

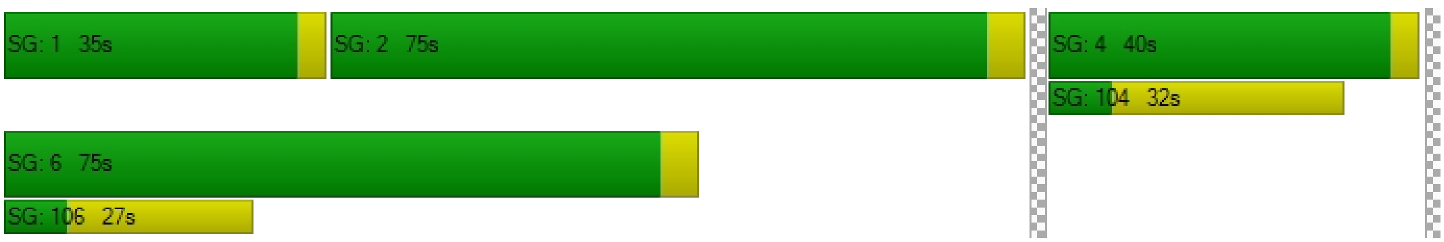
X, volume / capacity	0.72	0.39	0.00	0.89	0.30	0.60	0.59
d, Delay for Lane Group [s/veh]	66.06	55.19	0.00	73.52	0.20	7.27	8.19
Lane Group LOS	E	E	A	E	A	A	A
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	7.89	3.81	0.00	7.92	0.07	4.63	4.93
50th-Percentile Queue Length [ft]	197.18	95.23	0.00	198.08	1.75	115.78	123.33
95th-Percentile Queue Length [veh]	12.49	6.86	0.00	12.54	0.13	8.16	8.58
95th-Percentile Queue Length [ft]	312.33	171.42	0.00	313.49	3.15	204.02	214.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	66.06	0.00	55.19	0.00	0.00	0.00	0.00	73.52	0.20	0.00	0.00	7.55	8.19
Movement LOS	E		E	A	A	A	A	E	A			A	A
d_A, Approach Delay [s/veh]	62.19			0.00				11.13			7.58		
Approach LOS	E			A				B			A		
d_I, Intersection Delay [s/veh]	13.59												
Intersection LOS	B												
Intersection V/C	0.679												

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	4.8
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.531

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	28	0	50	1	0	0	119	1204	1	30	2068	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	0.00	0.00	0.00	0.00	0.00	0.80	3.70	0.00	6.70	2.60	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	54	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	0	0	1	0	0	119	1204	1	30	2068	15
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	0	0	0	0	31	317	0	8	544	4
Total Analysis Volume [veh/h]	29	0	0	1	0	0	125	1267	1	32	2177	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			6		
Bicycle Volume [bicycles/h]	0			0			5			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	77.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	11	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Split [s]	0	35	0	0	35	0	30	85	0	30	85	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	15	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	12	124	124	4	115	115
g / C, Green / Cycle	0.07	0.07	0.07	0.08	0.83	0.83	0.02	0.77	0.77
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.00	0.07	0.24	0.24	0.02	0.41	0.41
s, saturation flow rate [veh/h]	1664	1615	859	1795	3489	1831	1696	3526	1844
c, Capacity [veh/h]	161	109	106	149	2889	1517	41	2712	1418
d1, Uniform Delay [s]	66.18	0.00	69.07	65.66	0.00	0.00	72.16	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.53	0.00	0.03	11.65	0.25	0.48	26.94	0.75	1.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.18	0.00	0.01	0.84	0.29	0.29	0.78	0.53	0.53
d, Delay for Lane Group [s/veh]	66.71	0.00	69.11	77.32	0.25	0.48	99.09	0.75	1.43
Lane Group LOS	E	A	E	E	A	A	F	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.09	0.00	0.04	5.04	0.10	0.20	1.52	0.28	0.56
50th-Percentile Queue Length [ft]	27.24	0.00	0.97	126.08	2.52	5.04	38.00	7.04	14.09
95th-Percentile Queue Length [veh]	1.96	0.00	0.07	8.73	0.18	0.36	2.74	0.51	1.01
95th-Percentile Queue Length [ft]	49.03	0.00	1.75	218.16	4.54	9.08	68.40	12.68	25.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	66.71	66.71	0.00	69.11	69.11	69.11	77.32	0.33	0.48	99.09	0.98	1.43
Movement LOS	E	E	A	E	E	E	E	A	A	F	A	A
d_A, Approach Delay [s/veh]	66.71			69.11			7.24			2.39		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	4.77											
Intersection LOS	A											
Intersection V/C	0.531											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	10.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.562

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	397	386	59	340	302	67
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.93	1.92	2.00	1.94	1.90	1.74
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	397	386	59	340	302	67
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	107	104	16	91	81	18
Total Analysis Volume [veh/h]	427	415	63	366	325	72
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		21		23	
Bicycle Volume [bicycles/h]	11		91		16	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	0
Maximum Green [s]	30	30	15	40	25	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	30	30	0	30	0	0
Vehicle Extension [s]	2.0	2.0	2.0	2.0	2.0	0.0
Walk [s]	7	7	0	0	7	0
Pedestrian Clearance [s]	10	10	0	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	0.0
Minimum Recall	Yes		Yes	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	13	13	2	19	9	9
g / C, Green / Cycle	0.36	0.36	0.05	0.53	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.23	0.28	0.04	0.20	0.18	0.05
s, saturation flow rate [veh/h]	1864	1486	1774	1864	1776	1451
c, Capacity [veh/h]	667	532	94	982	430	351
d1, Uniform Delay [s]	9.48	10.14	16.48	4.94	12.47	10.72
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.38	0.96	3.03	0.09	1.03	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

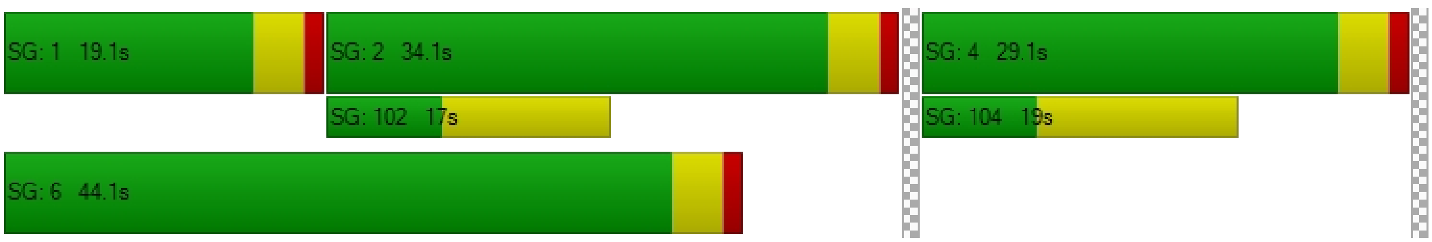
X, volume / capacity	0.64	0.78	0.67	0.37	0.76	0.21
d, Delay for Lane Group [s/veh]	9.86	11.10	19.51	5.03	13.50	10.82
Lane Group LOS	A	B	B	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	2.09	2.24	0.51	0.93	2.03	0.37
50th-Percentile Queue Length [ft]	52.22	55.97	12.81	23.20	50.63	9.31
95th-Percentile Queue Length [veh]	3.76	4.03	0.92	1.67	3.65	0.67
95th-Percentile Queue Length [ft]	93.99	100.75	23.05	41.76	91.13	16.76

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.86	11.10	19.51	5.03	13.50	10.82
Movement LOS	A	B	B	A	B	B
d_A, Approach Delay [s/veh]	10.47		7.16		13.02	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	10.22					
Intersection LOS	B					
Intersection V/C	0.562					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 39: Santa Cruz Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	45.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	231	1143	261	331	559	51	94	615	389	223	669	236
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.50	1.40	4.20	1.50	3.40	3.90	8.50	3.90	1.50	0.90	3.40	4.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	144	0	0	38	0	0	288	0	0	281
Total Hourly Volume [veh/h]	231	1143	117	331	559	13	94	615	101	223	669	0
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	304	31	88	149	3	25	164	27	59	178	0
Total Analysis Volume [veh/h]	246	1216	124	352	595	14	100	654	107	237	712	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			5			7		
Bicycle Volume [bicycles/h]	33			33			29			49		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	133
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	8	8	4	8	8	8	8	8	8	8	8
Maximum Green [s]	30	60	60	30	60	60	25	30	30	25	30	30
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.1	3.6	3.6	3.1	3.6	3.6
All red [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Split [s]	37	45	45	37	45	45	19	32	32	19	32	32
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	24	24	0	24	24	0	24	24	0	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	3.6	3.6	2.0	3.6	3.6	2.1	3.6	3.6	2.1	3.6	3.6
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	5.60	5.60	4.00	5.60	5.60	4.10	5.60	5.60	4.10	5.60	5.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.60	3.60	2.00	3.60	3.60	2.10	3.60	3.60	2.10	3.60	3.60
g_i, Effective Green Time [s]	12	58	58	16	62	62	8	28	28	11	31	31
g / C, Green / Cycle	0.09	0.44	0.44	0.12	0.47	0.47	0.06	0.21	0.21	0.08	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.07	0.34	0.08	0.10	0.17	0.01	0.03	0.19	0.07	0.07	0.20	0.00
s, saturation flow rate [veh/h]	3395	3568	1500	3462	3499	1505	3239	3482	1508	3483	3499	1543
c, Capacity [veh/h]	316	1563	657	429	1641	706	193	725	314	296	817	360
d1, Uniform Delay [s]	59.09	31.91	22.93	56.93	22.64	18.97	60.79	51.43	44.96	59.84	49.13	0.00
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.17	3.88	0.64	3.97	0.62	0.05	2.14	4.50	0.64	4.98	3.06	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

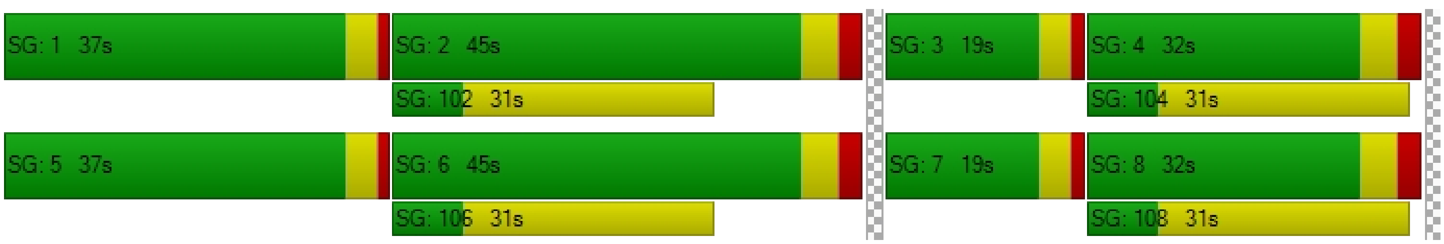
X, volume / capacity	0.78	0.78	0.19	0.82	0.36	0.02	0.52	0.90	0.34	0.80	0.87	0.00
d, Delay for Lane Group [s/veh]	63.25	35.80	23.57	60.90	23.26	19.02	62.94	55.93	45.60	64.82	52.18	0.00
Lane Group LOS	E	D	C	E	C	B	E	E	D	E	D	A
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	4.22	17.13	2.50	5.98	6.06	0.24	1.69	10.98	3.07	4.11	11.61	0.00
50th-Percentile Queue Length [ft]	105.51	428.31	62.58	149.45	151.58	6.09	42.30	274.50	76.68	102.84	290.33	0.00
95th-Percentile Queue Length [veh]	7.59	23.92	4.51	9.99	10.10	0.44	3.05	16.41	5.52	7.40	17.20	0.00
95th-Percentile Queue Length [ft]	189.74	598.01	112.64	249.69	252.53	10.96	76.14	410.35	138.02	185.11	430.05	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.25	35.80	23.57	60.90	23.26	19.02	62.94	55.93	45.60	64.82	52.18	0.00
Movement LOS	E	D	C	E	C	B	E	E	D	E	D	A
d_A, Approach Delay [s/veh]	39.10			36.99			55.46			55.34		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	45.40											
Intersection LOS	D											
Intersection V/C	0.755											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	100.9
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.138

Intersection Setup

Name	University Avenue		University Avenue		Adams Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		Adams Drive	
Base Volume Input [veh/h]	42	508	1449	140	6	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.30	4.70	2.60	4.30	5.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	508	1449	140	6	1
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	137	390	38	2	0
Total Analysis Volume [veh/h]	45	546	1558	151	6	1
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.01	0.02	0.00	0.14	0.00
d_M, Delay for Movement [s/veh]	18.21	0.00	0.00	0.00	100.88	16.81
Movement LOS	C	A	A	A	F	C
95th-Percentile Queue Length [veh]	0.49	0.00	0.00	0.00	0.44	0.01
95th-Percentile Queue Length [ft]	12.21	0.00	0.00	0.00	11.00	0.25
d_A, Approach Delay [s/veh]	1.39		0.00		88.87	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	0.62					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 71: Chilco Street/Terminal Avenue

Control Type:	All-way stop	Delay (sec / veh):	10.0
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street		Chilco Street		Terminal Avenue	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Chilco Street		Chilco Street		Terminal Avenue	
Base Volume Input [veh/h]	48	206	101	62	115	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	206	101	62	115	45
Peak Hour Factor	0.8580	0.8580	0.7990	0.7990	0.8890	0.8890
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	60	32	19	32	13
Total Analysis Volume [veh/h]	56	240	126	78	129	51
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.84	1.03	1.00
95th-Percentile Queue Length [ft]	45.88	25.73	25.11
Approach Delay [s/veh]	10.64	9.13	9.79
Approach LOS	B	A	A
Intersection Delay [s/veh]	9.96		
Intersection LOS	A		

Intersection Level Of Service Report
Intersection 74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.529

Intersection Setup

Name	University Avenue		University Avenue		O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		O'Brien Drive	
Base Volume Input [veh/h]	67	532	1284	142	16	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	5.10	2.90	3.50	18.80	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	67	532	1284	142	16	25
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	139	334	37	4	7
Total Analysis Volume [veh/h]	70	554	1338	148	17	26
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	7		5		1	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	48.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	8	8	0	6	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	19	87	106	0	24	0
Vehicle Extension [s]	2.0	4.0	4.0	0.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	112	118	118	4	4
g / C, Green / Cycle	0.03	0.86	0.91	0.91	0.03	0.03
(v / s)_i Volume / Saturation Flow Rate	0.05	0.18	0.45	0.47	0.01	0.02
s, saturation flow rate [veh/h]	1312	3098	1662	1597	1371	1370
c, Capacity [veh/h]	68	2661	1513	1454	38	38
d1, Uniform Delay [s]	62.05	1.57	0.94	0.97	62.13	62.55
k, delay calibration	0.50	0.50	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	118.67	0.18	1.14	1.29	2.97	7.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.03	0.21	0.49	0.51	0.44	0.68
d, Delay for Lane Group [s/veh]	180.72	1.75	2.08	2.26	65.10	70.13
Lane Group LOS	F	A	A	A	E	E
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	4.53	0.89	1.25	1.32	0.59	0.93
50th-Percentile Queue Length [ft]	113.22	22.13	31.34	32.97	14.65	23.35
95th-Percentile Queue Length [veh]	8.08	1.59	2.26	2.37	1.05	1.68
95th-Percentile Queue Length [ft]	201.96	39.84	56.41	59.35	26.36	42.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	180.72	1.75	2.16	2.26	65.10	70.13
Movement LOS	F	A	A	A	E	E
d_A, Approach Delay [s/veh]	21.82		2.17		68.14	
Approach LOS	C		A		E	
d_I, Intersection Delay [s/veh]	9.19					
Intersection LOS	A					
Intersection V/C	0.529					

Sequence

Ring 1	5	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 77: University Avenue/Donohoe Street

Control Type:	Signalized	Delay (sec / veh):	115.5
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.015

Intersection Setup

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	150.00	100.00	70.00	200.00	100.00	100.00	200.00	100.00	200.00	200.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	136	362	360	23	865	65	8	97	494	522	521	394
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	136	362	360	23	865	65	8	97	494	522	521	394
Peak Hour Factor	0.8090	0.8090	0.8090	0.9450	0.9450	0.9450	0.9080	0.9080	0.9080	0.9380	0.9380	0.9380
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	112	111	6	229	17	2	27	136	139	139	105
Total Analysis Volume [veh/h]	168	447	445	24	915	69	9	107	544	557	555	420
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			24			0			0		
Bicycle Volume [bicycles/h]	6			12			1			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	39	0	8	37	0	0	47	0	0	36	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	20	0	0	0	0	0	19	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	R	L	C	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	6	37	37	2	33	33	43	43	43	32	32	32	32
g / C, Green / Cycle	0.05	0.28	0.28	0.02	0.25	0.25	0.33	0.33	0.33	0.25	0.25	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.05	0.14	0.32	0.02	0.30	0.30	0.01	0.06	0.39	0.25	0.25	0.25	0.28
s, saturation flow rate [veh/h]	3101	3192	1401	1597	1676	1629	1597	1676	1407	1597	1644	1468	1324
c, Capacity [veh/h]	143	898	394	30	426	414	528	555	465	393	405	361	326
d1, Uniform Delay [s]	62.00	39.04	46.71	63.55	48.50	48.50	29.28	31.10	43.50	49.00	48.97	49.00	49.00
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.50	0.46	0.45	0.46	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	93.61	1.97	85.19	37.90	99.15	101.37	0.01	0.17	97.00	45.44	42.14	48.90	87.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

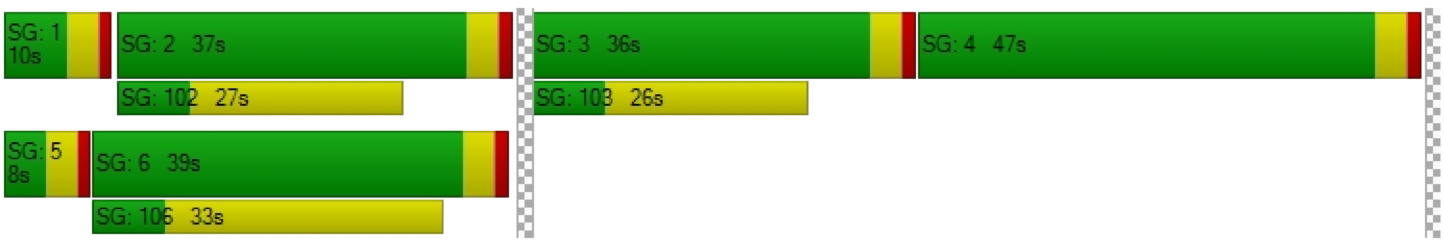
X, volume / capacity	1.17	0.50	1.13	0.81	1.17	1.17	0.02	0.19	1.17	1.01	1.00	1.01	1.12
d, Delay for Lane Group [s/veh]	155.61	41.00	131.90	101.45	147.65	149.87	29.29	31.26	140.50	94.44	91.11	97.90	136.2
Lane Group LOS	F	D	F	F	F	F	C	C	F	F	F	F	F
Critical Lane Group	Yes	No	No	No	No	Yes	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	4.23	6.24	21.97	1.11	25.44	24.98	0.19	2.46	27.34	17.65	17.77	16.58	18.42
50th-Percentile Queue Length [ft]	105.70	155.92	549.36	27.67	636.08	624.59	4.86	61.46	683.48	441.2	444.2	414.3	460.6
95th-Percentile Queue Length [veh]	7.61	10.33	31.88	1.99	36.87	36.35	0.35	4.42	39.59	24.65	24.68	23.43	27.17
95th-Percentile Queue Length [ft]	190.27	258.31	797.05	49.81	921.83	908.72	8.75	110.62	989.77	616.3	617.0	585.8	679.2

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	155.61	41.00	131.90	101.45	148.66	149.87	29.29	31.26	140.50	93.39	94.93	132.86
Movement LOS	F	D	F	F	F	F	C	C	F	F	F	F
d_A, Approach Delay [s/veh]	97.33			147.62			121.28			104.37		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	115.47											
Intersection LOS	F											
Intersection V/C	1.015											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	24.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.666

Intersection Setup

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Base Volume Input [veh/h]	152	429	122	42	550	59	56	85	33	71	51	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.80	2.40	4.20	0.00	0.00	8.70	0.00	0.00	13.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	429	122	42	550	59	56	85	33	71	51	62
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	45	128	36	13	164	18	17	25	10	21	15	18
Total Analysis Volume [veh/h]	181	511	145	50	655	70	67	101	39	85	61	74
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	54			0			12			0		
Bicycle Volume [bicycles/h]	26			2			7			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	25	30	0	25	30	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	14	0	0	0	0	0	0	0	0	13	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	0.00	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	39	32	39	29	19	19	19
g / C, Green / Cycle	0.58	0.49	0.58	0.43	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.19	0.37	0.06	0.41	0.17	0.07	0.10
s, saturation flow rate [veh/h]	959	1770	885	1788	1238	1269	1416
c, Capacity [veh/h]	437	861	444	775	421	217	400
d1, Uniform Delay [s]	12.73	13.97	9.20	17.99	20.77	29.86	18.96
k, delay calibration	0.23	0.36	0.11	0.40	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.34	4.68	0.11	17.05	0.89	1.16	0.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

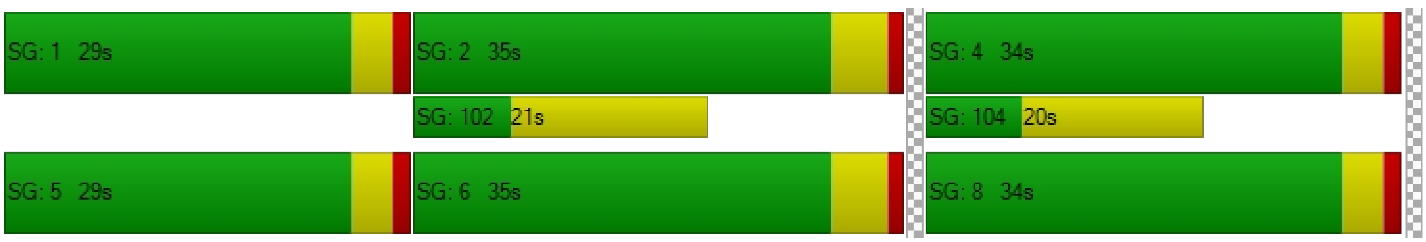
X, volume / capacity	0.41	0.76	0.11	0.94	0.49	0.39	0.34
d, Delay for Lane Group [s/veh]	14.07	18.66	9.31	35.03	21.66	31.02	19.46
Lane Group LOS	B	B	A	D	C	C	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	1.10	7.82	0.25	12.70	2.84	1.37	1.64
50th-Percentile Queue Length [ft]	27.41	195.42	6.32	317.57	71.12	34.28	41.08
95th-Percentile Queue Length [veh]	1.97	12.40	0.45	18.55	5.12	2.47	2.96
95th-Percentile Queue Length [ft]	49.34	310.05	11.37	463.69	128.01	61.70	73.94

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	14.07	18.66	18.66	9.31	35.03	35.03	21.66	21.66	21.66	31.02	19.46	19.46
Movement LOS	B	B	B	A	D	D	C	C	C	C	B	B
d_A, Approach Delay [s/veh]	17.66			33.37			21.66			23.93		
Approach LOS	B			C			C			C		
d_I, Intersection Delay [s/veh]	24.72											
Intersection LOS	C											
Intersection V/C	0.666											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	13.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.742

Intersection Setup

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	23	2	41	2	2	7	103	1888	233	113	852	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	2	41	2	2	7	103	1888	233	113	852	39
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	1	11	1	1	2	27	502	62	30	227	10
Total Analysis Volume [veh/h]	24	2	44	2	2	7	110	2009	248	120	906	41
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			1			6		
Bicycle Volume [bicycles/h]	0			0			27			22		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	9.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	13	0	0	11	0	14	60	0	16	62	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	3.0	0.0	3.0	6.0	0.0	2.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	7	7	7	4	4	10	71	71	10	72	72
g / C, Green / Cycle	0.07	0.07	0.07	0.04	0.04	0.10	0.71	0.71	0.10	0.71	0.71
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.03	0.00	0.01	0.06	0.57	0.16	0.07	0.26	0.26
s, saturation flow rate [veh/h]	1774	1787	1544	1774	1638	1774	3547	1525	1774	1863	1828
c, Capacity [veh/h]	127	128	111	66	61	173	2509	1079	184	1329	1304
d1, Uniform Delay [s]	43.50	43.50	44.45	46.54	46.74	43.51	9.90	5.12	43.18	5.53	5.54
k, delay calibration	0.10	0.10	0.10	0.11	0.11	0.20	0.50	0.50	0.10	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.33	0.33	2.18	0.19	1.11	7.02	2.79	0.50	3.57	0.76	0.77
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

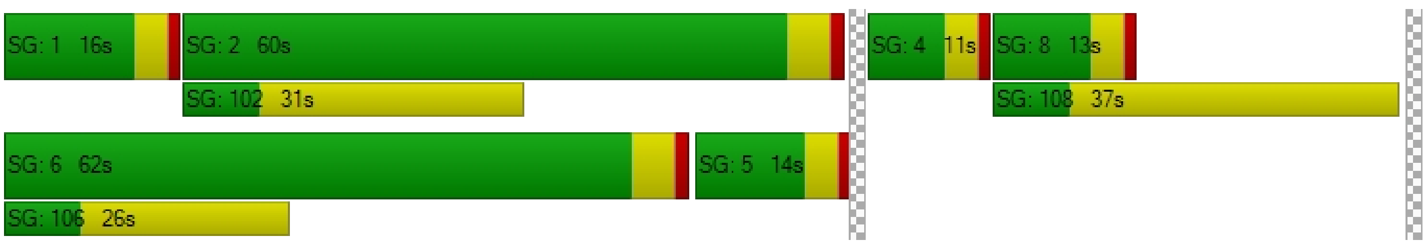
X, volume / capacity	0.10	0.10	0.40	0.03	0.15	0.63	0.80	0.23	0.65	0.36	0.36
d, Delay for Lane Group [s/veh]	43.83	43.83	46.64	46.72	47.85	50.53	12.69	5.62	46.75	6.29	6.31
Lane Group LOS	D	D	D	D	D	D	B	A	D	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.31	0.32	1.12	0.05	0.24	2.89	12.00	1.56	2.96	3.22	3.18
50th-Percentile Queue Length [ft]	7.87	7.88	27.91	1.29	5.93	72.30	300.09	38.97	74.09	80.60	79.62
95th-Percentile Queue Length [veh]	0.57	0.57	2.01	0.09	0.43	5.21	17.69	2.81	5.33	5.80	5.73
95th-Percentile Queue Length [ft]	14.16	14.19	50.23	2.33	10.68	130.14	442.14	70.15	133.37	145.08	143.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.83	43.83	46.64	46.72	47.85	47.85	50.53	12.69	5.62	46.75	6.30	6.31
Movement LOS	D	D	D	D	D	D	D	B	A	D	A	A
d_A, Approach Delay [s/veh]	45.59			47.65			13.71			10.85		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	13.58											
Intersection LOS	B											
Intersection V/C	0.742											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	44.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.783

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	40.00		35.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	663	556	65	172	852	517
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	4.00	3.10	1.70	2.70	0.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	663	556	65	172	852	517
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	178	149	17	46	229	139
Total Analysis Volume [veh/h]	713	598	70	185	916	556
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	43		21		15	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal group	0	4	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	40	30	0	50	0
Amber [s]	0.0	3.6	3.1	0.0	3.9	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	33	44	0	61	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.6	2.1	0.0	2.9	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60	4.10	4.10	4.90	4.90
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60	2.10	2.10	2.90	2.90
g_i, Effective Green Time [s]	38	38	38	19	19	65	65
g / C, Green / Cycle	0.28	0.28	0.28	0.14	0.14	0.48	0.48
(v / s)_i Volume / Saturation Flow Rate	0.25	0.25	0.25	0.04	0.12	0.26	0.35
s, saturation flow rate [veh/h]	1790	1775	1662	1755	1516	3522	1581
c, Capacity [veh/h]	506	502	470	247	213	1679	754
d1, Uniform Delay [s]	46.73	46.69	46.64	52.28	57.17	25.15	28.70
k, delay calibration	0.24	0.23	0.23	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.04	10.91	11.21	0.62	10.21	1.28	6.37
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

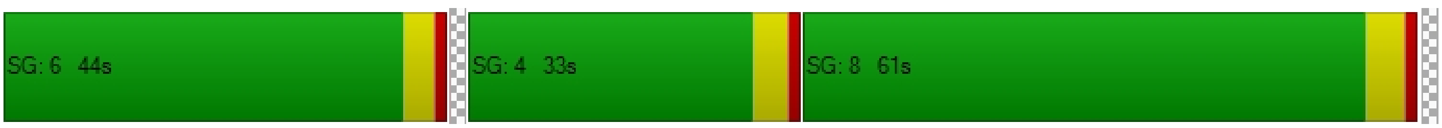
X, volume / capacity	0.89	0.89	0.88	0.28	0.87	0.55	0.74
d, Delay for Lane Group [s/veh]	57.77	57.60	57.85	52.90	67.38	26.43	35.08
Lane Group LOS	E	E	E	D	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	15.83	15.63	14.62	2.18	6.79	10.46	15.42
50th-Percentile Queue Length [ft]	395.67	390.76	365.54	54.59	169.79	261.59	385.44
95th-Percentile Queue Length [veh]	22.35	22.11	20.89	3.93	11.07	15.77	21.86
95th-Percentile Queue Length [ft]	558.78	552.85	522.32	98.26	276.64	394.21	546.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.70	57.77	52.90	67.38	26.43	35.08
Movement LOS	E	E	D	E	C	D
d_A, Approach Delay [s/veh]	57.74		63.40		29.70	
Approach LOS	E		E		C	
d_I, Intersection Delay [s/veh]	44.63					
Intersection LOS	D					
Intersection V/C	0.783					

Sequence

Ring 1	-	6	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 110: Marsh Road and US 101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	13.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name	Marsh Road		Marsh Road			
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Marsh Road		Marsh Road			
Base Volume Input [veh/h]	1097	0	0	1261	848	349
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	0.00	0.00	5.20	1.90	4.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1097	0	0	1261	848	349
Peak Hour Factor	0.9000	1.0000	1.0000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	305	0	0	350	236	97
Total Analysis Volume [veh/h]	1219	0	0	1401	942	388
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	40.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	50	0	0	50	30	9
Vehicle Extension [s]	3.0	0.0	0.0	3.0	2.0	2.0
Walk [s]	7	0	0	0	5	0
Pedestrian Clearance [s]	12	0	0	0	15	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	Yes			Yes	No	No
Maximum Recall	No			No	No	No
Pedestrian Recall	No			No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	50	50	26	78
g / C, Green / Cycle	0.63	0.63	0.32	0.97
(v / s)_i Volume / Saturation Flow Rate	0.35	0.41	0.27	0.25
s, saturation flow rate [veh/h]	3462	3439	3449	1548
c, Capacity [veh/h]	2168	2153	1117	1467
d1, Uniform Delay [s]	8.62	9.42	25.12	0.15
k, delay calibration	0.50	0.50	0.04	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.06	1.54	0.69	0.44
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

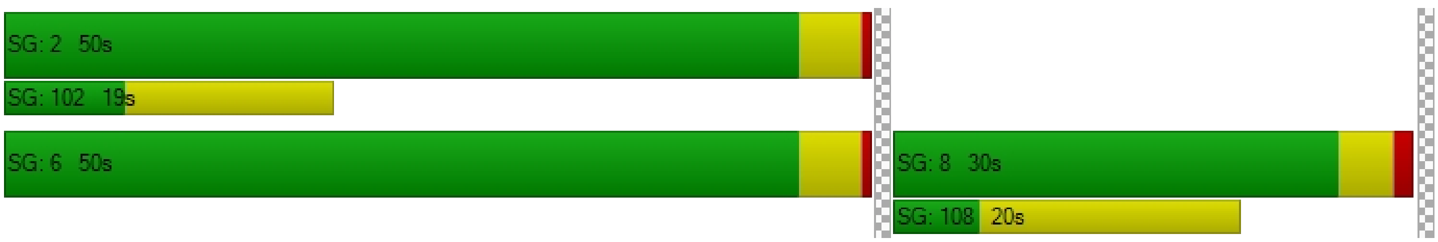
X, volume / capacity	0.56	0.65	0.84	0.26
d, Delay for Lane Group [s/veh]	9.68	10.96	25.81	0.59
Lane Group LOS	A	B	C	A
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	5.43	6.88	7.96	0.18
50th-Percentile Queue Length [ft]	135.65	171.94	198.99	4.49
95th-Percentile Queue Length [veh]	9.25	11.18	12.59	0.32
95th-Percentile Queue Length [ft]	231.15	279.46	314.66	8.08

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.68	0.00	0.00	10.96	25.81	0.59
Movement LOS	A			B	C	A
d_A, Approach Delay [s/veh]	9.68		10.96		18.45	
Approach LOS	A		B		B	
d_I, Intersection Delay [s/veh]	13.09					
Intersection LOS	B					
Intersection V/C	0.746					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 111: University Avenue / Woodland Avenue

Control Type:	Signalized	Delay (sec / veh):	58.6
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.850

Intersection Setup

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	1	0	0	0
Pocket Length [ft]	170.00	100.00	100.00	220.00	100.00	100.00	100.00	100.00	40.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Base Volume Input [veh/h]	35	645	19	211	972	533	19	87	311	392	84	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	645	19	211	972	533	19	87	311	392	84	44
Peak Hour Factor	0.8920	0.8920	0.8920	0.9840	0.9840	0.9840	0.7340	0.7340	0.7340	0.9420	0.9420	0.9420
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	181	5	54	247	135	6	30	106	104	22	12
Total Analysis Volume [veh/h]	39	723	21	214	988	542	26	119	424	416	89	47
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	51			0			1			13		
Bicycle Volume [bicycles/h]	5			1			4			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	7	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	9	31	0	28	50	0	0	40	0	0	31	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	15	0	0	0	0	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	39	39	19	54	54	36	36	20	20
g / C, Green / Cycle	0.03	0.30	0.30	0.15	0.41	0.41	0.28	0.28	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.02	0.22	0.22	0.13	0.31	0.39	0.09	0.30	0.13	0.09
s, saturation flow rate [veh/h]	1597	1676	1657	1597	3192	1394	1662	1403	3101	1508
c, Capacity [veh/h]	48	496	490	237	1322	577	460	389	482	235
d1, Uniform Delay [s]	62.66	41.46	41.49	54.43	32.30	36.49	37.23	47.00	53.53	50.94
k, delay calibration	0.04	0.50	0.50	0.20	0.50	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.17	10.15	10.34	19.26	3.89	25.02	0.39	72.39	4.70	2.26
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

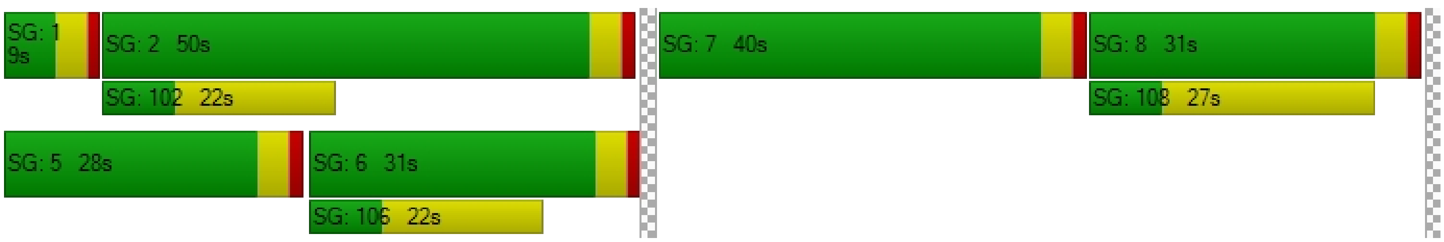
X, volume / capacity	0.81	0.75	0.76	0.90	0.75	0.94	0.32	1.09	0.86	0.58
d, Delay for Lane Group [s/veh]	73.83	51.61	51.83	73.68	36.19	61.52	37.62	119.39	58.23	53.20
Lane Group LOS	E	D	D	E	D	E	D	F	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.43	12.23	12.14	8.16	13.77	20.20	3.74	20.30	6.95	4.28
50th-Percentile Queue Length [ft]	35.86	305.71	303.55	203.92	344.27	504.91	93.49	507.44	173.78	106.92
95th-Percentile Queue Length [veh]	2.58	17.96	17.86	12.84	19.86	27.57	6.73	29.18	11.28	7.67
95th-Percentile Queue Length [ft]	64.55	449.08	446.41	321.01	496.42	689.17	168.28	729.52	281.88	191.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	73.83	51.72	51.83	73.68	36.19	61.52	37.62	37.62	119.39	58.23	53.20	53.20
Movement LOS	E	D	D	E	D	E	D	D	F	E	D	D
d_A, Approach Delay [s/veh]		52.82			48.66			98.55			56.99	
Approach LOS		D			D			F			E	
d_I, Intersection Delay [s/veh]						58.60						
Intersection LOS						E						
Intersection V/C						0.850						

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 131: Chilco Street/Hamilton Avenue

Control Type:	All-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Streeet			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Streeet			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	13	88	10	50	79	15	37	41	16	22	51	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	88	10	50	79	15	37	41	16	22	51	131
Peak Hour Factor	0.9570	0.9570	0.9570	0.8000	0.8000	0.8000	0.7830	0.7830	0.7830	0.9110	0.9110	0.9110
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	23	3	16	25	5	12	13	5	6	14	36
Total Analysis Volume [veh/h]	14	92	10	63	99	19	47	52	20	24	56	144
Pedestrian Volume [ped/h]	3			3			9			5		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.57	0.97	0.58	1.15
95th-Percentile Queue Length [ft]	14.25	24.37	14.59	28.64
Approach Delay [s/veh]	8.94	9.55	8.93	9.23
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	9.21			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	17.2
Analysis Method:	HCM 2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.800

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	35.00		35.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	1794	740	38	77	189
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.20	1.90	2.60	0.00	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1794	740	38	77	189
Peak Hour Factor	1.0000	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	504	208	11	22	53
Total Analysis Volume [veh/h]	0	2016	831	43	87	212
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27		0		5	
Bicycle Volume [bicycles/h]	31		28		9	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	89
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal group	0	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	4	0
Maximum Green [s]	0	64	64	0	32	0
Amber [s]	0.0	3.6	3.6	0.0	3.1	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	66	66	0	23	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.6	2.6	0.0	2.1	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.10	2.10
g_i, Effective Green Time [s]	61	61	19	19
g / C, Green / Cycle	0.69	0.69	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.63	0.28	0.05	0.15
Total Saturation Flow Adjustment	0.85	0.83	0.86	0.76
s, saturation flow rate [veh/h]	3217	3172	1625	1446
c, Capacity [veh/h]	2220	2188	345	307
d1, Uniform Delay [s]	11.46	5.91	29.17	32.35
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.88	0.55	1.75	12.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.91	0.40	0.25	0.69
d, Delay for Lane Group [s/veh]	18.35	6.45	30.92	44.37
Lane Group LOS	B	A	C	D
Critical Lane Group	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	29.61	5.68	1.97	5.86
50th-Percentile Queue Length [ft]	740.19	142.02	49.26	146.38
95th-Percentile Queue Length [veh]	47.45	10.91	4.48	11.18
95th-Percentile Queue Length [ft]	1186.29	272.84	112.03	279.60

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	18.35	6.45	6.45	30.92	44.37
Movement LOS		B	A	A	C	D
d_A, Approach Delay [s/veh]	18.35		6.45		40.46	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	17.16					
Intersection LOS	B					
Intersection V/C	0.800					

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	10	0	33	14	1	9	211	1594	117	73	760	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	33	14	1	9	211	1594	117	73	760	50
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	9	4	0	2	58	438	32	20	209	14
Total Analysis Volume [veh/h]	11	0	36	15	1	10	232	1752	129	80	835	55
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			10			7			0		
Bicycle Volume [bicycles/h]	1			7			23			14		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	62.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	0	12	0	0	12	0	4	10	0	6	10	0
Maximum Green [s]	0	25	0	0	25	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	28	0	0	28	0	25	55	0	17	47	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	15	15	15	15	17	72	72	8	63	63
g / C, Green / Cycle	0.15	0.15	0.15	0.15	0.17	0.72	0.72	0.08	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.01	0.02	0.02	0.01	0.13	0.50	0.52	0.05	0.24	0.24
s, saturation flow rate [veh/h]	766	1562	810	1526	1774	1863	1809	1774	1863	1813
c, Capacity [veh/h]	185	230	189	225	298	1331	1292	139	1163	1132
d1, Uniform Delay [s]	42.57	37.20	41.50	36.59	39.82	8.24	8.50	44.51	9.30	9.31
k, delay calibration	0.11	0.11	0.11	0.11	0.20	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.13	0.31	0.19	0.08	8.02	3.18	3.62	3.75	0.97	1.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.16	0.08	0.04	0.78	0.71	0.73	0.58	0.39	0.39
d, Delay for Lane Group [s/veh]	42.71	37.52	41.69	36.67	47.84	11.42	12.12	48.26	10.27	10.32
Lane Group LOS	D	D	D	D	D	B	B	D	B	B
Critical Lane Group	No	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.26	0.80	0.38	0.22	5.94	9.86	10.25	2.05	4.78	4.69
50th-Percentile Queue Length [ft]	6.51	19.88	9.48	5.42	148.57	246.46	256.30	51.24	119.51	117.35
95th-Percentile Queue Length [veh]	0.47	1.43	0.68	0.39	9.94	15.01	15.50	3.69	8.37	8.25
95th-Percentile Queue Length [ft]	11.73	35.79	17.07	9.76	248.53	375.20	387.58	92.23	209.15	206.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	42.71	42.71	37.52	41.69	41.69	36.67	47.84	11.75	12.12	48.26	10.29	10.32
Movement LOS	D	D	D	D	D	D	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	38.73			39.76			15.73			13.43		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	15.56											
Intersection LOS	B											
Intersection V/C	0.588											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	7.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.613

Intersection Setup

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	8	3	0	2	11	473	3	5	246	6
Total Analysis Volume [veh/h]	8	1	33	14	1	9	42	1893	14	19	985	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			6			0			11		
Bicycle Volume [bicycles/h]	2			0			32			53		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	92.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	15	0	0	15	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	34	0	0	34	0	13	54	0	12	53	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	2.9	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	11	11	5	79	79	4	78	78
g / C, Green / Cycle	0.11	0.11	0.05	0.79	0.79	0.04	0.78	0.78
(v / s)_i Volume / Saturation Flow Rate	0.03	0.02	0.02	0.51	0.51	0.01	0.27	0.27
s, saturation flow rate [veh/h]	1539	1493	1774	1863	1857	1774	1863	1842
c, Capacity [veh/h]	218	227	89	1470	1465	66	1445	1429
d1, Uniform Delay [s]	40.33	39.80	46.18	4.56	4.57	46.85	3.45	3.45
k, delay calibration	0.10	0.10	0.04	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.41	0.19	1.43	2.23	2.26	0.89	0.67	0.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.19	0.11	0.47	0.65	0.65	0.29	0.35	0.35
d, Delay for Lane Group [s/veh]	40.74	40.00	47.62	6.79	6.83	47.73	4.12	4.13
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.97	0.55	1.03	5.81	5.83	0.47	2.27	2.26
50th-Percentile Queue Length [ft]	24.30	13.66	25.68	145.23	145.85	11.65	56.74	56.41
95th-Percentile Queue Length [veh]	1.75	0.98	1.85	9.76	9.80	0.84	4.09	4.06
95th-Percentile Queue Length [ft]	43.74	24.59	46.22	244.05	244.88	20.97	102.14	101.54

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.74	40.74	40.74	40.00	40.00	40.00	47.62	6.81	6.83	47.73	4.12	4.13
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.74			40.00			7.69			4.93		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	7.47											
Intersection LOS	A											
Intersection V/C	0.613											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	36.7
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.260

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Base Volume Input [veh/h]	145	1496	17	27	732	136	2	0	9	215	3	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	145	1496	17	27	732	136	2	0	9	215	3	174
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	402	5	7	197	37	1	0	2	58	1	47
Total Analysis Volume [veh/h]	156	1609	18	29	787	146	2	0	10	231	3	187
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			0			4			3		
Bicycle Volume [bicycles/h]	0			32			20			61		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	99.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	6	10	0	0	6	0	0	6	0
Maximum Green [s]	30	60	0	30	60	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	22	53	0	12	43	0	0	35	0	0	35	0
Vehicle Extension [s]	3.0	7.0	0.0	3.0	7.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	13	56	56	5	49	49	33	33	33
g / C, Green / Cycle	0.13	0.56	0.56	0.05	0.49	0.49	0.33	0.33	0.33
(v / s)_i Volume / Saturation Flow Rate	0.09	0.44	0.44	0.02	0.26	0.26	0.03	0.68	0.13
s, saturation flow rate [veh/h]	1774	1863	1855	1774	1863	1732	463	345	1479
c, Capacity [veh/h]	222	1039	1035	95	906	842	194	185	486
d1, Uniform Delay [s]	41.98	17.38	17.42	45.54	17.78	17.89	25.46	40.28	25.82
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.01	5.91	6.00	1.77	2.21	2.47	0.13	155.82	0.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

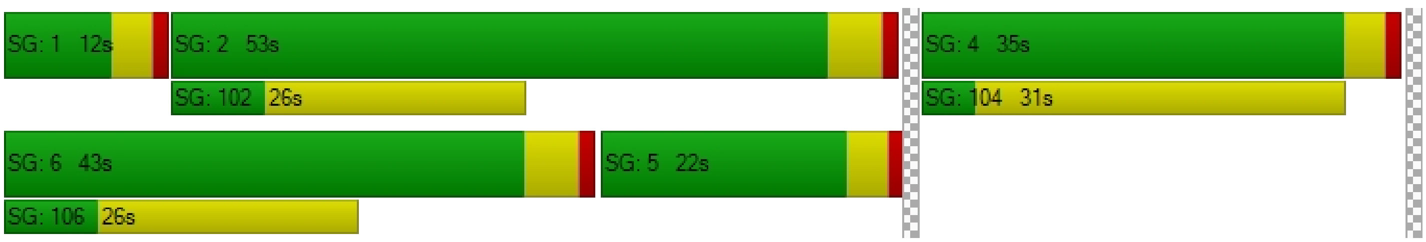
X, volume / capacity	0.70	0.78	0.79	0.30	0.53	0.54	0.06	1.27	0.38
d, Delay for Lane Group [s/veh]	45.99	23.29	23.42	47.31	19.99	20.35	25.59	196.10	26.32
Lane Group LOS	D	C	C	D	B	C	C	F	C
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	3.83	14.67	14.70	0.73	7.77	7.45	0.20	12.63	3.49
50th-Percentile Queue Length [ft]	95.87	366.65	367.45	18.26	194.29	186.18	5.01	315.87	87.20
95th-Percentile Queue Length [veh]	6.90	20.95	20.99	1.32	12.34	11.92	0.36	20.91	6.28
95th-Percentile Queue Length [ft]	172.57	523.66	524.64	32.88	308.59	298.06	9.01	522.80	156.96

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	45.99	23.36	23.42	47.31	20.13	20.35	25.59	25.59	25.59	196.10	196.10	26.32
Movement LOS	D	C	C	D	C	C	C	C	C	F	F	C
d_A, Approach Delay [s/veh]	25.34			20.98			25.59			120.69		
Approach LOS	C			C			C			F		
d_I, Intersection Delay [s/veh]	36.65											
Intersection LOS	D											
Intersection V/C	1.260											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	65.0
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.023

Intersection Setup

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Base Volume Input [veh/h]	143	35	1141	6	35	8	5	66	209	2636	407	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.00	0.00	4.60	0.00	0.00	16.70	0.00	18.20	9.10	4.70	4.90	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	143	35	1141	6	35	8	5	66	209	2636	407	12
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	9	300	2	9	2	1	17	55	694	107	3
Total Analysis Volume [veh/h]	151	37	1201	6	37	8	5	69	220	2775	428	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			9			0			0		
Bicycle Volume [bicycles/h]	1			0			14			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	125.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	3	3	6	4	6	4	1	4	8	2	8
Auxiliary Signal Groups		3	2,3									
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	6	6	0	4	0	4	12	4	0	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	4.7	3.6	3.6	0.0	3.6	0.0	3.6	3.6	3.6	0.0	4.7	0.0
All red [s]	1.0	1.0	1.0	0.0	0.5	0.0	0.5	0.0	0.5	0.0	1.0	0.0
Split [s]	61	33	33	0	31	0	31	35	31	0	61	0
Vehicle Extension [s]	4.5	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	4.5	0.0
Walk [s]	5	0	0	0	5	0	5	5	5	0	5	0
Pedestrian Clearance [s]	16	0	0	0	22	0	22	26	22	0	16	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No		No			No			Yes	
Maximum Recall		No	No		No			No			No	
Pedestrian Recall		No	No		Yes			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	38	120	6	6	28	28	28	80	80
g / C, Green / Cycle	0.24	0.75	0.04	0.04	0.17	0.17	0.17	0.50	0.50
(v / s)_i Volume / Saturation Flow Rate	0.10	0.44	0.01	0.01	0.02	0.02	0.15	0.55	0.24
s, saturation flow rate [veh/h]	1827	2699	1879	1634	1597	1463	1434	5035	1801
c, Capacity [veh/h]	437	1966	70	61	277	254	249	2517	901
d1, Uniform Delay [s]	51.61	10.62	75.16	75.20	55.98	55.98	64.53	39.98	26.47
k, delay calibration	0.04	0.50	0.04	0.04	0.04	0.04	0.30	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.25	1.43	1.25	1.54	0.08	0.09	23.02	52.81	1.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

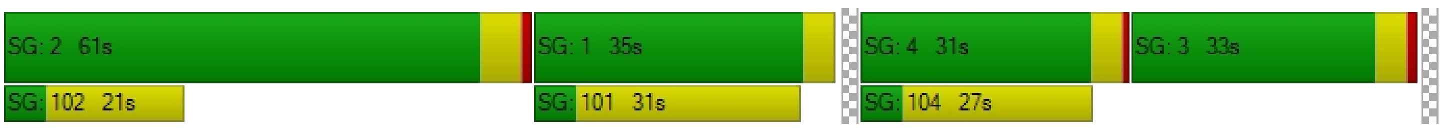
X, volume / capacity	0.43	0.61	0.38	0.40	0.14	0.14	0.88	1.10	0.49
d, Delay for Lane Group [s/veh]	51.86	12.05	76.41	76.75	56.07	56.07	87.55	92.79	28.38
Lane Group LOS	D	B	E	E	E	E	F	F	C
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	6.51	10.34	1.11	1.01	1.35	1.23	10.38	44.75	11.76
50th-Percentile Queue Length [ft]	162.87	258.42	27.68	25.19	33.69	30.77	259.56	1118.70	294.12
95th-Percentile Queue Length [veh]	10.70	15.61	1.99	1.81	2.43	2.22	15.67	60.17	17.39
95th-Percentile Queue Length [ft]	267.52	390.24	49.83	45.34	60.65	55.39	391.66	1504.34	434.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.86	51.86	12.05	76.41	76.56	76.75	56.07	56.07	87.55	92.79	28.38	28.38
Movement LOS	D	D	B	E	E	E	E	E	F	F	C	C
d_A, Approach Delay [s/veh]	17.44			76.57			79.63			83.96		
Approach LOS	B			E			E			F		
d_I, Intersection Delay [s/veh]	64.96											
Intersection LOS	E											
Intersection V/C	1.023											

Sequence

Ring 1	-	2	1	4	3	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	9.8
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.643

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Base Volume Input [veh/h]	64	636	403	112	100	74
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	3.20	5.40	1.00	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	64	636	403	112	100	74
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	181	114	32	28	21
Total Analysis Volume [veh/h]	73	723	458	127	114	84
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		20		20	
Bicycle Volume [bicycles/h]	24		13		11	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	4	10	10	0	4	0
Maximum Green [s]	20	60	40	0	20	0
Amber [s]	3.1	3.5	3.5	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	4.0	4.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	13	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.5	2.5	0.0	2.1	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.50	4.50	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.50	2.50	2.10	2.10
g_i, Effective Green Time [s]	2	23	17	4	4
g / C, Green / Cycle	0.06	0.65	0.47	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.04	0.43	0.37	0.07	0.06
s, saturation flow rate [veh/h]	1629	1678	1575	1612	1356
c, Capacity [veh/h]	95	1083	748	192	161
d1, Uniform Delay [s]	16.94	4.03	8.00	15.24	15.10
k, delay calibration	0.11	0.15	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.41	1.02	2.59	2.93	2.60
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

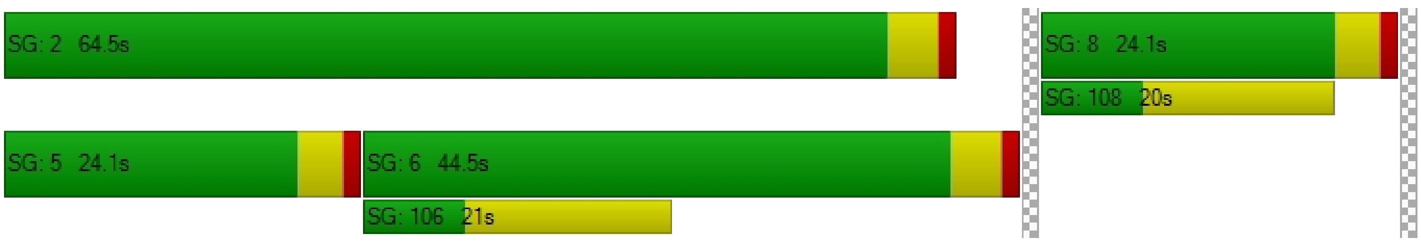
X, volume / capacity	0.77	0.67	0.78	0.59	0.52
d, Delay for Lane Group [s/veh]	29.36	5.05	10.59	18.18	17.70
Lane Group LOS	C	A	B	B	B
Critical Lane Group	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	0.85	1.49	2.79	0.89	0.66
50th-Percentile Queue Length [ft]	21.26	37.13	69.86	22.37	16.39
95th-Percentile Queue Length [veh]	1.53	2.67	5.03	1.61	1.18
95th-Percentile Queue Length [ft]	38.27	66.83	125.75	40.27	29.50

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.36	5.05	10.59	10.59	18.18	17.70
Movement LOS	C	A	B	B	B	B
d_A, Approach Delay [s/veh]	7.28		10.59		17.97	
Approach LOS	A		B		B	
d_I, Intersection Delay [s/veh]	9.84					
Intersection LOS	A					
Intersection V/C	0.643					

Sequence

Ring 1	-	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	30.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.065

Intersection Setup

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	1
Pocket Length [ft]	80.00	100.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		No	

volumes

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	205	26	176	2726	933	169
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	23.10	6.30	3.80	5.10	5.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	205	26	176	2726	933	169
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	7	47	725	248	45
Total Analysis Volume [veh/h]	218	28	187	2900	993	180
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	4	4	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	Lead	-	-	-
Minimum Green [s]	10	10	4	10	10	0
Maximum Green [s]	36	36	20	50	50	0
Amber [s]	3.0	3.0	3.0	5.0	5.0	0.0
All red [s]	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	2.0	2.0	2.0	3.0	3.0	0.0
Walk [s]	5	5	0	0	0	0
Pedestrian Clearance [s]	38	38	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	1.5	1.5	1.0	3.5	3.5	0.0
Minimum Recall	No		Yes	No	Yes	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.00	5.50	5.50	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.00	3.50	3.50	3.50
g_i, Effective Green Time [s]	2	2	5	23	15	15
g / C, Green / Cycle	0.07	0.07	0.15	0.67	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.14	0.02	0.12	0.65	0.22	0.13
s, saturation flow rate [veh/h]	1575	1181	1532	4488	4432	1380
c, Capacity [veh/h]	109	82	234	2999	1897	591
d1, Uniform Delay [s]	15.96	15.22	14.01	5.33	7.23	6.45
k, delay calibration	0.04	0.04	0.04	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	453.69	0.92	2.37	3.13	0.23	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

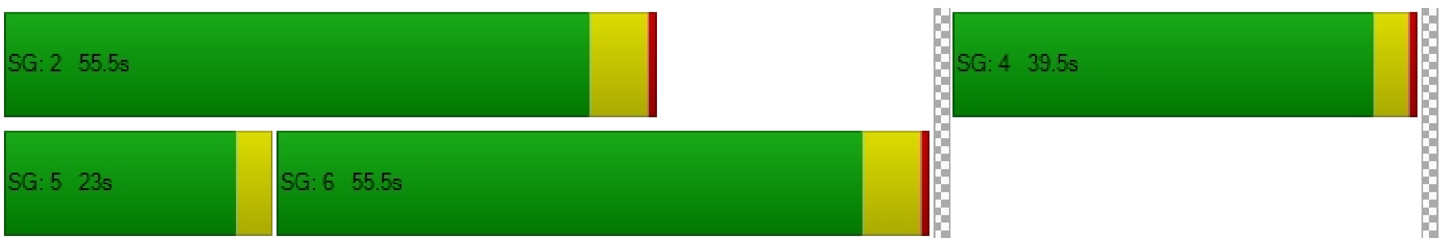
X, volume / capacity	2.00	0.34	0.80	0.97	0.52	0.30
d, Delay for Lane Group [s/veh]	469.65	16.14	16.38	8.45	7.46	6.74
Lane Group LOS	F	B	B	A	A	A
Critical Lane Group	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh]	14.42	0.19	1.11	0.87	0.74	0.39
50th-Percentile Queue Length [ft]	360.45	4.80	27.75	21.70	18.51	9.69
95th-Percentile Queue Length [veh]	24.13	0.35	2.00	1.56	1.33	0.70
95th-Percentile Queue Length [ft]	603.28	8.63	49.95	39.06	33.32	17.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	469.65	16.14	16.38	8.45	7.46	6.74
Movement LOS	F	B	B	A	A	A
d_A, Approach Delay [s/veh]	418.03		8.93		7.35	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	30.86					
Intersection LOS	C					
Intersection V/C	1.065					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	10.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.930

Intersection Setup

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration	┓┏		‖‖┏		┓‖‖	
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	140.00	100.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	179	12	1106	56	22	2914
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.30	8.30	5.30	7.10	0.00	3.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	179	12	1106	56	22	2914
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	48	3	294	15	6	775
Total Analysis Volume [veh/h]	190	13	1177	60	23	3100
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	1		1		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Protected	Permissive	Permissive	Protected	Permissive
Signal group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	0	10	0	7	10
Maximum Green [s]	31	0	40	0	21	40
Amber [s]	3.0	0.0	5.0	0.0	3.0	5.0
All red [s]	0.5	0.0	0.5	0.0	0.0	0.5
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	2.0	3.0
Walk [s]	5	0	0	0	0	0
Pedestrian Clearance [s]	35	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	1.5	0.0	3.5	0.0	1.0	3.5
Minimum Recall	No		Yes		No	Yes
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	20.0	0.0	0.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	3.00	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	1.00	3.50
g_i, Effective Green Time [s]	7	23	23	2	28
g / C, Green / Cycle	0.16	0.53	0.53	0.04	0.64
(v / s)_i Volume / Saturation Flow Rate	0.12	0.24	0.04	0.01	0.62
s, saturation flow rate [veh/h]	1611	4915	1477	1810	4991
c, Capacity [veh/h]	250	2617	786	71	3194
d1, Uniform Delay [s]	17.78	6.32	5.01	20.55	7.52
k, delay calibration	0.11	0.11	0.11	0.04	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.69	0.12	0.04	0.97	3.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

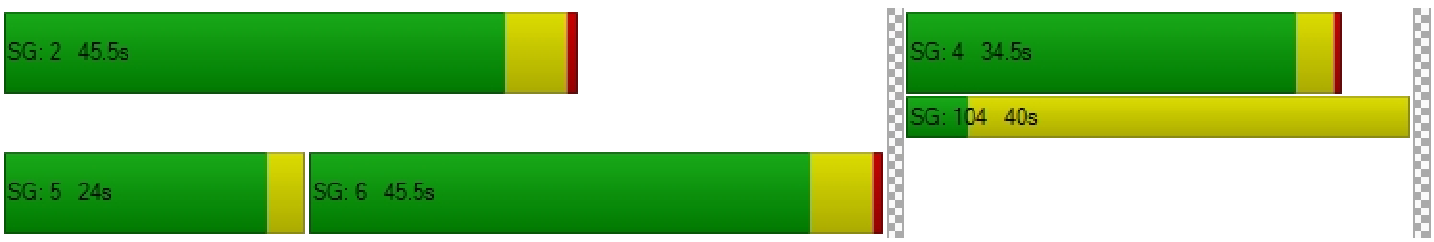
X, volume / capacity	0.76	0.45	0.08	0.32	0.97
d, Delay for Lane Group [s/veh]	22.47	6.44	5.05	21.51	10.75
Lane Group LOS	C	A	A	C	B
Critical Lane Group	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.97	1.13	0.14	0.21	3.20
50th-Percentile Queue Length [ft]	49.25	28.27	3.56	5.21	80.04
95th-Percentile Queue Length [veh]	3.55	2.04	0.26	0.38	5.76
95th-Percentile Queue Length [ft]	88.65	50.89	6.41	9.39	144.07

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.47	0.00	6.44	5.05	21.51	10.75
Movement LOS	C		A	A	C	B
d_A, Approach Delay [s/veh]	22.47		6.37		10.83	
Approach LOS	C		A		B	
d_I, Intersection Delay [s/veh]	10.11					
Intersection LOS	B					
Intersection V/C	0.930					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 204: Chilco Street/Newbridge Street

Control Type:	All-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Peak Hour Factor	0.9060	0.9060	0.9060	0.7870	0.7870	0.7870	0.8610	0.8610	0.8610	0.7920	0.7920	0.7920
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	3	30	2	3	1	34	1	4	40	27
Total Analysis Volume [veh/h]	2	17	13	118	6	11	5	137	2	16	160	107
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.14	0.70	0.69	1.52
95th-Percentile Queue Length [ft]	3.40	17.50	17.19	37.94
Approach Delay [s/veh]	8.11	9.28	8.78	9.56
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	9.23			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 206: Chilco Street/Ivy Drive

Control Type:	All-way stop	Delay (sec / veh):	9.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Streeet			Ivy Drive			Ivy Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Streeet			Ivy Drive			Ivy Drive		
Base Volume Input [veh/h]	42	44	12	41	54	20	17	56	25	9	64	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	44	12	41	54	20	17	56	25	9	64	63
Peak Hour Factor	0.8450	0.8450	0.8450	0.6530	0.6530	0.6530	0.6620	0.6620	0.6620	0.7250	0.7250	0.7250
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	13	4	16	21	8	6	21	9	3	22	22
Total Analysis Volume [veh/h]	50	52	14	63	83	31	26	85	38	12	88	87
Pedestrian Volume [ped/h]	29			100			28			66		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.57	0.93	0.74	0.93
95th-Percentile Queue Length [ft]	14.33	23.36	18.44	23.34
Approach Delay [s/veh]	8.97	9.41	8.99	9.06
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	9.13			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	11.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Base Volume Input [veh/h]	114	148	74	133	204	8	5	5	17	14	8	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	10.10	6.80	2.30	3.40	0.00	40.00	40.00	29.40	14.30	37.50	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	114	148	74	133	204	8	5	5	17	14	8	28
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	40	20	36	55	2	1	1	5	4	2	8
Total Analysis Volume [veh/h]	124	161	80	145	222	9	5	5	18	15	9	30
Pedestrian Volume [ped/h]	0			1			0			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	2.54	2.71	0.14	0.28
95th-Percentile Queue Length [ft]	63.46	67.76	3.62	6.88
Approach Delay [s/veh]	11.69	12.04	9.22	9.14
Approach LOS	B	B	A	A
Intersection Delay [s/veh]	11.60			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	9.6
Analysis Method:	HCM 2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	1	0	0	1	53	0	2	17	1	1	0	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.90	0.00	0.00	5.90	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	0	1	53	0	2	17	1	1	0	11
Peak Hour Factor	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	0	18	0	1	6	0	0	0	4
Total Analysis Volume [veh/h]	1	0	0	1	71	0	3	23	1	1	0	15
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
d_M, Delay for Movement [s/veh]	9.20	9.57	8.40	7.25	0.00	0.00	7.34	0.00	0.00	9.15	9.62	8.67
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.14	0.14	0.14	0.05	0.05	0.05	0.05	0.05	0.05
95th-Percentile Queue Length [ft]	0.09	0.09	0.09	3.52	3.52	3.52	1.34	1.34	1.34	1.23	1.23	1.23
d_A, Approach Delay [s/veh]	9.20			0.10			0.82			8.70		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	1.53											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Base Volume Input [veh/h]	8	33	5	1	6	0	29	11	91	0	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	9.10	20.00	100.00	33.30	0.00	10.30	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	33	5	1	6	0	29	11	91	0	0	1
Peak Hour Factor	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400	0.8400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	10	1	0	2	0	9	3	27	0	0	0
Total Analysis Volume [veh/h]	10	39	6	1	7	0	35	13	108	0	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.10	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.23	0.00	0.00	8.24	0.00	0.00	9.72	10.10	9.18	9.84	9.42	8.33
Movement LOS	A	A	A	A	A	A	A	B	A	A	A	A
95th-Percentile Queue Length [veh]	0.10	0.10	0.10	0.02	0.02	0.02	0.57	0.57	0.57	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	2.62	2.62	2.62	0.54	0.54	0.54	14.15	14.15	14.15	0.07	0.07	0.07
d_A, Approach Delay [s/veh]	1.31			1.03			9.38			8.33		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.05											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	12.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Approach	Southbound			Northeastbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Base Volume Input [veh/h]	111	39	0	0	23	14	7	0	11	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	10.30	2.00	2.00	26.10	7.10	0.00	0.00	18.20	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	39	0	0	23	14	7	0	11	0	0	0
Peak Hour Factor	0.7800	0.7800	1.0000	1.0000	0.7800	0.7800	0.7800	0.7800	0.7800	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	13	0	0	7	4	2	0	4	0	0	0
Total Analysis Volume [veh/h]	142	50	0	0	29	18	9	0	14	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.09	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.55	0.00	0.00	0.00	0.00	0.00	11.74	12.23	8.79	0.00	0.00	0.00
Movement LOS	A	A			A	A	B	B	A			
95th-Percentile Queue Length [veh]	0.42	0.42	0.00	0.00	0.00	0.00	0.09	0.09	0.09	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	10.53	10.53	0.00	0.00	0.00	0.00	2.37	2.37	2.37	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	5.58			0.00			9.95			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	4.96											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 215: Chrysler Dr/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	8.8
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chrysler Drive						Constitution Drive					
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive						Constitution Drive					
Base Volume Input [veh/h]	23	47	12	19	127	97	19	5	102	1	28	2
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	13.00	8.50	8.30	21.10	0.80	3.10	5.30	40.00	9.80	0.00	17.90	100.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	47	12	19	127	97	19	5	102	1	28	2
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	13	3	5	35	27	5	1	28	0	8	1
Total Analysis Volume [veh/h]	26	52	13	21	141	108	21	6	113	1	31	2
Pedestrian Volume [ped/h]	0			1			1			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.43	1.36	0.59	0.16
95th-Percentile Queue Length [ft]	10.76	34.03	14.72	3.93
Approach Delay [s/veh]	8.70	9.15	8.08	8.56
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.76			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 233: Sand Hill Road and Sand Hill Circle

Control Type:	Signalized	Delay (sec / veh):	14.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.576

Intersection Setup

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			Yes		

volumes

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Base Volume Input [veh/h]	4	293	0	0	51	40	0	0	0	0	795	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	26.60	2.00	2.00	5.90	7.50	2.00	2.00	2.00	3.00	3.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	293	0	0	51	40	0	0	0	0	795	32
Peak Hour Factor	0.8700	0.8700	1.0000	1.0000	0.8700	0.8700	1.0000	1.0000	1.0000	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	84	0	0	15	11	0	0	0	0	228	9
Total Analysis Volume [veh/h]	5	337	0	0	59	46	0	0	0	0	914	37
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Split	Split	Split
Signal group	0	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	55	0	0	55	0	0	0	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	55	0	0	55	0	0	0	0	0	30	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	14	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Minimum Recall		No			No						No	
Maximum Recall		No			No						No	
Pedestrian Recall		No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R		C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		1.00	1.00
g_i, Effective Green Time [s]	23	23	23		57	57
g / C, Green / Cycle	0.27	0.27	0.27		0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.23	0.03	0.03		0.27	0.27
s, saturation flow rate [veh/h]	1491	1794	1483		1845	1651
c, Capacity [veh/h]	448	487	402		1236	1106
d1, Uniform Delay [s]	29.24	23.34	23.29		6.36	6.37
k, delay calibration	0.08	0.08	0.08		0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	2.05	0.08	0.09		0.99	1.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00

Lane Group Results

X, volume / capacity	0.76	0.12	0.11		0.41	0.41
d, Delay for Lane Group [s/veh]	31.29	23.42	23.39		7.36	7.48
Lane Group LOS	C	C	C		A	A
Critical Lane Group	Yes	No	No		No	Yes
50th-Percentile Queue Length [veh]	6.61	0.89	0.69		3.71	3.37
50th-Percentile Queue Length [ft]	165.17	22.15	17.28		92.74	84.14
95th-Percentile Queue Length [veh]	10.82	1.59	1.24		6.68	6.06
95th-Percentile Queue Length [ft]	270.56	39.87	31.10		166.93	151.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.29	31.29	0.00	0.00	23.42	23.39	0.00	0.00	0.00	7.36	7.41	7.48
Movement LOS	C	C			C	C				A	A	A
d_A, Approach Delay [s/veh]		31.29			23.41			0.00			7.41	
Approach LOS		C			C			A			A	
d_I, Intersection Delay [s/veh]						14.46						
Intersection LOS						B						
Intersection V/C						0.576						

Sequence

Ring 1	-	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	43.9
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.755

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	0	112	478	48	0	0	156	1696	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.70	3.60	4.20	2.00	2.00	2.60	1.50	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	112	478	48	0	0	156	1696	0	0	0	0
Peak Hour Factor	1.0000	0.9500	0.9500	0.9500	1.0000	1.0000	0.9500	0.9500	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	29	126	13	0	0	41	446	0	0	0	0
Total Analysis Volume [veh/h]	0	118	503	51	0	0	164	1785	0	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			40			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Protecte	Permiss	Overlap	Permiss	Permiss	Protecte	Protecte	Permiss
Signal group	0	8	5	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups			5,8				1,5,6					
Lead / Lag	-	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	0	6	5	6	0	0	4	8	0	0	0	0
Maximum Green [s]	0	14	30	25	0	0	16	30	0	0	0	0
Amber [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0
All red [s]	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Split [s]	0	14	30	25	0	0	16	30	0	0	0	0
Vehicle Extension [s]	0.0	2.5	3.0	2.0	0.0	0.0	2.0	4.0	0.0	0.0	0.0	0.0
Walk [s]	0	10	0	0	0	0	0	10	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	0	0	0	10	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Minimum Recall		No	No	No			No	Yes				
Maximum Recall		No	No	No			No	No				
Pedestrian Recall		No	No	No			No	No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	L	C	
L, Total Lost Time per Cycle [s]	2.00	2.25	2.00	2.25	2.50	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.50	
g_i, Effective Green Time [s]	16	23	6	23	32	
g / C, Green / Cycle	0.24	0.34	0.09	0.34	0.48	
(v / s)_i Volume / Saturation Flow Rate	0.06	0.32	0.03	0.11	0.50	
s, saturation flow rate [veh/h]	1850	1559	1737	1500	3564	
c, Capacity [veh/h]	444	512	151	439	1710	
d1, Uniform Delay [s]	20.57	22.21	28.65	21.78	17.34	
k, delay calibration	0.04	0.50	0.04	0.11	0.19	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.12	35.74	0.49	0.56	26.56	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

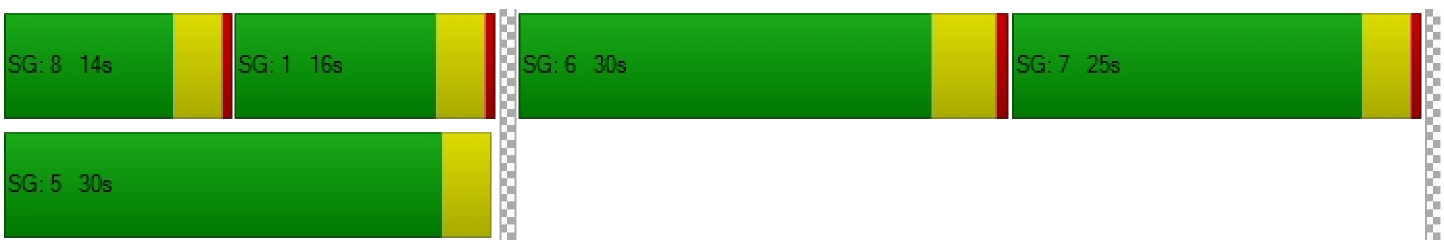
X, volume / capacity	0.27	0.98	0.34	0.37	1.04	
d, Delay for Lane Group [s/veh]	20.69	57.95	29.14	22.34	43.90	
Lane Group LOS	C	E	C	C	F	
Critical Lane Group	No	Yes	Yes	Yes	Yes	
50th-Percentile Queue Length [veh]	1.36	11.83	0.73	1.71	16.62	
50th-Percentile Queue Length [ft]	34.11	295.73	18.33	42.77	415.39	
95th-Percentile Queue Length [veh]	2.46	17.47	1.32	3.08	24.04	
95th-Percentile Queue Length [ft]	61.41	436.75	33.00	76.98	600.92	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	20.69	57.95	29.14	0.00	0.00	22.34	43.90	0.00	0.00	0.00	0.00
Movement LOS		C	E	C			C	F				
d_A, Approach Delay [s/veh]		50.87			29.14			42.09			0.00	
Approach LOS		D			C			D			A	
d_I, Intersection Delay [s/veh]						43.92						
Intersection LOS						D						
Intersection V/C						0.755						

Sequence

Ring 1	8	1	6	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 243: University Avenue/US 101 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	30.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.759

Intersection Setup

Name	University Avenue		University Avenue		US 101 SB Ramps	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	0	1
Pocket Length [ft]	100.00	160.00	230.00	100.00	100.00	220.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		US 101 SB Ramps	
Base Volume Input [veh/h]	932	453	841	1474	360	274
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	932	453	841	1474	360	274
Peak Hour Factor	0.8990	0.8900	0.9710	0.9710	0.9060	0.9060
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	259	127	217	380	99	76
Total Analysis Volume [veh/h]	1037	509	866	1518	397	302
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	7		5		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	4.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Protected	Permissive	Protected	Permissive
Signal group	6	7	5	2	7	0
Auxiliary Signal Groups		6,7				
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	10	6	4	10	6	0
Maximum Green [s]	30	30	30	30	30	0
Amber [s]	4.0	3.0	3.0	4.0	3.0	0.0
All red [s]	0.5	0.5	0.5	0.5	0.5	0.0
Split [s]	49	29	52	101	29	0
Vehicle Extension [s]	3.0	2.0	2.0	3.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.5	1.5	1.5	2.5	1.5	0.0
Minimum Recall	Yes	No	No	Yes	No	
Maximum Recall	No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R
L, Total Lost Time per Cycle [s]	4.50	3.50	3.50	4.50	3.50	3.50	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.50	0.00	1.50	2.50	1.50	1.50	1.50
g_i, Effective Green Time [s]	57	84	39	99	23	23	23
g / C, Green / Cycle	0.44	0.65	0.30	0.76	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.32	0.21	0.28	0.48	0.15	0.15	0.16
s, saturation flow rate [veh/h]	3192	2462	3101	3192	1597	1533	1425
c, Capacity [veh/h]	1405	1598	921	2440	278	267	248
d1, Uniform Delay [s]	30.16	10.10	44.55	6.88	52.30	52.36	52.48
k, delay calibration	0.50	0.04	0.04	0.50	0.25	0.26	0.27
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.50	0.04	2.26	1.21	17.44	18.99	21.99
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

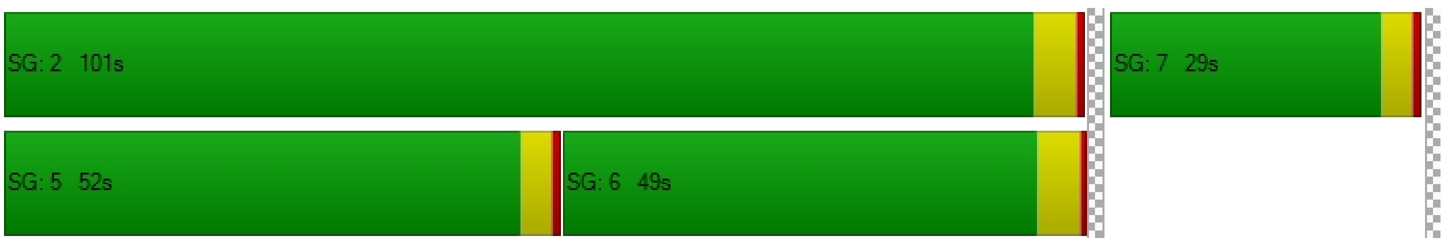
X, volume / capacity	0.74	0.32	0.94	0.62	0.87	0.88	0.89
d, Delay for Lane Group [s/veh]	33.66	10.14	46.81	8.09	69.73	71.36	74.48
Lane Group LOS	C	B	D	A	E	E	E
Critical Lane Group	Yes	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	13.98	3.15	13.81	8.54	9.07	8.89	8.57
50th-Percentile Queue Length [ft]	349.55	78.72	345.21	213.49	226.66	222.13	214.23
95th-Percentile Queue Length [veh]	20.11	5.67	19.90	13.33	14.00	13.77	13.37
95th-Percentile Queue Length [ft]	502.86	141.70	497.56	333.30	350.11	344.34	334.26

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	33.66	10.14	46.81	8.09	70.39	73.73
Movement LOS	C	B	D	A	E	E
d_A, Approach Delay [s/veh]	25.92		22.15		71.78	
Approach LOS	C		C		E	
d_I, Intersection Delay [s/veh]	30.90					
Intersection LOS	C					
Intersection V/C	0.759					

Sequence

Ring 1	2	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 245: University Avenue/Runnymede Street

Control Type:	Signalized	Delay (sec / veh):	11.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.506

Intersection Setup

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	120.00	100.00	100.00	130.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Base Volume Input [veh/h]	9	671	47	167	848	89	19	85	1	27	172	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	671	47	167	848	89	19	85	1	27	172	22
Peak Hour Factor	0.9230	0.9230	0.9230	0.9200	0.9200	0.9200	0.5050	0.5050	0.5050	0.7180	0.7180	0.7180
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	182	13	45	230	24	9	42	0	9	60	8
Total Analysis Volume [veh/h]	10	727	51	182	922	97	38	168	2	38	240	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			5			6			8		
Bicycle Volume [bicycles/h]	1			7			0			1		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	54.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	35	0	0	35	0	0	30	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	42	42	42	42	42	42	15	15
g / C, Green / Cycle	0.65	0.65	0.65	0.65	0.65	0.65	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.02	0.23	0.24	0.29	0.31	0.31	0.15	0.19
s, saturation flow rate [veh/h]	496	1676	1631	622	1676	1611	1427	1588
c, Capacity [veh/h]	327	1082	1053	415	1082	1040	396	430
d1, Uniform Delay [s]	10.58	5.33	5.34	12.01	5.91	5.93	21.98	23.71
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.17	0.95	0.98	3.35	1.51	1.60	1.08	2.28
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

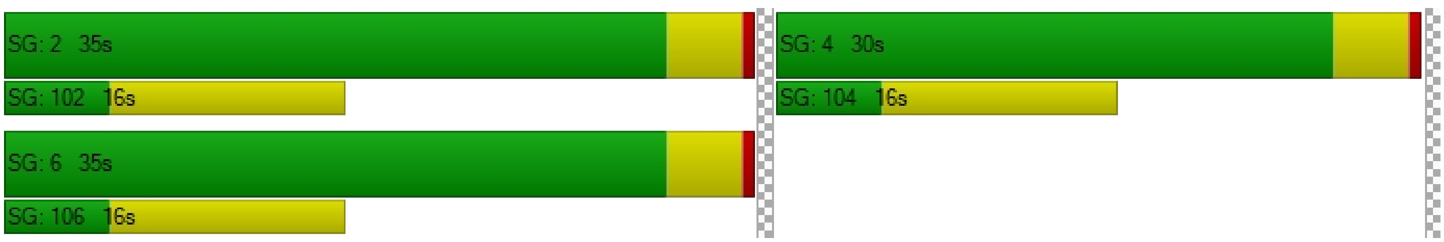
X, volume / capacity	0.03	0.36	0.37	0.44	0.48	0.48	0.53	0.72
d, Delay for Lane Group [s/veh]	10.75	6.28	6.32	15.37	7.42	7.53	23.07	25.99
Lane Group LOS	B	A	A	B	A	A	C	C
Critical Lane Group	No	No	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.09	2.09	2.05	2.02	3.08	3.02	2.73	4.47
50th-Percentile Queue Length [ft]	2.26	52.20	51.33	50.45	77.08	75.44	68.30	111.85
95th-Percentile Queue Length [veh]	0.16	3.76	3.70	3.63	5.55	5.43	4.92	7.94
95th-Percentile Queue Length [ft]	4.07	93.97	92.40	90.82	138.74	135.79	122.94	198.57

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.75	6.30	6.32	15.37	7.47	7.53	23.07	23.07	23.07	25.99	25.99	25.99
Movement LOS	B	A	A	B	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	6.36			8.67			23.07			25.99		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	11.27											
Intersection LOS	B											
Intersection V/C	0.506											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 246: University Avenue/Bell Street

Control Type:	Signalized	Delay (sec / veh):	10.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.528

Intersection Setup

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	60.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Base Volume Input [veh/h]	29	678	43	16	888	16	12	76	35	90	115	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	678	43	16	888	16	12	76	35	90	115	12
Peak Hour Factor	0.9100	0.9100	0.9100	0.8460	0.8460	0.8460	0.6830	0.6830	0.6830	0.8350	0.8350	0.8350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	186	12	5	262	5	4	28	13	27	34	4
Total Analysis Volume [veh/h]	32	745	47	19	1050	19	18	111	51	108	138	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			5			7			1		
Bicycle Volume [bicycles/h]	4			11			2			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	78.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	35	0	0	35	0	0	30	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	41	41	41	41	41	41	16	16
g / C, Green / Cycle	0.63	0.63	0.63	0.63	0.63	0.63	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.07	0.24	0.24	0.03	0.32	0.32	0.12	0.21
s, saturation flow rate [veh/h]	473	1676	1636	614	1676	1664	1553	1251
c, Capacity [veh/h]	314	1055	1030	409	1055	1047	445	388
d1, Uniform Delay [s]	11.37	5.86	5.86	8.86	6.56	6.56	20.77	23.30
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.65	1.04	1.07	0.21	1.75	1.77	0.59	2.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

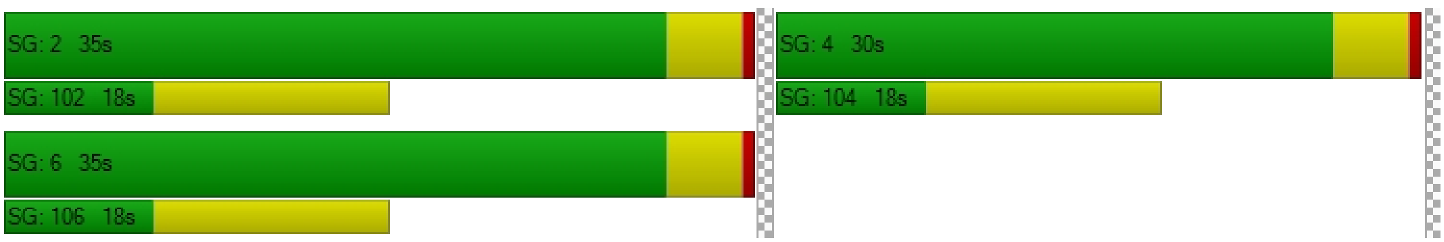
X, volume / capacity	0.10	0.38	0.38	0.05	0.51	0.51	0.40	0.67
d, Delay for Lane Group [s/veh]	12.02	6.90	6.93	9.07	8.30	8.33	21.36	25.31
Lane Group LOS	B	A	A	A	A	A	C	C
Critical Lane Group	No	No	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.31	2.30	2.27	0.15	3.51	3.50	2.25	3.77
50th-Percentile Queue Length [ft]	7.79	57.60	56.69	3.74	87.81	87.44	56.17	94.28
95th-Percentile Queue Length [veh]	0.56	4.15	4.08	0.27	6.32	6.30	4.04	6.79
95th-Percentile Queue Length [ft]	14.02	103.68	102.05	6.74	158.07	157.39	101.11	169.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	12.02	6.91	6.93	9.07	8.32	8.33	21.36	21.36	21.36	25.31	25.31	25.31
Movement LOS	B	A	A	A	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	7.11			8.33			21.36			25.31		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	10.78											
Intersection LOS	B											
Intersection V/C	0.528											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 247: University Avenue/Bay Road

Control Type:	Signalized	Delay (sec / veh):	38.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.641

Intersection Setup

Name	University Avenue			University Avenue						BayRoad		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	170.00	100.00	170.00	170.00	100.00	170.00
Speed [mph]	35.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue						BayRoad		
Base Volume Input [veh/h]	99	585	79	99	970	34	95	192	96	56	175	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	585	79	99	970	34	95	192	96	56	175	76
Peak Hour Factor	0.9210	0.9210	0.9210	0.9040	0.9040	0.9040	0.8870	0.8870	0.8870	0.9480	0.9480	0.9480
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	159	21	27	268	9	27	54	27	15	46	20
Total Analysis Volume [veh/h]	107	635	86	110	1073	38	107	216	108	59	185	80
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	78			19			8			26		
Bicycle Volume [bicycles/h]	9			8			3			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	14	49	0	20	55	0	0	31	0	0	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	23	0	0	17	0	0	27	0	0	26	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	67	67	11	68	68	19	19	19	17	17	17
g / C, Green / Cycle	0.08	0.52	0.52	0.08	0.52	0.52	0.15	0.15	0.15	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.07	0.22	0.22	0.07	0.33	0.33	0.07	0.13	0.08	0.04	0.11	0.07
s, saturation flow rate [veh/h]	1597	1676	1598	1597	1676	1649	1597	1676	1349	1597	1676	1166
c, Capacity [veh/h]	123	866	826	132	876	862	238	250	201	205	216	150
d1, Uniform Delay [s]	59.36	19.46	19.50	58.74	22.24	22.29	50.45	54.03	51.17	51.25	55.48	52.99
k, delay calibration	0.29	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.12	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	35.19	1.53	1.62	12.56	3.54	3.65	1.33	8.70	2.23	0.76	10.25	2.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

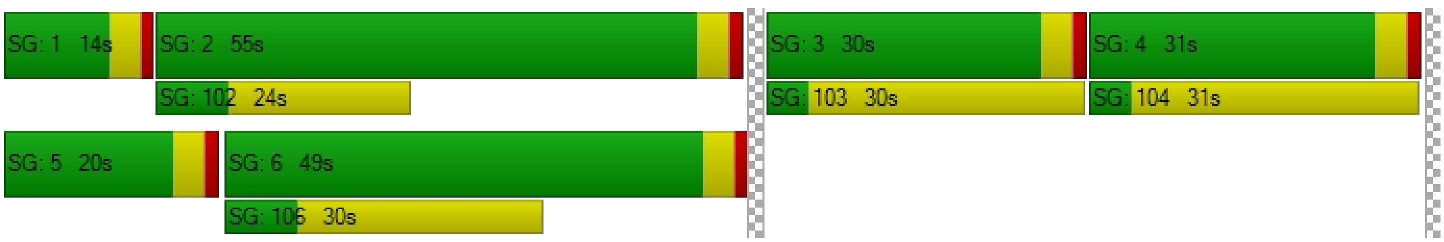
X, volume / capacity	0.87	0.42	0.43	0.83	0.64	0.64	0.45	0.86	0.54	0.29	0.86	0.53
d, Delay for Lane Group [s/veh]	94.55	20.99	21.12	71.29	25.78	25.94	51.78	62.74	53.40	52.01	65.73	55.92
Lane Group LOS	F	C	C	E	C	C	D	E	D	D	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	4.67	7.12	6.86	4.01	12.69	12.60	3.28	7.51	3.39	1.80	6.56	2.58
50th-Percentile Queue Length [ft]	116.66	177.94	171.54	100.18	317.28	314.97	82.05	187.75	84.85	44.88	163.99	64.45
95th-Percentile Queue Length [veh]	8.21	11.49	11.16	7.21	18.53	18.42	5.91	12.00	6.11	3.23	10.76	4.64
95th-Percentile Queue Length [ft]	205.23	287.32	278.94	180.33	463.34	460.50	147.70	300.10	152.74	80.78	269.00	116.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	94.55	21.04	21.12	71.29	25.86	25.94	51.78	62.74	53.40	52.01	65.73	55.92
Movement LOS	F	C	C	E	C	C	D	E	D	D	E	E
d_A, Approach Delay [s/veh]	30.55			29.95			57.68			60.81		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	37.96											
Intersection LOS	D											
Intersection V/C	0.641											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 249: Donohoe Street/US 101 NB Off-ramp/Capitol Avenue

Control Type:	Signalized	Delay (sec / veh):	40.7
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.369

Intersection Setup

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	387	0	156	0	0	0	0	444	0	0	1042	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	387	0	156	0	0	0	0	444	0	0	1042	0
Peak Hour Factor	0.8870	1.0000	0.8870	1.0000	1.0000	1.0000	0.9330	0.9330	1.0000	1.0000	0.9540	0.9540
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	109	0	44	0	0	0	0	119	0	0	273	0
Total Analysis Volume [veh/h]	436	0	176	0	0	0	0	476	0	0	1092	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			25			0			1		
Bicycle Volume [bicycles/h]	1			0			2			4		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Protecte	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	0	5	0	0	6	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	4	0	4	0	0	4	0	5	0	0	5	0
Maximum Green [s]	30	0	30	0	0	30	0	30	0	0	30	0
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	45	0	45	0	0	35	0	50	0	0	50	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	26	0	0	26	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No		No			No		No			No	
Maximum Recall	No		No			Yes		No			No	
Pedestrian Recall	No		No			No		No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	R	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22	48	48	48	48
g / C, Green / Cycle	0.17	0.17	0.37	0.37	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.14	0.13	0.00	0.15	0.23	0.22
s, saturation flow rate [veh/h]	3101	1406	1425	3192	3192	1676
c, Capacity [veh/h]	515	234	527	1186	1186	623
d1, Uniform Delay [s]	52.58	51.65	0.00	30.16	33.25	32.78
k, delay calibration	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.92	4.86	0.00	1.01	2.38	3.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

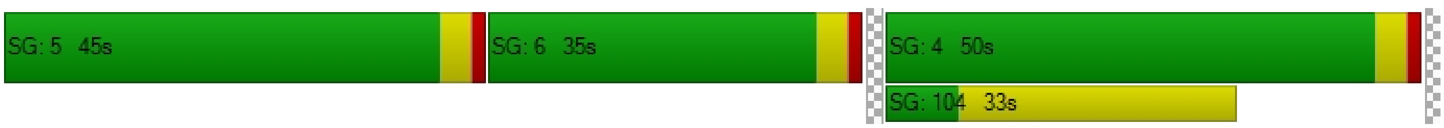
X, volume / capacity	0.85	0.75	0.00	0.40	0.61	0.58
d, Delay for Lane Group [s/veh]	56.50	56.51	0.00	31.18	35.63	36.76
Lane Group LOS	E	E	A	C	D	D
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	7.19	5.80	0.00	5.71	9.74	9.90
50th-Percentile Queue Length [ft]	179.77	144.90	0.00	142.73	243.38	247.52
95th-Percentile Queue Length [veh]	11.59	9.74	0.00	9.63	14.85	15.06
95th-Percentile Queue Length [ft]	289.72	243.61	0.00	240.70	371.31	376.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.50	0.00	56.51	0.00	0.00	0.00	0.00	31.18	0.00	0.00	36.00	36.76
Movement LOS	E		E			A		C			D	D
d_A, Approach Delay [s/veh]	56.50			0.00			31.18			36.00		
Approach LOS	E			A			C			D		
d_I, Intersection Delay [s/veh]	40.70											
Intersection LOS	D											
Intersection V/C	0.369											

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



General Plan & Facebook Expansion

Vistro File: J:\...\Existing Conditions_AM.vistro

Scenario 1: Existing AM

Report File: J:\...\Existing Conditions AM.pdf

5/19/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	784	1747	953	320	3804

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	28	1184	14	439	1422	296	15	4	71	239	12	5	3729

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	99	767	90	27	1068	435	447	47	198	27	16	25	3246

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	1	803	82	268	867	31	114	78	7	45	19	173	2488

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
5	Middlefield Rd/Marsh Rd	485	295	374	391	225	455	2225

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	85	522	446	364	420	75	1912

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringswood Ave	5	3	12	136	44	251	55	559	84	216	653	62	2080

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
13	Middlefield Rd/Lytton Ave	118	39	71	4	111	6	129	273	7	5	464	337	1564

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14	Middlefield Rd/University Ave	25	240	25	113	497	143	34	240	65	110	352	67	1911

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	873	85	1495	3915	185	359	6912

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	128	380	361	16	59	42	217	713	155	732	2780	24	5607

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	124	807	71	88	795	57	78	22	50	26	24	23	2165

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	129	1141	842	9	17	147	2285

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1201	304	54	969	195	58	2781

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	151	1407	166	51	1132	10	37	169	281	273	120	42	3839

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	67	1278	1161	445	363	60	3374

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	26	1040	16	36	925	89	40	3	10	48	12	70	2315

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	22	864	3	1	805	120	191	6	51	4	4	5	2076

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	3	745	40	27	826	4	37	70	17	78	112	100	2059

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	28	201	139	458	75	391	80	368	256	320	356	15	2687

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	15	618	67	20	471	11	138	113	13	136	188	65	1855

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	11	258	85	30	345	61	30	107	16	72	200	52	1267

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	8	57	9	156	14	149	16	840	113	169	1838	71	3440

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	255	126	124	84	177	16	101	700	35	54	1349	547	3568

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	57	196	53	117	254	63	89	731	73	125	1365	85	3208

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	78	54	76	41	44	30	818	39	1420	16	2616

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	24	345	60	417	214	44	88	779	396	161	1420	16	3964

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	65	8	68	6	3	10	43	1188	25	43	1755	43	3257

ID	Intersection Name	Northeastbound		Southwestbound				Northwestbound		Southeastbound		Total Volume
		Left	Right	U-T	Left	Thru	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	185	285	0	0	0	0	182	1040	1753	68	3513

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	28	0	50	1	0	0	119	1204	1	30	2068	15	3516

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	397	386	59	340	302	67	1551

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Santa Cruz Ave/Sand Hill Rd	231	1143	261	331	559	51	94	615	389	223	669	236	4802

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
58	University Avenue and Adams Drive	42	508	1449	140	6	1	2146

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
71	Chilco Street/Terminal Avenue	48	206	101	62	115	45	577

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	67	532	1284	142	16	25	2066

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
77	University Avenue/Donohoe Street	136	362	360	23	865	65	8	97	494	522	521	394	3847

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	152	429	122	42	550	59	56	85	33	71	51	62	1712

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	23	2	41	2	2	7	103	1888	233	113	852	39	3305

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	663	556	65	172	852	517	2825

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road and US 101 NB Ramps	1097	1261	848	349	3555

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
111	University Avenue / Woodland Avenue	35	645	19	211	972	533	19	87	311	392	84	44	3352

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
131	Chilco Street/Hamilton Avenue	13	88	10	50	79	15	37	41	16	22	51	131	553

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	1794	740	38	77	189	2838

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	10	0	33	14	1	9	211	1594	117	73	760	50	2872

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	7	1	29	12	1	8	37	1666	12	17	867	21	2678

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	145	1496	17	27	732	136	2	0	9	215	3	174	2956

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	143	35	1141	6	35	8	5	66	209	2636	407	12	4703

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	64	636	403	112	100	74	1389

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	205	26	176	2726	933	169	4235

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	179	12	1106	56	22	2914	4289

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
204	Chilco Street/Newbridge Street	2	15	12	93	5	9	4	118	2	13	127	85	485

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
206	Chilco Street/Ivy Drive	42	44	12	41	54	20	17	56	25	9	64	63	447

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	114	148	74	133	204	8	5	5	17	14	8	28	758

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	1	0	0	1	53	0	2	17	1	1	0	11	87

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	8	33	5	1	6	0	29	11	91	0	0	1	185

ID	Intersection Name	Southbound		Northeastbound		Northwestbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
214	Chrysler Dr/Jefferson Dr	111	39	23	14	7	0	11	205

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	23	47	12	19	127	97	19	5	102	1	28	2	482

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Road and Sand Hill Circle	4	293	51	40	0	795	32	1215

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	112	478	48	156	1696	2490

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
243	University Avenue/US 101 SB Ramps	932	453	841	1474	360	274	4334

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
245	University Avenue/Runnymede Street	9	671	47	167	848	89	19	85	1	27	172	22	2157

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
246	University Avenue/Bell Street	29	678	43	16	888	16	12	76	35	90	115	12	2010

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
247	University Avenue/Bay Road	99	585	79	99	970	34	95	192	96	56	175	76	2556

ID	Intersection Name	Northbound		Southbound	Eastbound	Westbound		Total Volume
		Left	Right	Right	Thru	Thru	Right	
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	387	156	0	444	1042	0	2029

Existing Conditions – PM Peak Hour

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General Plan & Facebook Expansion EIR

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Scenario 1: Existing PM

Report File: J:\...\Existing Conditions PM.pdf
5/19/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM 2010	SWB Thru	0.810	18.7	B
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM 2010	NEB Left	0.605	21.8	C
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM 2010	NB Left	0.705	36.3	D
4	Marsh Rd/Bay Rd	Signalized	HCM 2010	WB Right	0.583	23.3	C
5	Middlefield Rd/Marsh Rd	Signalized	HCM 2010	EB Left	0.840	45.7	D
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM 2010	NWB Left	1.218	39.4	D
10	Middlefield Rd/Ringwood Ave	Signalized	HCM 2010	SEB Left	0.657	32.6	C
13	Middlefield Rd/Lytton Ave	Signalized	HCM 2010	SEB Left	0.837	51.1	D
14	Middlefield Rd/University Ave	Signalized	HCM 2010	SEB Left	0.583	36.6	D
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM 2010	NWB Right	1.110	127.3	F
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM 2010	NB Right	0.812	58.0	E
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM 2010	EB Left	0.612	26.6	C
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM 2010	NB Left	0.558	11.9	B
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM 2010	SB Left	0.566	12.3	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM 2010	NB Left	0.758	38.0	D
21	Willow Rd/Bay Rd	Signalized	HCM 2010	NEB Left	0.865	16.7	B
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM 2010	NB Left	0.681	16.1	B
23	Willow Rd/Coleman Ave	Signalized	HCM 2010	EB Left	0.591	8.5	A
24	Willow Rd/Gilbert Ave	Signalized	HCM 2010	WB Left	0.538	13.2	B
25	Middlefield Rd-Willow Rd	Signalized	HCM 2010	NEB Right	0.530	71.9	E
26	Ravenswood Ave/Laurel St	Signalized	HCM 2010	NWB Left	0.698	24.0	C
28	Oak Grove Ave/Laurel St	Signalized	HCM 2010	NWB Thru	0.596	8.2	A

29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM 2010	SWB Left	12.300	39.5	D
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM 2010	SWB Thru	0.764	33.3	C
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM 2010	SWB Left	0.684	23.0	C
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM 2010	SWB Thru	0.677	12.4	B
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM 2010	NEB Right	0.794	45.8	D
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM 2010	SEB Left	0.570	9.1	A
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM 2010	NWB Left	0.693	17.3	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM 2010	NWB Left	0.566	11.7	B
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM 2010	SWB Left	0.575	11.2	B
39	Sand Hill Rd/Santa Cruz Ave	Signalized	HCM 2010	NWB Left	0.684	43.6	D
58	University Avenue and Adams Drive	Two-way stop	HCM 2010	EB Thru	0.000	88.0	F
71	Chilco Street/Terminal Avenue	All-way stop	HCM 2010	SEB Thru		19.4	C
74	University Ave/O'Brien Dr	Signalized	HCM 2010	NB Left	0.695	10.0	B
77	University Avenue/Donohoe Street	Signalized	HCM 2010	EB Right	1.124	126.2	F
88	Valparaiso Ave/ University Dr	Signalized	HCM 2010	SEB Left	0.667	17.7	B
103	Addison Wesley/Sand Hill Rd	Signalized	HCM 2010	EB Left	0.692	16.3	B
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM 2010	NEB Thru	0.731	47.6	D
110	Marsh Road/101 NB Ramps	Signalized	HCM 2010	NWB Left	0.929	15.0	B
111	University Avenue/Woodland Avenue	Signalized	HCM 2010	NWB Right	0.841	71.2	E
131	Chilco Street/Hamilton Avenue	All-way stop	HCM 2010	SB Thru		16.8	C
132	Oak Ave/Sand Hill Rd	Signalized	HCM 2000	SEB Right	0.564	8.6	A
156	Saga Ln/Sand Hill Rd	Signalized	HCM 2010	NB Left	11.337	32.7	C
157	Branner Dr/Sand Hill Rd	Signalized	HCM 2010	WB Left	0.487	5.7	A

162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM 2010	SWB Right	0.887	33.1	C
163	Bayfront Expy/Marsh Rd	Signalized	HCM 2010	EB Thru	0.785	43.8	D
181	Santa Cruz Ave/Elder Ave	Signalized	HCM 2010	NEB Left	0.610	7.6	A
195	Bayfront Expy/Chilco St	Signalized	HCM 2010	WB Left	0.820	11.9	B
196	Bayfront Expy/Chrysler Drive	Signalized	HCM 2010	NB Left	1.011	30.5	C
204	Chilco Street/Newbridge Street	All-way stop	HCM 2010	SB Left		10.3	B
206	Chilco Street/Ivy Drive	All-way stop	HCM 2010	SB Thru		12.0	B
207	Chilco St/Constitution Dr	All-way stop	HCM 2010	NWB Right		23.6	C
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM 2010	SB Left	0.037	15.5	C
213	Chrysler Dr/Independence Dr	Two-way stop	HCM 2010	SEB Thru	0.004	10.0	A
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM 2010	NWB Left	0.002	10.4	B
215	Chrysler Dr/Constitution Dr	All-way stop	HCM 2010	EB Thru		14.4	B
233	Sand Hill Circle/Sand Hill Road	Signalized	HCM 2010	WB Right	1.165	74.0	E
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM 2010	SB Left	0.408	11.0	B
243	University Avenue/US 101 SB Ramps	Signalized	HCM 2010	WB Right	0.888	59.3	E
245	University Avenue/Runnymede Street	Signalized	HCM 2010	WB Right	0.545	15.5	B
246	University Avenue/Bell Street	Signalized	HCM 2010	WB Thru	0.543	13.4	B
247	University Avenue/Bay Road	Signalized	HCM 2010	NWB Right	0.975	100.6	F
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	Signalized	HCM 2010	NB Right	0.794	32.2	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	18.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	980	893	279	1547	401
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.70	2.15	3.60	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	980	893	279	1547	401
Peak Hour Factor	1.0000	0.9600	0.9600	1.0000	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	255	233	70	403	104
Total Analysis Volume [veh/h]	0	1021	930	279	1611	418
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	0	6	2	0	4	5
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	32	32	0	60	10
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	33	33	0	47	8
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	7	0	0	5	0
Pedestrian Clearance [s]	0	16	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	2.1	0.0	0.0	1.1
Minimum Recall		Yes	Yes		No	No
Maximum Recall		No	No		No	No
Pedestrian Recall		No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	4.10	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.10	0.00	0.00
g_i, Effective Green Time [s]	34	32	42	42
g / C, Green / Cycle	0.43	0.40	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.26	0.26	0.47	0.26
s, saturation flow rate [veh/h]	4000	3522	3392	1607
c, Capacity [veh/h]	1708	1412	1775	841
d1, Uniform Delay [s]	17.67	19.56	17.36	12.32
k, delay calibration	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.55	2.42	0.79	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

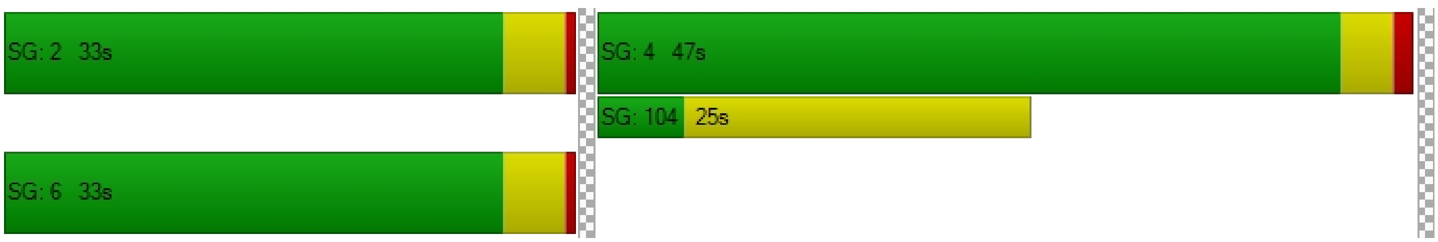
X, volume / capacity	0.60	0.66	0.91	0.50
d, Delay for Lane Group [s/veh]	19.23	21.98	18.14	12.49
Lane Group LOS	B	C	B	B
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	6.97	6.93	12.06	4.41
50th-Percentile Queue Length [ft]	174.19	173.16	301.44	110.21
95th-Percentile Queue Length [veh]	11.30	11.24	17.75	7.85
95th-Percentile Queue Length [ft]	282.42	281.06	443.80	196.30

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	19.23	21.98	0.00	18.14	12.49
Movement LOS		B	C		B	B
d_A, Approach Delay [s/veh]	19.23		21.98		16.98	
Approach LOS	B		C		B	
d_I, Intersection Delay [s/veh]	18.72					
Intersection LOS	B					
Intersection V/C	0.810					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	21.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.605

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Base Volume Input [veh/h]	29	1083	4	66	1014	203	27	9	467	229	13	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	2.40	0.00	4.50	1.50	2.50	3.70	0.00	1.70	1.30	7.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	326	0	0	0
Total Hourly Volume [veh/h]	29	1083	4	66	1014	203	27	9	141	229	13	1
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	276	1	17	259	52	7	2	36	58	3	0
Total Analysis Volume [veh/h]	30	1105	4	67	1035	207	28	9	144	234	13	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	77.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	0	1	6	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	4	10	0	0	6	0	0	4	0
Maximum Green [s]	15	40	0	15	40	0	0	20	0	0	20	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.2	0.0	0.0	3.2	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	15	51	0	12	48	0	0	41	0	0	36	0
Vehicle Extension [s]	2.5	3.5	0.0	2.0	3.5	0.0	0.0	2.5	0.0	0.0	2.5	0.0
Walk [s]	0	7	0	0	7	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	21	0	0	21	0	0	28	0	0	24	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	5	92	92	6	93	93	12	12	22	22
g / C, Green / Cycle	0.04	0.66	0.66	0.05	0.67	0.67	0.08	0.08	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.02	0.21	0.21	0.02	0.34	0.35	0.02	0.05	0.13	0.01
s, saturation flow rate [veh/h]	1750	3533	1852	3363	1872	1751	1831	2811	1786	1742
c, Capacity [veh/h]	63	2315	1214	155	1245	1165	151	232	284	277
d1, Uniform Delay [s]	66.05	10.45	10.45	64.90	11.88	11.97	60.05	62.02	56.90	49.84
k, delay calibration	0.08	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.14	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.02	0.36	0.68	0.71	1.50	1.66	0.62	2.02	7.79	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

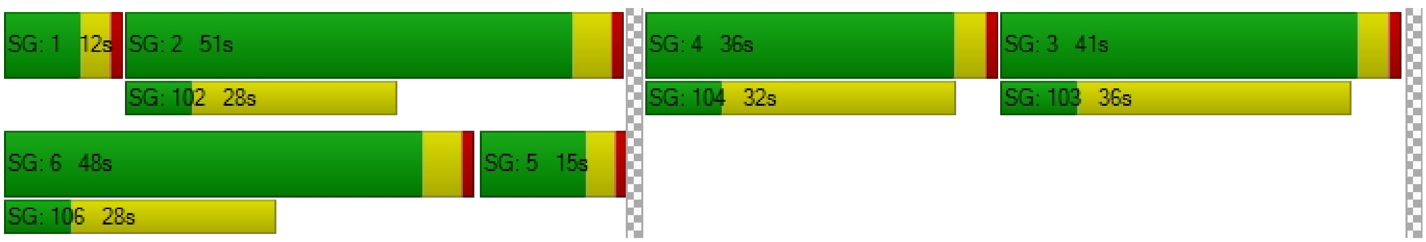
X, volume / capacity	0.47	0.31	0.31	0.43	0.51	0.52	0.25	0.62	0.82	0.05
d, Delay for Lane Group [s/veh]	70.07	10.81	11.13	65.62	13.38	13.63	60.67	64.03	64.68	49.90
Lane Group LOS	E	B	B	E	B	B	E	E	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.12	4.82	5.17	1.18	10.08	9.68	1.27	2.57	8.70	0.43
50th-Percentile Queue Length [ft]	27.98	120.61	129.19	29.41	252.04	242.11	31.80	64.23	217.39	10.70
95th-Percentile Queue Length [veh]	2.01	8.43	8.90	2.12	15.29	14.79	2.29	4.62	13.53	0.77
95th-Percentile Queue Length [ft]	50.37	210.67	222.39	52.94	382.22	369.70	57.24	115.61	338.30	19.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.07	10.92	11.13	65.62	13.48	13.63	60.67	60.67	64.03	64.68	49.90	49.90
Movement LOS	E	B	B	E	B	B	E	E	E	E	D	D
d_A, Approach Delay [s/veh]	12.48			16.17			63.35			63.85		
Approach LOS	B			B			E			E		
d_I, Intersection Delay [s/veh]	21.79											
Intersection LOS	C											
Intersection V/C	0.605											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	36.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.705

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Base Volume Input [veh/h]	185	720	84	30	697	377	475	15	130	98	41	72
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	3.20	6.00	6.70	2.20	4.00	2.50	0.00	0.80	4.10	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	174	0	0	0
Total Hourly Volume [veh/h]	185	720	84	30	697	377	475	15	0	98	41	72
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	198	23	8	191	104	130	4	0	27	11	20
Total Analysis Volume [veh/h]	203	791	92	33	766	414	522	16	0	108	45	79
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	16			1			7			3		
Bicycle Volume [bicycles/h]	3			1			1			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	31.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	22	55	55	12	45	45	37	36	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	12	12	0	16	16	25	25	25	0	25	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	20	87	87	5	72	72	25	25	25	15	15
g / C, Green / Cycle	0.14	0.62	0.62	0.04	0.52	0.52	0.18	0.18	0.18	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.12	0.24	0.25	0.02	0.34	0.35	0.15	0.15	0.00	0.06	0.07
s, saturation flow rate [veh/h]	1762	1841	1764	1696	1859	1608	1765	1815	1602	1738	1681
c, Capacity [veh/h]	247	1140	1093	65	962	832	320	329	291	180	175
d1, Uniform Delay [s]	58.47	13.40	13.43	65.97	24.50	24.86	55.16	55.16	0.00	59.89	60.65
k, delay calibration	0.40	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.57	1.02	1.08	2.28	3.38	4.22	4.14	4.03	0.00	2.35	3.94
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

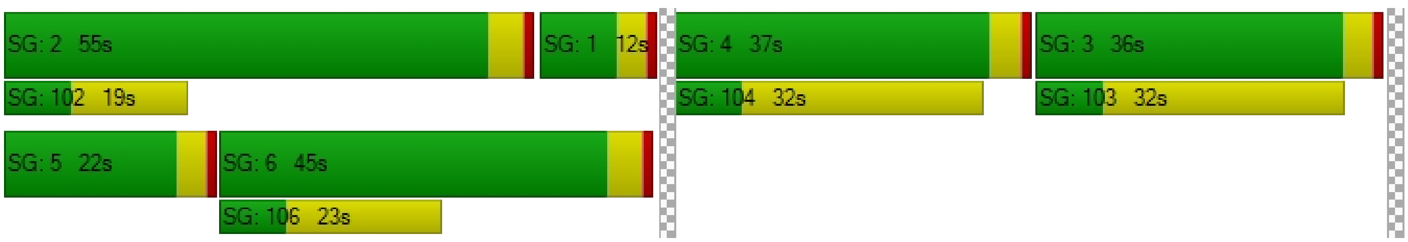
X, volume / capacity	0.82	0.39	0.40	0.51	0.65	0.67	0.83	0.83	0.00	0.60	0.71
d, Delay for Lane Group [s/veh]	80.04	14.43	14.51	68.26	27.88	29.09	59.30	59.19	0.00	62.25	64.59
Lane Group LOS	F	B	B	E	C	C	E	E	A	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	8.43	7.29	7.06	1.19	15.63	14.28	9.47	9.72	0.00	3.82	4.50
50th-Percentile Queue Length [ft]	210.80	182.14	176.38	29.86	390.76	356.99	236.76	243.10	0.00	95.56	112.45
95th-Percentile Queue Length [veh]	13.19	11.71	11.41	2.15	22.11	20.48	14.52	14.84	0.00	6.88	7.98
95th-Percentile Queue Length [ft]	329.86	292.81	285.28	53.75	552.85	511.93	362.93	370.96	0.00	172.02	199.40

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	80.04	14.46	14.51	68.26	28.10	29.09	59.25	59.19	0.00	62.25	64.59	64.59
Movement LOS	F	B	B	E	C	C	E	E	A	E	E	E
d_A, Approach Delay [s/veh]	26.73			29.53			59.25			63.50		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	36.31											
Intersection LOS	D											
Intersection V/C	0.705											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	23.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.583

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			No		

volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	2	681	108	194	841	54	45	29	6	84	18	143
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.30	0.90	1.00	1.00	0.00	2.20	6.90	0.00	1.20	0.00	2.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	681	108	194	841	54	45	29	6	84	18	143
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	193	31	55	239	15	13	8	2	24	5	41
Total Analysis Volume [veh/h]	2	774	123	220	956	61	51	33	7	95	20	163
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			7			7			0		
Bicycle Volume [bicycles/h]	1			7			7			11		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	33.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	40	60	40	25	40	60	31	31	31	0	31	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	107	74	107	33	107	74	33	33	33	0	33	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	84	84	21	107	107	29	29
g / C, Green / Cycle	0.60	0.60	0.15	0.76	0.76	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.26	0.26	0.12	0.27	0.27	0.10	0.18
s, saturation flow rate [veh/h]	1854	1596	1792	1881	1834	952	1525
c, Capacity [veh/h]	1133	953	268	1432	1396	240	355
d1, Uniform Delay [s]	15.33	15.38	57.68	5.49	5.50	47.58	53.28
k, delay calibration	0.50	0.50	0.13	0.50	0.50	0.08	0.41
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.17	1.46	7.14	0.70	0.73	0.73	13.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

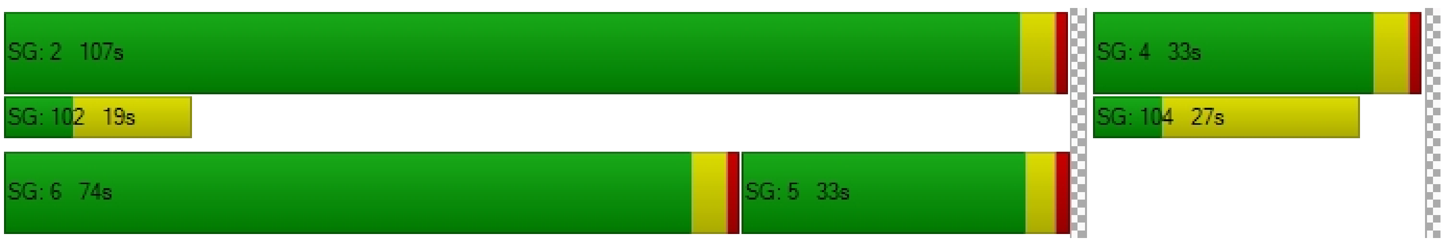
X, volume / capacity	0.43	0.44	0.82	0.36	0.36	0.38	0.78
d, Delay for Lane Group [s/veh]	16.50	16.85	64.82	6.19	6.23	48.31	66.63
Lane Group LOS	B	B	E	A	A	D	E
Critical Lane Group	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	8.53	7.49	8.04	4.64	4.57	2.86	10.77
50th-Percentile Queue Length [ft]	213.30	187.17	201.10	116.04	114.20	71.45	269.32
95th-Percentile Queue Length [veh]	13.32	11.97	12.70	8.17	8.07	5.14	16.16
95th-Percentile Queue Length [ft]	333.06	299.35	317.38	204.37	201.83	128.62	403.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	16.50	16.64	16.85	64.82	6.21	6.23	48.31	48.31	48.31	66.63	66.63	66.63
Movement LOS	B	B	B	E	A	A	D	D	D	E	E	E
d_A, Approach Delay [s/veh]	16.66			16.63			48.31			66.63		
Approach LOS	B			B			D			E		
d_I, Intersection Delay [s/veh]	23.34											
Intersection LOS	C											
Intersection V/C	0.583											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Middlefield Rd/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	45.7
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.840

Intersection Setup

Name	Marsh Road		Middlefield Road		Middlefield Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	225.00	150.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	426	399	324	288	502	393
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	426	399	324	288	502	393
Peak Hour Factor	0.8850	0.8850	0.8640	0.8640	0.9640	0.9640
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	120	113	94	83	130	102
Total Analysis Volume [veh/h]	481	451	375	333	521	408
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	6		10		28	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	40.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Overlap	Protected	Permissive	Permissive	Permissive
Signal group	3	1	1	2	2	4
Auxiliary Signal Groups		1,3				4,6
Lead / Lag	Lead	-	Lag	-	-	-
Minimum Green [s]	6	5	5	24	24	0
Maximum Green [s]	30	30	30	50	50	0
Amber [s]	3.0	3.0	3.0	3.2	3.2	0.0
All red [s]	2.0	1.0	1.0	1.0	1.0	0.0
Split [s]	49	33	33	48	48	0
Vehicle Extension [s]	2.5	2.0	2.0	2.0	2.0	0.0
Walk [s]	0	0	0	8	8	0
Pedestrian Clearance [s]	0	0	0	12	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	3.0	2.0	2.0	2.2	2.2	0.0
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	6.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	5.00	5.00	4.00	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	0.00	2.00	2.20	2.20	2.20
g_i, Effective Green Time [s]	38	71	29	50	50	50
g / C, Green / Cycle	0.29	0.54	0.22	0.38	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.27	0.29	0.21	0.18	0.28	0.27
s, saturation flow rate [veh/h]	1774	1545	1774	1863	1863	1539
c, Capacity [veh/h]	515	841	396	717	717	593
d1, Uniform Delay [s]	44.88	19.06	49.72	29.91	34.10	33.42
k, delay calibration	0.29	0.50	0.39	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.82	2.45	29.15	2.16	6.34	6.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

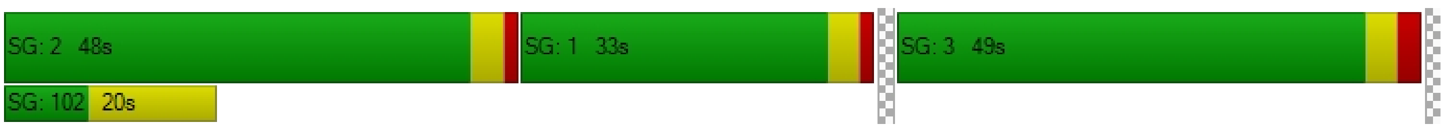
X, volume / capacity	0.93	0.54	0.95	0.46	0.73	0.69
d, Delay for Lane Group [s/veh]	62.70	21.51	78.87	32.06	40.43	39.85
Lane Group LOS	E	C	E	C	D	D
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	17.54	9.21	15.17	8.27	15.24	11.79
50th-Percentile Queue Length [ft]	438.56	230.15	379.19	206.65	381.03	294.69
95th-Percentile Queue Length [veh]	24.41	14.18	21.55	12.98	21.64	17.42
95th-Percentile Queue Length [ft]	610.29	354.55	538.87	324.53	541.10	435.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.70	21.51	78.87	32.06	40.43	39.85
Movement LOS	E	C	E	C	D	D
d_A, Approach Delay [s/veh]	42.77		56.85		40.17	
Approach LOS	D		E		D	
d_I, Intersection Delay [s/veh]	45.71					
Intersection LOS	D					
Intersection V/C	0.840					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	39.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.218

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	199	610	457	673	357	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.10	1.30	0.60	1.40	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	199	0	457	673	357	60
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	0	120	177	94	16
Total Analysis Volume [veh/h]	209	0	481	708	376	63
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6		13		0	
Bicycle Volume [bicycles/h]	9		26		13	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	58.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	5	10	0
Maximum Green [s]	50	35	35	70	35	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	50	35	35	70	35	0
Vehicle Extension [s]	2.5	3.6	3.0	3.0	3.6	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	10	12	0	12	12	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.6	0.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	4.60	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	2.60	0.00
g_i, Effective Green Time [s]	18	18	35	72	38
g / C, Green / Cycle	0.15	0.15	0.30	0.60	0.31
(v / s)_i Volume / Saturation Flow Rate	0.12	0.00	0.27	0.37	0.24
s, saturation flow rate [veh/h]	1774	1582	1786	1889	1814
c, Capacity [veh/h]	271	241	528	1140	568
d1, Uniform Delay [s]	48.85	0.00	40.72	15.07	37.36
k, delay calibration	0.08	0.08	0.44	0.20	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.50	0.00	20.28	1.04	9.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

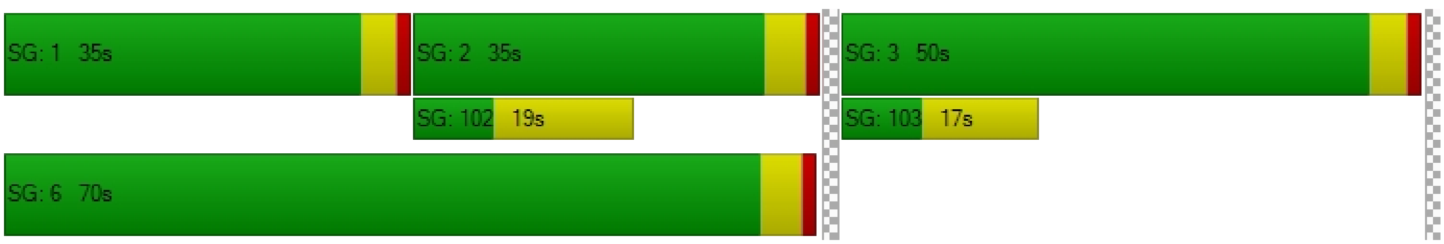
X, volume / capacity	0.77	0.00	0.91	0.62	0.77
d, Delay for Lane Group [s/veh]	52.35	0.00	61.00	16.10	47.22
Lane Group LOS	D	A	E	B	D
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	6.28	0.00	16.38	11.76	13.01
50th-Percentile Queue Length [ft]	156.89	0.00	409.50	293.94	325.34
95th-Percentile Queue Length [veh]	10.38	0.00	23.02	17.38	18.93
95th-Percentile Queue Length [ft]	259.60	0.00	575.44	434.52	473.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.35	0.00	61.00	16.10	47.22	47.22
Movement LOS	D	A	E	B	D	D
d_A, Approach Delay [s/veh]	52.35		34.27		47.22	
Approach LOS	D		C		D	
d_I, Intersection Delay [s/veh]	39.42					
Intersection LOS	D					
Intersection V/C	1.218					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Middlefield Rd/Ringwood Ave

Control Type:	Signalized	Delay (sec / veh):	32.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.657

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	58	70	38	63	1	272	10	775	97	379	568	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	0.00	0.00	0.00	0.00	2.20	0.00	1.70	0.00	2.10	1.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	8	0	0	57	0	0	0
Total Hourly Volume [veh/h]	58	70	38	63	1	264	10	775	40	379	568	5
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	18	10	17	0	69	3	204	11	100	149	1
Total Analysis Volume [veh/h]	61	74	40	66	1	278	11	816	42	399	598	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			14			5			0		
Bicycle Volume [bicycles/h]	14			14			17			16		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	58.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	2	8	2	6	8	6	1	6	8	5	2	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	35	35	35	50	35	50	50	50	35	35	35	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.0	3.6	3.2	3.5	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	35	35	35	50	35	50	50	50	35	35	35	0
Vehicle Extension [s]	3.0	2.9	3.0	3.6	2.9	3.6	3.0	3.6	2.9	3.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	12	12	12	12	12	0	12	12	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.6	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.6	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.50	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.60	2.60
g_i, Effective Green Time [s]	26	26	26	26	3	56	56	29	82	82
g / C, Green / Cycle	0.22	0.22	0.22	0.22	0.03	0.47	0.47	0.24	0.68	0.68
(v / s)_i Volume / Saturation Flow Rate	0.04	0.06	0.08	0.18	0.01	0.23	0.03	0.23	0.16	0.16
s, saturation flow rate [veh/h]	1415	1766	889	1539	1810	3557	1538	1772	1866	1860
c, Capacity [veh/h]	188	388	255	338	51	1670	722	425	1270	1265
d1, Uniform Delay [s]	51.83	39.05	45.63	44.59	56.99	21.91	17.36	44.73	7.32	7.32
k, delay calibration	0.10	0.10	0.10	0.20	0.11	0.50	0.50	0.36	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.94	0.40	0.52	8.78	2.06	1.02	0.15	24.49	0.44	0.44
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

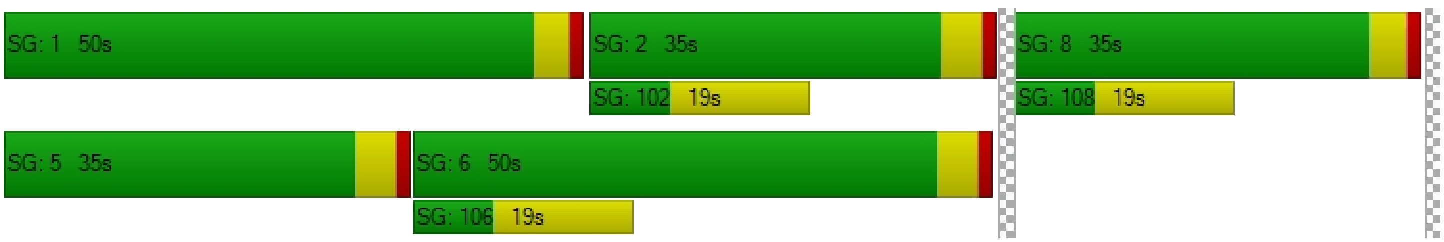
X, volume / capacity	0.32	0.29	0.26	0.82	0.21	0.49	0.06	0.94	0.24	0.24
d, Delay for Lane Group [s/veh]	52.77	39.45	46.15	53.37	59.05	22.93	17.51	69.23	7.76	7.76
Lane Group LOS	D	D	D	D	E	C	B	E	A	A
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	1.83	2.92	1.83	8.67	0.35	7.95	0.66	14.34	2.87	2.86
50th-Percentile Queue Length [ft]	45.65	72.90	45.85	216.78	8.84	198.81	16.50	358.43	71.64	71.45
95th-Percentile Queue Length [veh]	3.29	5.25	3.30	13.50	0.64	12.58	1.19	20.55	5.16	5.14
95th-Percentile Queue Length [ft]	82.17	131.22	82.54	337.51	15.91	314.43	29.70	513.68	128.95	128.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.77	39.45	39.45	46.15	46.15	53.37	59.05	22.93	17.51	69.23	7.76	7.76
Movement LOS	D	D	D	D	D	D	E	C	B	E	A	A
d_A, Approach Delay [s/veh]	44.09			51.97			23.13			32.24		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	32.64											
Intersection LOS	C											
Intersection V/C	0.657											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Middlefield Rd/Lytton Ave

Control Type:	Signalized	Delay (sec / veh):	51.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.837

Intersection Setup

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	238	179	68	2	66	8	84	445	16	16	512	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.50	5.60	0.00	0.60	0.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	238	179	68	2	66	8	84	445	16	16	512	179
Peak Hour Factor	0.8790	0.8790	0.8790	0.7920	0.7920	0.7920	0.8360	0.8360	0.8360	0.9550	0.9550	0.9550
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	51	19	1	21	3	25	133	5	4	134	47
Total Analysis Volume [veh/h]	271	204	77	3	83	10	100	532	19	17	536	187
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			10			11		
Bicycle Volume [bicycles/h]	19			2			5			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	65.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	4	0	0	1	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	4	0	0	12	0	0	12	0
Maximum Green [s]	0	26	0	0	17	0	0	31	0	0	22	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	30	0	0	21	0	0	22	0	0	27	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	6	0	0	5	0	0	6	0	0	6	0
Pedestrian Clearance [s]	0	10	0	0	9	0	0	10	0	0	8	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	7	24	24	23	23
g / C, Green / Cycle	0.30	0.30	0.07	0.24	0.24	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.15	0.28	0.05	0.19	0.17	0.22	0.19
s, saturation flow rate [veh/h]	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	525	525	124	431	431	413	413
d1, Uniform Delay [s]	29.04	33.95	45.73	35.71	35.00	38.34	36.59
k, delay calibration	0.08	0.28	0.08	0.50	0.50	0.45	0.37
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.58	15.79	7.31	13.62	9.95	36.40	12.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.52	0.92	0.77	0.79	0.72	0.98	0.82
d, Delay for Lane Group [s/veh]	29.62	49.74	53.04	49.32	44.95	74.73	48.84
Lane Group LOS	C	D	D	D	D	E	D
Critical Lane Group	No	Yes	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	5.47	13.58	2.61	9.38	8.13	13.93	9.17
50th-Percentile Queue Length [ft]	136.83	339.43	65.20	234.57	203.23	348.16	229.34
95th-Percentile Queue Length [veh]	9.31	19.62	4.69	14.41	12.81	20.05	14.14
95th-Percentile Queue Length [ft]	232.75	490.51	117.36	360.16	320.13	501.16	353.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.62	49.74	49.74	53.04	53.04	53.04	49.32	46.92	44.95	74.73	67.50	48.84
Movement LOS	C	D	D	D	D	D	D	D	D	E	E	D
d_A, Approach Delay [s/veh]		42.53			53.04			47.24			62.95	
Approach LOS		D			D			D			E	
d_I, Intersection Delay [s/veh]						51.08						
Intersection LOS						D						
Intersection V/C						0.837						

Sequence

Ring 1	1	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 14: Middlefield Rd/University Ave

Control Type:	Signalized	Delay (sec / veh):	36.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.583

Intersection Setup

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	66	338	35	81	374	86	27	319	87	101	370	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	338	35	81	374	86	27	319	87	101	370	55
Peak Hour Factor	0.9070	0.9070	0.9070	0.9200	0.9200	0.9200	0.9750	0.9750	0.9750	0.9460	0.9460	0.9460
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	93	10	22	102	23	7	82	22	27	98	15
Total Analysis Volume [veh/h]	73	373	39	88	407	93	28	327	89	107	391	58
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			4			23			17		
Bicycle Volume [bicycles/h]	13			11			2			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	54.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	2	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	8	0	0	8	0	0	8	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	52	0	0	52	0	0	23	0	0	25	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	12	0	0	11	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	26	26	26	26	26	43	43	19	19
g / C, Green / Cycle	0.26	0.26	0.26	0.26	0.26	0.43	0.43	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.04	0.24	0.05	0.15	0.14	0.13	0.11	0.16	0.15
s, saturation flow rate [veh/h]	1750	1750	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	282	461	109	461	461	765	765	345	345
d1, Uniform Delay [s]	28.33	35.50	28.58	31.82	31.52	19.04	18.66	39.06	38.27
k, delay calibration	0.08	0.08	0.08	0.08	0.08	0.50	0.50	0.34	0.30
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.36	4.81	9.94	0.79	0.70	1.06	0.87	16.45	9.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

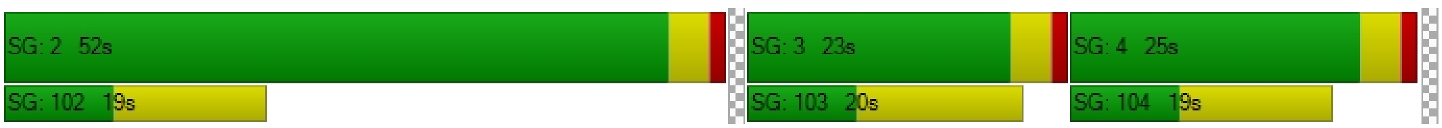
X, volume / capacity	0.26	0.89	0.81	0.56	0.53	0.31	0.27	0.85	0.76
d, Delay for Lane Group [s/veh]	28.68	40.31	38.52	32.60	32.22	20.10	19.53	55.50	47.59
Lane Group LOS	C	D	D	C	C	C	B	E	D
Critical Lane Group	No	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.38	10.21	1.93	5.40	5.05	3.87	3.28	8.52	6.99
50th-Percentile Queue Length [ft]	34.62	255.32	48.26	134.90	126.33	96.68	82.01	213.04	174.64
95th-Percentile Queue Length [veh]	2.49	15.45	3.47	9.21	8.74	6.96	5.90	13.31	11.32
95th-Percentile Queue Length [ft]	62.31	386.34	86.86	230.13	218.49	174.03	147.62	332.72	283.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	28.68	40.31	40.31	38.52	32.46	32.22	20.10	19.89	19.53	55.50	51.36	47.59
Movement LOS	C	D	D	D	C	C	C	B	B	E	D	D
d_A, Approach Delay [s/veh]	38.56			33.33			19.83			51.77		
Approach LOS	D			C			B			D		
d_I, Intersection Delay [s/veh]	36.61											
Intersection LOS	D											
Intersection V/C	0.583											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	127.3
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.110

Intersection Setup

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	3800	62	304	813	78	1577
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	16.10	4.90	3.80	9.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3800	62	304	813	78	1577
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	969	16	78	207	20	402
Total Analysis Volume [veh/h]	3878	63	310	830	80	1609
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal group	6	2	5	2	4	4
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	4
Maximum Green [s]	150	35	50	35	15	15
Amber [s]	5.0	5.4	3.0	5.4	3.0	3.0
All red [s]	1.0	0.5	0.5	0.5	1.0	1.0
Split [s]	30	0	0	0	30	30
Vehicle Extension [s]	3.5	3.5	2.0	3.5	2.0	2.0
Walk [s]	5	0	0	0	5	5
Pedestrian Clearance [s]	35	0	0	0	29	29
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	4.0	5.8	1.5	5.8	2.0	2.0
Minimum Recall	Yes		No	Yes	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	0.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	6.00	6.00	3.50	7.80	4.00	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	1.50	5.80	2.00	0.00
g_i, Effective Green Time [s]	150	150	29	180	15	48
g / C, Green / Cycle	0.72	0.72	0.14	0.87	0.07	0.23
(v / s)_i Volume / Saturation Flow Rate	0.77	0.05	0.09	0.17	0.02	0.38
s, saturation flow rate [veh/h]	5054	1374	3350	4986	3224	4224
c, Capacity [veh/h]	3657	994	465	4342	233	974
d1, Uniform Delay [s]	28.65	8.30	84.69	2.08	91.46	79.75
k, delay calibration	0.13	0.13	0.04	0.13	0.04	0.05
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	29.25	0.03	0.62	0.03	0.32	293.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

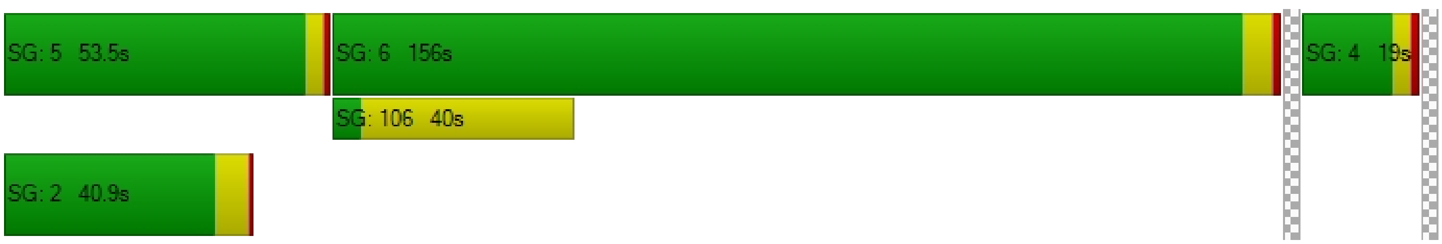
X, volume / capacity	1.06	0.06	0.67	0.19	0.34	1.65
d, Delay for Lane Group [s/veh]	57.90	8.33	85.31	2.10	91.78	373.58
Lane Group LOS	F	A	F	A	F	F
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	62.36	0.79	7.82	1.15	2.07	43.88
50th-Percentile Queue Length [ft]	1558.90	19.85	195.56	28.67	51.84	1097.06
95th-Percentile Queue Length [veh]	79.61	1.43	12.41	2.06	3.73	68.06
95th-Percentile Queue Length [ft]	1990.28	35.73	310.23	51.60	93.32	1701.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.90	8.33	85.31	2.10	91.78	373.58
Movement LOS	F	A	F	A	F	F
d_A, Approach Delay [s/veh]	57.10		24.73		360.23	
Approach LOS	E		C		F	
d_I, Intersection Delay [s/veh]	127.28					
Intersection LOS	F					
Intersection V/C	1.110					

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	58.0
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.812

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Base Volume Input [veh/h]	24	46	1404	116	191	116	35	2362	75	359	675	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	10.90	3.30	4.30	1.00	1.70	37.10	2.50	12.00	6.40	5.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	70	0	0	45	0	0	1
Total Hourly Volume [veh/h]	24	46	1404	116	191	46	35	2362	30	359	675	9
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	12	358	30	49	12	9	603	8	92	172	2
Total Analysis Volume [veh/h]	24	47	1433	118	195	47	36	2410	31	366	689	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			7			0		
Bicycle Volume [bicycles/h]	0			7			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	68
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	7	7	4	8	4	1	6	2	5	2	6
Auxiliary Signal Groups			5,7									
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	6	8	8	0	6	0	6	10	10	6	10	10
Maximum Green [s]	18	15	15	0	18	0	16	65	20	65	20	65
Amber [s]	3.0	3.9	3.9	0.0	3.0	0.0	3.5	5.0	5.0	3.6	5.0	5.0
All red [s]	1.5	0.5	0.5	0.0	1.5	0.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	30	0	0	0	30	0	30	30	0	0	0	30
Vehicle Extension [s]	2.0	2.2	2.2	0.0	2.0	0.0	2.0	3.0	3.0	2.0	3.0	3.0
Walk [s]	5	0	0	0	5	0	0	5	0	0	0	5
Pedestrian Clearance [s]	29	0	0	0	29	0	0	35	0	0	0	35
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.4	2.4	0.0	2.5	0.0	1.5	4.0	4.0	2.6	4.0	4.0
Minimum Recall		No	No		No		No	Yes		No	Yes	
Maximum Recall		No	No		No		No	No		No	No	
Pedestrian Recall		No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.40	4.40	4.40	4.40	4.50	4.50	4.50	3.50	6.00	6.00	4.60	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.40	2.40	2.40	0.00	2.50	2.50	2.50	1.50	4.00	4.00	2.60	4.00	4.00
g_i, Effective Green Time [s]	15	15	15	47	11	11	11	4	53	53	27	77	77
g / C, Green / Cycle	0.12	0.12	0.12	0.37	0.09	0.09	0.09	0.03	0.42	0.42	0.22	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate	0.01	0.02	0.02	0.43	0.07	0.05	0.03	0.01	0.41	0.02	0.11	0.12	0.01
s, saturation flow rate [veh/h]	1737	1216	1216	3343	1735	3582	1503	2563	5846	1442	3303	5846	1615
c, Capacity [veh/h]	207	145	145	1247	149	308	129	88	2470	609	717	3590	992
d1, Uniform Delay [s]	49.43	49.77	49.64	39.40	56.34	55.53	54.20	59.44	35.66	21.42	43.32	10.61	9.41
k, delay calibration	0.06	0.06	0.06	0.50	0.04	0.04	0.04	0.04	0.11	0.11	0.04	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.13	0.30	0.26	76.80	3.54	0.81	0.64	1.13	4.50	0.03	0.21	0.03	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

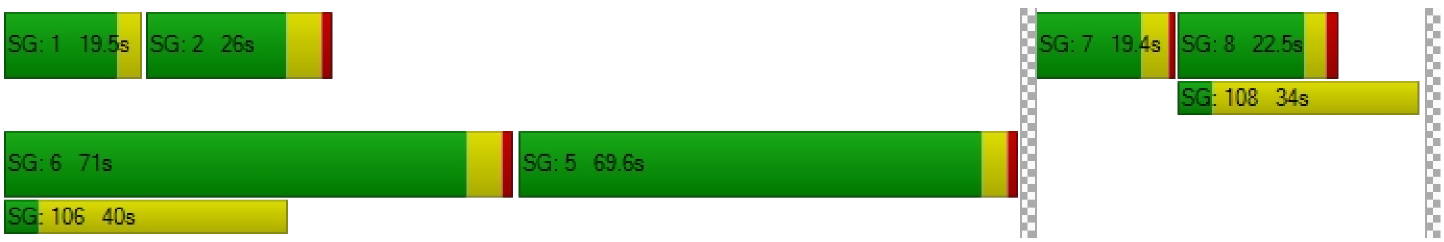
X, volume / capacity	0.12	0.17	0.15	1.15	0.79	0.63	0.36	0.41	0.98	0.05	0.51	0.19	0.01
d, Delay for Lane Group [s/veh]	49.56	50.07	49.90	116.2	59.88	56.34	54.84	60.57	40.16	21.46	43.53	10.64	9.42
Lane Group LOS	D	D	D	F	E	E	D	E	D	C	D	B	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh]	0.67	0.71	0.62	31.72	3.88	3.07	1.45	0.58	24.64	0.55	5.05	2.76	0.10
50th-Percentile Queue Length [ft]	16.85	17.78	15.59	792.9	96.90	76.79	36.30	14.40	615.90	13.83	126.14	69.08	2.42
95th-Percentile Queue Length [veh]	1.21	1.28	1.12	44.95	6.98	5.53	2.61	1.04	32.78	1.00	8.73	4.97	0.17
95th-Percentile Queue Length [ft]	30.32	32.00	28.06	1123.	174.43	138.23	65.34	25.93	819.41	24.89	218.24	124.35	4.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.56	49.99	116.20	59.88	56.34	54.84	60.57	40.16	21.46	43.53	10.64	9.42
Movement LOS	D	D	F	E	E	D	E	D	C	D	B	A
d_A, Approach Delay [s/veh]	113.06			57.30			40.22			21.94		
Approach LOS	F			E			D			C		
d_I, Intersection Delay [s/veh]	58.03											
Intersection LOS	E											
Intersection V/C	0.812											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	26.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.612

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	50	1299	3	13	623	30	163	15	39	139	17	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	3.50	33.30	7.70	3.50	0.00	0.60	26.70	5.10	0.70	5.90	1.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	1299	3	13	623	30	163	15	39	139	17	61
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	335	1	3	161	8	42	4	10	36	4	16
Total Analysis Volume [veh/h]	52	1339	3	13	642	31	168	15	40	143	18	63
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			1			5			3		
Bicycle Volume [bicycles/h]	4			12			3			3		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	20.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	1	6	2	5	2	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	4	4	4	4	4	4
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.2	3.2	3.2
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	23	93	89	19	89	93	33	33	33	33	33	33
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	7	5	7	5	7	5	5	5	5	5	5
Pedestrian Clearance [s]	0	19	10	15	10	19	25	25	25	25	25	25
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.2	1.2	1.2
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	20.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	1.00	2.00	2.00	0.00	1.20
g_i, Effective Green Time [s]	5	109	109	2	105	105	24	24
g / C, Green / Cycle	0.04	0.75	0.75	0.01	0.73	0.73	0.17	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.37	0.37	0.01	0.18	0.19	0.21	0.15
s, saturation flow rate [veh/h]	1774	1836	1834	1680	1836	1800	1083	1468
c, Capacity [veh/h]	67	1385	1383	19	1336	1310	204	282
d1, Uniform Delay [s]	69.15	6.90	6.91	71.42	6.59	6.60	58.40	59.66
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.47	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.03	1.22	1.22	15.27	0.46	0.47	88.71	1.94
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

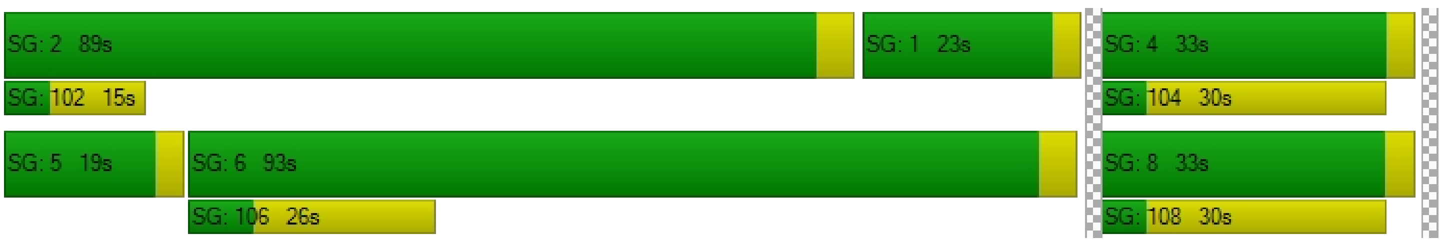
X, volume / capacity	0.78	0.48	0.48	0.69	0.25	0.25	1.10	0.79
d, Delay for Lane Group [s/veh]	76.18	8.12	8.12	86.70	7.05	7.07	147.10	61.60
Lane Group LOS	E	A	A	F	A	A	F	E
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	2.03	7.43	7.42	0.56	3.54	3.49	12.38	8.33
50th-Percentile Queue Length [ft]	50.70	185.66	185.59	14.10	88.42	87.29	309.57	208.26
95th-Percentile Queue Length [veh]	3.65	11.90	11.89	1.02	6.37	6.28	18.96	13.06
95th-Percentile Queue Length [ft]	91.26	297.40	297.29	25.38	159.15	157.12	473.94	326.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.18	8.12	8.12	86.70	7.06	7.07	147.10	147.10	147.10	61.60	61.60	61.60
Movement LOS	E	A	A	F	A	A	F	F	F	E	E	E
d_A, Approach Delay [s/veh]	10.66			8.57			147.10			61.60		
Approach LOS	B			A			F			E		
d_I, Intersection Delay [s/veh]	26.65											
Intersection LOS	C											
Intersection V/C	0.612											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	11.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.558

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	68	1339	885	15	33	141
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	3.30	2.80	0.00	0.00	2.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	68	1339	885	15	33	141
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	352	233	4	9	37
Total Analysis Volume [veh/h]	72	1409	932	16	35	148
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12		23		13	
Bicycle Volume [bicycles/h]	7		6		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	10.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	15	10	10	11	11
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	4.0	3.0	3.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	24	113	89	89	32	32
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	5	5
Pedestrian Clearance [s]	0	0	22	22	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	2.0	1.0	1.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	2.00	1.00
g_i, Effective Green Time [s]	7	120	109	109	18
g / C, Green / Cycle	0.05	0.83	0.75	0.75	0.13
(v / s)_i Volume / Saturation Flow Rate	0.04	0.40	0.26	0.26	0.11
s, saturation flow rate [veh/h]	1783	3502	1848	1835	1615
c, Capacity [veh/h]	91	2892	1394	1384	203
d1, Uniform Delay [s]	68.04	3.67	5.88	5.90	62.47
k, delay calibration	0.04	0.50	0.50	0.50	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.75	0.59	0.66	0.68	10.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

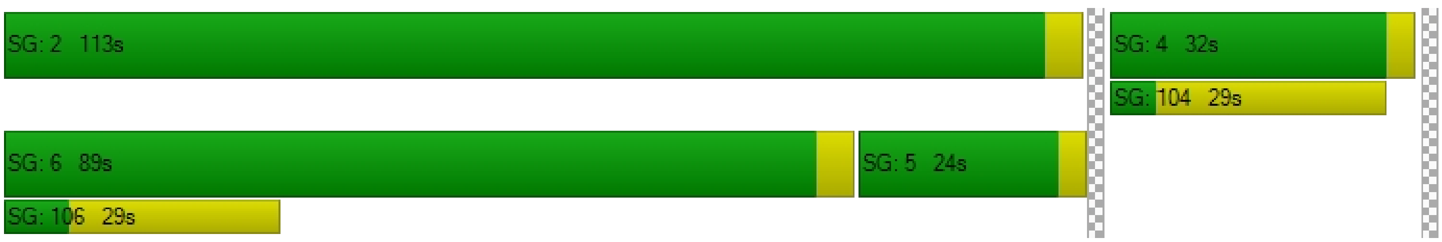
X, volume / capacity	0.79	0.49	0.34	0.34	0.90
d, Delay for Lane Group [s/veh]	73.79	4.26	6.55	6.57	73.33
Lane Group LOS	E	A	A	A	E
Critical Lane Group	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	2.76	4.58	4.45	4.46	7.28
50th-Percentile Queue Length [ft]	69.06	114.59	111.19	111.52	182.02
95th-Percentile Queue Length [veh]	4.97	8.09	7.91	7.92	11.71
95th-Percentile Queue Length [ft]	124.30	202.37	197.65	198.11	292.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	73.79	4.26	6.56	6.57	73.33	73.33
Movement LOS	E	A	A	A	E	E
d_A, Approach Delay [s/veh]	7.64		6.56		73.33	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	11.85					
Intersection LOS	B					
Intersection V/C	0.558					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	12.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.566

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1368	217	72	966	218	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.90	6.50	2.80	2.70	1.80	6.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1368	217	72	966	218	44
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	353	56	19	249	56	11
Total Analysis Volume [veh/h]	1410	224	74	996	225	45
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		3	
Bicycle Volume [bicycles/h]	6		9		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	10.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lag	-	Lead	-
Minimum Green [s]	10	10	5	15	8	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	4.0	4.0	3.0	4.0	3.2	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	102	102	15	117	28	0
Vehicle Extension [s]	4.0	4.0	2.0	4.0	2.0	0.0
Walk [s]	7	7	0	0	0	0
Pedestrian Clearance [s]	17	17	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	1.0	2.0	1.2	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	3.00	4.00	3.20	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	1.00	2.00	1.20	1.20
g_i, Effective Green Time [s]	114	114	8	124	14	14
g / C, Green / Cycle	0.78	0.78	0.05	0.86	0.09	0.09
(v / s)_i Volume / Saturation Flow Rate	0.40	0.15	0.04	0.28	0.08	0.08
s, saturation flow rate [veh/h]	3516	1479	1760	3522	1778	1626
c, Capacity [veh/h]	2756	1159	92	3019	166	152
d1, Uniform Delay [s]	5.64	3.98	67.91	2.07	64.65	64.70
k, delay calibration	0.50	0.50	0.04	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.68	0.37	6.02	0.29	4.52	5.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.19	0.80	0.33	0.85	0.85
d, Delay for Lane Group [s/veh]	6.33	4.35	73.94	2.36	69.17	69.84
Lane Group LOS	A	A	E	A	E	E
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	6.60	1.54	2.84	1.81	5.33	4.95
50th-Percentile Queue Length [ft]	164.88	38.50	71.07	45.34	133.35	123.63
95th-Percentile Queue Length [veh]	10.81	2.77	5.12	3.26	9.12	8.59
95th-Percentile Queue Length [ft]	270.17	69.31	127.93	81.62	228.04	214.81

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.33	4.35	73.94	2.36	69.42	69.84
Movement LOS	A	A	E	A	E	E
d_A, Approach Delay [s/veh]	6.06		7.31		69.49	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	12.27					
Intersection LOS	B					
Intersection V/C	0.566					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	38.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.758

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	301	1484	263	74	1016	22	28	137	210	210	249	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.30	4.40	5.30	0.00	3.40	0.00	0.00	4.40	0.50	3.80	4.40	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	175	0	0	45
Total Hourly Volume [veh/h]	301	1484	263	74	1016	22	28	137	35	210	249	31
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	78	382	68	19	262	6	7	35	9	54	64	8
Total Analysis Volume [veh/h]	310	1530	271	76	1047	23	29	141	36	216	257	32
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	28			47			11			1		
Bicycle Volume [bicycles/h]	0			4			1			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	140.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	4	4	8	3	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	4	4	4	0	4	0
Maximum Green [s]	0	0	0	0	16	16	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0
Split [s]	35	73	73	18	56	56	32	32	32	0	22	0
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	0.0	2.0	0.0
Walk [s]	0	5	5	0	7	7	5	5	5	0	0	0
Pedestrian Clearance [s]	0	19	19	0	16	16	23	23	23	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	3.0	3.0	1.0	3.0	3.0	2.0	2.0	2.0	0.0	1.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	6.0	6.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	5.00	5.00	3.00	5.00	5.00	4.00	4.00	4.00	3.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	3.00	3.00	1.00	3.00	3.00	2.00	2.00	2.00	1.00	1.00	1.00
g_i, Effective Green Time [s]	27	86	86	8	67	67	13	13	13	23	23	23
g / C, Green / Cycle	0.19	0.60	0.60	0.05	0.46	0.46	0.09	0.09	0.09	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.17	0.35	0.35	0.04	0.29	0.29	0.02	0.08	0.02	0.06	0.14	0.02
s, saturation flow rate [veh/h]	1786	3465	1684	1810	1838	1820	1810	1820	1440	3385	1820	1571
c, Capacity [veh/h]	331	2067	1004	96	852	844	166	167	132	526	283	244
d1, Uniform Delay [s]	58.19	18.11	18.26	67.87	29.44	29.47	60.78	64.82	61.34	55.24	60.22	52.79
k, delay calibration	0.28	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.27	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	24.18	1.21	2.57	5.46	3.52	3.57	0.18	4.41	0.41	0.19	22.15	0.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

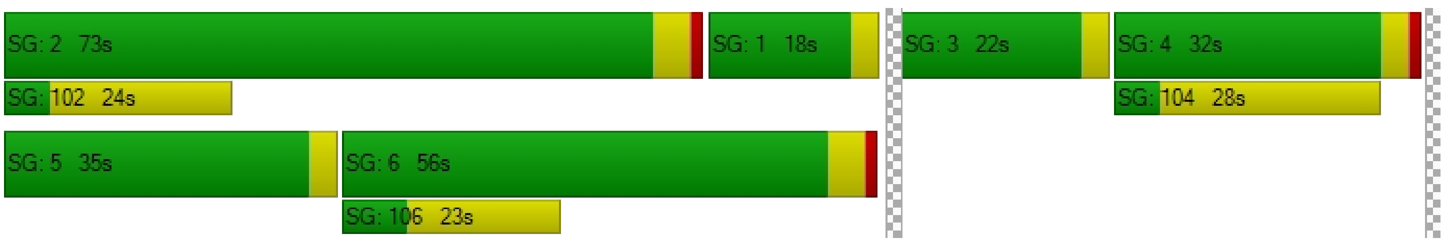
X, volume / capacity	0.94	0.58	0.59	0.79	0.63	0.63	0.17	0.84	0.27	0.41	0.91	0.13
d, Delay for Lane Group [s/veh]	82.37	19.32	20.83	73.33	32.97	33.04	60.96	69.24	61.74	55.43	82.37	52.88
Lane Group LOS	F	B	C	E	C	C	E	E	E	E	F	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	13.27	12.30	12.61	2.96	15.22	15.13	1.00	5.35	1.26	3.61	11.06	1.02
50th-Percentile Queue Length [ft]	331.81	307.45	315.22	74.01	380.40	378.18	25.04	133.87	31.48	90.13	276.41	25.57
95th-Percentile Queue Length [veh]	19.25	18.05	18.43	5.33	21.61	21.51	1.80	9.15	2.27	6.49	16.51	1.84
95th-Percentile Queue Length [ft]	481.17	451.23	460.81	133.22	540.33	537.64	45.07	228.75	56.66	162.23	412.74	46.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	82.37	19.64	20.83	73.33	33.00	33.04	60.96	69.24	61.74	55.43	82.37	52.88
Movement LOS	F	B	C	E	C	C	E	E	E	E	F	D
d_A, Approach Delay [s/veh]	29.01			35.68			66.76			68.98		
Approach LOS	C			D			E			E		
d_I, Intersection Delay [s/veh]	37.98											
Intersection LOS	D											
Intersection V/C	0.758											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	16.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.865

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	80.00	100.00	100.00	100.00	100.00	175.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	35	1276	922	261	504	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.20	0.00	1.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	223	0	47
Total Hourly Volume [veh/h]	35	1276	922	38	504	21
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	354	256	11	140	6
Total Analysis Volume [veh/h]	39	1418	1024	42	560	23
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		7	
Bicycle Volume [bicycles/h]	8		7		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	10	20	20	4	4
Maximum Green [s]	16	36	36	36	36	36
Amber [s]	3.0	4.5	4.5	4.5	3.2	3.2
All red [s]	0.5	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	0	0
Pedestrian Clearance [s]	0	0	18	18	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	1.5	3.5	3.5	3.5	2.2	2.2
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	5.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	3.50	2.20	2.20
g_i, Effective Green Time [s]	2	32	27	27	22	22
g / C, Green / Cycle	0.03	0.51	0.42	0.42	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.02	0.40	0.29	0.03	0.31	0.01
s, saturation flow rate [veh/h]	1810	3526	3540	1573	1792	1554
c, Capacity [veh/h]	57	1782	1482	658	613	532
d1, Uniform Delay [s]	30.49	13.02	15.12	11.04	20.02	13.97
k, delay calibration	0.04	0.15	0.15	0.15	0.06	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.23	1.20	0.83	0.06	3.36	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.68	0.80	0.69	0.06	0.91	0.04
d, Delay for Lane Group [s/veh]	35.71	14.22	15.96	11.10	23.38	13.98
Lane Group LOS	D	B	B	B	C	B
Critical Lane Group	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.65	7.22	5.31	0.32	7.68	0.21
50th-Percentile Queue Length [ft]	16.22	180.47	132.85	7.96	191.96	5.14
95th-Percentile Queue Length [veh]	1.17	11.63	9.09	0.57	12.22	0.37
95th-Percentile Queue Length [ft]	29.19	290.63	227.36	14.33	305.58	9.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	35.71	14.22	15.96	11.10	23.38	13.98
Movement LOS	D	B	B	B	C	B
d_A, Approach Delay [s/veh]	14.79		15.76		23.01	
Approach LOS	B		B		C	
d_I, Intersection Delay [s/veh]	16.67					
Intersection LOS	B					
Intersection V/C	0.865					

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	16.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.681

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	8	935	10	54	719	29	117	2	28	21	2	97
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	2.10	0.00	0.00	2.60	27.60	4.30	0.00	17.90	0.00	0.00	6.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	18	0	0	0
Total Hourly Volume [veh/h]	8	935	10	54	719	29	117	2	10	21	2	97
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	254	3	15	195	8	32	1	3	6	1	26
Total Analysis Volume [veh/h]	9	1016	11	59	782	32	127	2	11	23	2	105
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			17			10			19		
Bicycle Volume [bicycles/h]	5			3			1			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	30	30	4	30	30	4	4	4	4	4	4
Maximum Green [s]	30	100	100	20	100	100	30	30	30	30	30	30
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	30	30	0	30	30	30	30	30	30	30	30
Vehicle Extension [s]	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	7	7	7	7	7	7
Pedestrian Clearance [s]	0	11	11	0	15	15	15	15	15	15	15	15
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
g_i, Effective Green Time [s]	1	33	33	3	36	16	16	16	16
g / C, Green / Cycle	0.01	0.51	0.51	0.04	0.54	0.24	0.24	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.01	0.28	0.28	0.03	0.44	0.16	0.01	0.02	0.07
s, saturation flow rate [veh/h]	1206	1861	1852	1810	1836	821	1340	1415	1566
c, Capacity [veh/h]	11	952	948	76	1000	306	320	148	374
d1, Uniform Delay [s]	32.26	10.74	10.75	30.93	12.14	26.03	19.04	31.41	20.27
k, delay calibration	0.11	0.23	0.23	0.11	0.23	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	78.13	1.02	1.03	15.16	3.49	0.92	0.04	0.48	0.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.81	0.54	0.54	0.77	0.81	0.42	0.03	0.16	0.29
d, Delay for Lane Group [s/veh]	110.39	11.77	11.78	46.09	15.63	26.95	19.08	31.89	20.68
Lane Group LOS	F	B	B	D	B	C	B	C	C
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.38	4.69	4.67	1.22	9.18	2.00	0.13	0.37	1.32
50th-Percentile Queue Length [ft]	9.50	117.22	116.87	30.51	229.54	49.99	3.37	9.26	33.09
95th-Percentile Queue Length [veh]	0.68	8.24	8.22	2.20	14.15	3.60	0.24	0.67	2.38
95th-Percentile Queue Length [ft]	17.11	206.01	205.52	54.91	353.77	89.98	6.07	16.67	59.57

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	110.39	11.77	11.78	46.09	15.63	15.63	26.95	26.95	19.08	31.89	20.68	20.68
Movement LOS	F	B	B	D	B	B	C	C	B	C	C	C
d_A, Approach Delay [s/veh]	12.63			17.69			26.33			22.67		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	16.14											
Intersection LOS	B											
Intersection V/C	0.681											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	8.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.591

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Coleman Avenue					
Base Volume Input [veh/h]	11	738	3	5	680	84	102	4	31	1	1	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.10	0.00	0.00	3.70	2.40	3.90	0.00	3.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	738	3	5	680	84	102	4	31	1	1	4
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	196	1	1	181	22	27	1	8	0	0	1
Total Analysis Volume [veh/h]	12	785	3	5	723	89	109	4	33	1	1	4
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12			3			1			9		
Bicycle Volume [bicycles/h]	16			10			7			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	80.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	10	10	10	10	10	4	4	4	0	4	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	73	73	73	73	73	73	27	27	27	0	27	0
Vehicle Extension [s]	6.0	6.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	11	11	11	13	13	13	15	15	15	0	15	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	0.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	80	80	80	80	12	12
g / C, Green / Cycle	0.80	0.80	0.80	0.80	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.02	0.43	0.01	0.45	0.10	0.00
s, saturation flow rate [veh/h]	683	1841	698	1792	1520	1719
c, Capacity [veh/h]	487	1473	508	1433	242	245
d1, Uniform Delay [s]	7.81	3.50	7.10	3.66	42.73	39.01
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.09	1.40	0.04	1.63	2.40	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.54	0.01	0.57	0.60	0.02
d, Delay for Lane Group [s/veh]	7.91	4.90	7.13	5.29	45.12	39.05
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.11	4.55	0.04	4.60	3.64	0.13
50th-Percentile Queue Length [ft]	2.82	113.82	1.07	115.12	91.12	3.36
95th-Percentile Queue Length [veh]	0.20	8.05	0.08	8.12	6.56	0.24
95th-Percentile Queue Length [ft]	5.08	201.30	1.93	203.10	164.02	6.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.91	4.90	4.90	7.13	5.29	5.29	45.12	45.12	45.12	39.05	39.05	39.05
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	4.94			5.30			45.12			39.05		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.54											
Intersection LOS	A											
Intersection V/C	0.591											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	13.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.538

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	30	671	13	26	597	6	61	51	69	56	43	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	0.00	2.70	0.00	3.30	2.00	10.10	0.00	2.30	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	671	13	26	597	6	61	51	69	56	43	28
Peak Hour Factor	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	188	4	7	168	2	17	14	19	16	12	8
Total Analysis Volume [veh/h]	34	754	15	29	671	7	69	57	78	63	48	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			4			3			3		
Bicycle Volume [bicycles/h]	15			12			5			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	12	12	12	12	12	12	5	5	5	0	5	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	73	73	73	73	73	73	27	27	27	0	27	0
Vehicle Extension [s]	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	14	14	14	14	14	14	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	74	74	74	74	17	17	17	17
g / C, Green / Cycle	0.74	0.74	0.74	0.74	0.17	0.17	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.04	0.42	0.04	0.37	0.05	0.08	0.05	0.05
s, saturation flow rate [veh/h]	774	1837	711	1846	1287	1652	1270	1706
c, Capacity [veh/h]	522	1368	461	1375	214	286	169	295
d1, Uniform Delay [s]	9.13	5.60	10.69	5.14	41.83	37.22	44.86	35.84
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.24	1.67	0.26	1.27	0.87	1.21	1.36	0.48
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.07	0.56	0.06	0.49	0.32	0.47	0.37	0.27
d, Delay for Lane Group [s/veh]	9.37	7.27	10.95	6.41	42.70	38.43	46.22	36.32
Lane Group LOS	A	A	B	A	D	D	D	D
Critical Lane Group	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.35	6.50	0.33	5.23	1.66	3.08	1.59	1.72
50th-Percentile Queue Length [ft]	8.83	162.46	8.34	130.82	41.49	77.03	39.69	43.03
95th-Percentile Queue Length [veh]	0.64	10.68	0.60	8.98	2.99	5.55	2.86	3.10
95th-Percentile Queue Length [ft]	15.89	266.98	15.01	224.62	74.68	138.65	71.45	77.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.37	7.27	7.27	10.95	6.41	6.41	42.70	38.43	38.43	46.22	36.32	36.32
Movement LOS	A	A	A	B	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	7.36			6.60			39.87			40.71		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	13.20											
Intersection LOS	B											
Intersection V/C	0.538											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	71.9
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.530

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	46	94	256	356	93	332	92	429	216	236	453	29
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	1.10	0.00	1.70	0.00	2.40	1.10	0.50	2.30	6.40	0.00	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	120	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	46	94	136	356	93	0	92	429	216	236	453	29
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	24	35	93	24	0	24	112	56	61	118	8
Total Analysis Volume [veh/h]	48	98	142	371	97	0	96	447	225	246	472	30
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			0			0			6		
Bicycle Volume [bicycles/h]	51			1			5			16		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	8	1	8	4	4	4	6	3	6	2	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	Lag	-	-
Minimum Green [s]	0	5	0	5	5	5	0	5	0	5	5	5
Maximum Green [s]	0	20	0	45	45	45	0	45	0	30	30	30
Amber [s]	0.0	3.3	0.0	3.7	3.7	3.7	0.0	3.7	0.0	3.7	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	0	33	0	46	46	46	0	32	0	39	39	39
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	8	0	8	8	8	0	8	0	8	8	8
Pedestrian Clearance [s]	0	20	0	22	22	22	0	17	0	18	18	18
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	2.3	0.0	2.7	2.7	2.7	0.0	2.7	0.0	2.7	2.7	2.7
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.30	4.30	4.30	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.30	2.30	2.30	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	17	17	17	22	22	22	23	23	23	23	24	24	24
g / C, Green / Cycle	0.11	0.11	0.11	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.05	0.10	0.13	0.13	0.00	0.05	0.13	0.13	0.13	0.14	0.14	0.14
s, saturation flow rate [veh/h]	1771	1879	1434	1779	1845	1577	1790	1891	1848	1528	1701	1898	1673
c, Capacity [veh/h]	201	213	162	266	276	236	275	290	284	235	278	310	273
d1, Uniform Delay [s]	60.61	62.22	65.45	62.27	62.27	0.00	56.79	61.48	61.53	61.84	61.17	61.14	61.27
k, delay calibration	0.11	0.11	0.24	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.23	0.22	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.61	1.55	25.33	8.11	7.85	0.00	0.76	5.71	5.98	8.53	15.19	13.61	16.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.24	0.46	0.87	0.86	0.86	0.00	0.35	0.82	0.82	0.85	0.87	0.86	0.88
d, Delay for Lane Group [s/veh]	61.22	63.76	90.79	70.38	70.12	0.00	57.55	67.20	67.50	70.37	76.36	74.76	77.74
Lane Group LOS	E	E	F	E	E	A	E	E	E	E	E	E	E
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	1.71	3.61	6.51	9.25	9.57	0.00	3.34	9.28	9.14	8.01	10.14	11.16	10.18
50th-Percentile Queue Length [ft]	42.87	90.36	162.83	231.25	239.32	0.00	83.59	232.0	228.5	200.3	253.61	278.93	254.40
95th-Percentile Queue Length [veh]	3.09	6.51	10.70	14.24	14.65	0.00	6.02	14.28	14.10	12.66	15.37	16.64	15.41
95th-Percentile Queue Length [ft]	77.17	162.64	267.46	355.95	366.18	0.00	150.4	356.9	352.5	316.4	384.19	415.88	385.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.22	63.76	90.79	70.28	70.12	0.00	57.55	67.34	70.35	76.36	76.08	77.74
Movement LOS	E	E	F	E	E	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	76.66			70.25			66.91			76.23		
Approach LOS	E			E			E			E		
d_I, Intersection Delay [s/veh]	71.90											
Intersection LOS	E											
Intersection V/C	0.530											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	24.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.698

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	57	596	125	32	523	24	267	215	64	52	135	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.00	0.00	0.00	2.10	4.20	0.40	0.50	0.00	13.50	0.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	57	596	125	32	523	24	267	215	64	52	135	26
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	160	34	9	141	6	72	58	17	14	36	7
Total Analysis Volume [veh/h]	61	641	134	34	562	26	287	231	69	56	145	28
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	35			40			67			58		
Bicycle Volume [bicycles/h]	1			5			20			7		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	8	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	4	4	0	4	0	4	4	4	4	4	4
Maximum Green [s]	60	60	60	0	60	0	35	35	35	35	35	35
Amber [s]	3.1	3.1	3.1	0.0	3.1	0.0	3.1	3.1	3.1	3.1	3.1	3.1
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	30	30	30	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	7	7	7	0	7	0	7	7	7	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	13	13	13	13	13	13
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	0.0	2.1	0.0	2.1	2.1	2.1	2.1	2.1	2.1
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	47	47	47	47	35	35	35
g / C, Green / Cycle	0.52	0.52	0.52	0.52	0.39	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.07	0.43	0.05	0.32	0.23	0.17	0.18
s, saturation flow rate [veh/h]	841	1793	707	1838	1221	1772	1290
c, Capacity [veh/h]	307	934	172	957	309	688	551
d1, Uniform Delay [s]	25.93	18.24	35.83	15.22	38.31	20.29	20.73
k, delay calibration	0.11	0.21	0.11	0.11	0.11	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.31	3.73	0.56	0.64	11.73	0.16	0.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.20	0.83	0.20	0.61	0.93	0.44	0.42
d, Delay for Lane Group [s/veh]	26.24	21.97	36.39	15.87	50.04	20.45	20.91
Lane Group LOS	C	C	D	B	D	C	C
Critical Lane Group	No	Yes	No	No	Yes	No	No
50th-Percentile Queue Length [veh]	1.04	13.41	0.70	8.05	7.36	4.52	3.86
50th-Percentile Queue Length [ft]	26.00	335.26	17.54	201.30	184.02	112.90	96.61
95th-Percentile Queue Length [veh]	1.87	19.42	1.26	12.71	11.81	8.00	6.96
95th-Percentile Queue Length [ft]	46.79	485.40	31.57	317.64	295.26	200.03	173.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.24	21.97	21.97	36.39	15.87	15.87	50.04	20.45	20.45	20.91	20.91	20.91
Movement LOS	C	C	C	D	B	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]	22.28			16.99			34.92			20.91		
Approach LOS	C			B			C			C		
d_I, Intersection Delay [s/veh]	23.96											
Intersection LOS	C											
Intersection V/C	0.698											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	8.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	13	335	94	30	262	48	78	232	38	28	116	29
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	7.40	0.00	0.80	0.00	0.00	0.40	2.60	0.00	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	335	94	30	262	48	78	232	38	28	116	29
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	95	27	9	74	14	22	66	11	8	33	8
Total Analysis Volume [veh/h]	15	381	107	34	298	55	89	264	43	32	132	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			1			18			5		
Bicycle Volume [bicycles/h]	16			12			20			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	4	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	8	8	8	0	8	0	0	4	0	4	4	4
Maximum Green [s]	30	30	30	0	30	0	0	30	0	30	30	30
Amber [s]	3.2	3.2	3.2	0.0	3.2	0.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	30	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	12	0	12	12	12
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	2.2	2.2	0.0	2.2	0.0	0.0	2.2	0.0	2.2	2.2	2.2
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	12	12	9	9
g / C, Green / Cycle	0.41	0.41	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.29	0.22	0.23	0.11
s, saturation flow rate [veh/h]	1734	1787	1750	1763
c, Capacity [veh/h]	841	870	683	679
d1, Uniform Delay [s]	7.23	6.53	9.17	8.08
k, delay calibration	0.11	0.11	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.69	0.36	0.58	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.60	0.45	0.58	0.29
d, Delay for Lane Group [s/veh]	7.91	6.89	9.76	8.25
Lane Group LOS	A	A	A	A
Critical Lane Group	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.71	1.16	1.67	0.66
50th-Percentile Queue Length [ft]	42.78	29.11	41.65	16.62
95th-Percentile Queue Length [veh]	3.08	2.10	3.00	1.20
95th-Percentile Queue Length [ft]	77.00	52.41	74.97	29.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.91	7.91	7.91	6.89	6.89	6.89	9.76	9.76	9.76	8.25	8.25	8.25
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
d_A, Approach Delay [s/veh]	7.91			6.89			9.76			8.25		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	8.18											
Intersection LOS	A											
Intersection V/C	0.596											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	39.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	12.300

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	19	15	31	107	9	238	24	1750	100	65	1215	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	1.30	0.00	1.40	0.00	1.50	1.20	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	101	0	0	0
Total Hourly Volume [veh/h]	19	15	31	107	9	238	24	1750	0	65	1215	13
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	4	8	27	2	61	6	446	0	17	310	3
Total Analysis Volume [veh/h]	19	15	32	109	9	243	24	1786	0	66	1240	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			12			0			17		
Bicycle Volume [bicycles/h]	3			3			14			3		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	15.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	0	10	10	0	10	10	0
Maximum Green [s]	0	30	0	0	30	0	25	35	0	25	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	0	40	0	0	40	0	25	85	0	25	85	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	37	6	94	94	9	97	97
g / C, Green / Cycle	0.25	0.25	0.25	0.25	0.04	0.62	0.62	0.06	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.41	0.02	11.43	0.16	0.01	0.50	0.00	0.04	0.23	0.23
s, saturation flow rate [veh/h]	82	1591	10	1539	1810	3568	1615	1783	3575	1866
c, Capacity [veh/h]	58	391	49	378	76	2230	1010	111	2307	1204
d1, Uniform Delay [s]	53.77	43.53	73.42	50.66	68.70	7.81	0.00	66.92	4.20	4.20
k, delay calibration	0.50	0.11	0.50	0.20	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	37.49	0.09	697.89	3.43	2.32	3.14	0.00	4.96	0.43	0.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.59	0.08	2.42	0.64	0.31	0.80	0.00	0.59	0.36	0.36
d, Delay for Lane Group [s/veh]	91.26	43.62	771.31	54.09	71.03	10.95	0.00	71.88	4.63	5.02
Lane Group LOS	F	D	F	D	E	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	1.94	0.96	11.33	8.59	0.94	9.34	0.00	2.58	2.26	2.50
50th-Percentile Queue Length [ft]	48.52	24.08	283.29	214.78	23.41	233.51	0.00	64.40	56.62	62.48
95th-Percentile Queue Length [veh]	3.49	1.73	20.40	13.40	1.69	14.35	0.00	4.64	4.08	4.50
95th-Percentile Queue Length [ft]	87.34	43.34	509.92	334.95	42.14	358.82	0.00	115.92	101.92	112.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	91.26	91.26	43.62	771.31	771.31	54.09	71.03	10.95	0.00	71.88	4.76	5.02
Movement LOS	F	F	D	F	F	D	E	B	A	E	A	A
d_A, Approach Delay [s/veh]	68.16			288.53			11.75			8.12		
Approach LOS	E			F			B			A		
d_I, Intersection Delay [s/veh]	39.55											
Intersection LOS	D											
Intersection V/C	12.300											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	33.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.764

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	363	144	79	59	171	41	98	1525	46	56	992	304
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.60	0.00	0.00	0.60	0.00	1.00	0.50	0.00	1.80	1.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	59	0	0	0	0	0	45	0	0	274
Total Hourly Volume [veh/h]	363	144	20	59	171	41	98	1525	1	56	992	30
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	38	5	15	45	11	26	397	0	15	258	8
Total Analysis Volume [veh/h]	378	150	21	61	178	43	102	1589	1	58	1033	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			9			17			3		
Bicycle Volume [bicycles/h]	6			5			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	26.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	3	0	0	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	8	10	0	8	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	40	0	0	25	0	22	63	0	22	63	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	2.0	2.2	0.0	2.0	2.2	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	4.00	4.20	4.20	4.00	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	2.00	2.20	2.20	2.00	2.20	2.20
g_i, Effective Green Time [s]	26	26	26	20	20	10	82	82	7	79	79
g / C, Green / Cycle	0.17	0.17	0.17	0.13	0.13	0.07	0.55	0.55	0.05	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.15	0.15	0.01	0.03	0.12	0.06	0.44	0.00	0.03	0.29	0.02
s, saturation flow rate [veh/h]	1810	1762	1583	1810	1818	1792	3600	1578	1778	3557	1572
c, Capacity [veh/h]	308	300	269	242	243	124	1967	862	86	1870	827
d1, Uniform Delay [s]	60.57	60.57	52.31	58.25	64.08	67.17	15.16	9.23	68.95	13.80	10.76
k, delay calibration	0.15	0.15	0.11	0.11	0.34	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.18	10.39	0.12	0.54	29.51	12.68	3.69	0.00	8.74	1.18	0.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

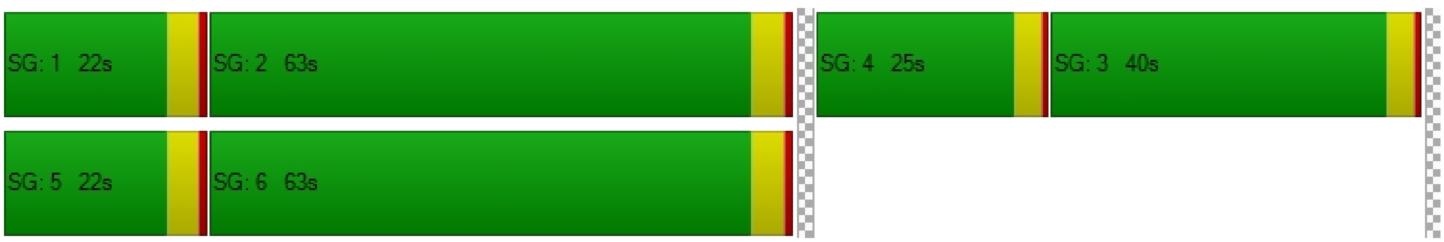
X, volume / capacity	0.87	0.87	0.08	0.25	0.91	0.82	0.81	0.00	0.67	0.55	0.04
d, Delay for Lane Group [s/veh]	70.76	70.96	52.43	58.80	93.59	79.85	18.85	9.24	77.70	14.98	10.84
Lane Group LOS	E	E	D	E	F	E	B	A	E	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	10.82	10.55	0.68	2.15	10.40	4.19	14.90	0.01	2.37	7.59	0.35
50th-Percentile Queue Length [ft]	270.46	263.63	17.08	53.65	259.91	104.81	372.53	0.25	59.36	189.78	8.86
95th-Percentile Queue Length [veh]	16.21	15.87	1.23	3.86	15.68	7.55	21.23	0.02	4.27	12.11	0.64
95th-Percentile Queue Length [ft]	405.31	396.77	30.75	96.58	392.11	188.65	530.80	0.45	106.84	302.74	15.94

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.82	70.96	52.43	58.80	93.59	93.59	79.85	18.85	9.24	77.70	14.98	10.84
Movement LOS	E	E	D	E	F	F	E	B	A	E	B	B
d_A, Approach Delay [s/veh]	70.15			86.06			22.52			18.11		
Approach LOS	E			F			C			B		
d_I, Intersection Delay [s/veh]	33.25											
Intersection LOS	C											
Intersection V/C	0.764											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	23.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.684

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	118	202	133	129	215	77	87	1426	94	114	1047	97
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.00	1.60	1.40	1.30	0.00	1.70	0.00	2.60	1.20	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	77	0	0	82	0	0	77	0	0	116
Total Hourly Volume [veh/h]	118	202	56	129	215	0	87	1426	17	114	1047	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	52	14	33	55	0	22	368	4	29	270	0
Total Analysis Volume [veh/h]	122	208	58	133	222	0	90	1470	18	118	1079	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			7			37			17		
Bicycle Volume [bicycles/h]	10			10			4			6		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	147.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	7	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	0	4	4	0	4	10	0	4	10	0
Maximum Green [s]	16	25	0	16	25	0	18	20	0	18	20	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	23	38	0	23	38	0	25	64	0	25	64	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	1.5	0.0	1.0	1.5	0.0	1.5	2.2	0.0	1.5	2.2	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	3.50	3.50	3.00	3.50	3.50	3.50	4.20	4.20	3.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.50	1.50	1.00	1.50	1.50	1.50	2.20	2.20	1.50	2.20	2.20
g_i, Effective Green Time [s]	12	23	23	13	24	24	9	88	88	12	90	90
g / C, Green / Cycle	0.08	0.15	0.15	0.09	0.16	0.16	0.06	0.58	0.58	0.08	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.07	0.11	0.04	0.07	0.12	0.00	0.05	0.41	0.01	0.07	0.30	0.00
s, saturation flow rate [veh/h]	1810	1872	1461	1781	1874	1594	1810	3557	1569	1764	3575	1599
c, Capacity [veh/h]	144	288	225	155	302	257	110	2082	919	139	2156	965
d1, Uniform Delay [s]	67.91	60.23	55.75	67.38	59.70	0.00	66.34	0.82	0.76	66.02	7.25	0.00
k, delay calibration	0.11	0.11	0.11	0.13	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.55	3.42	0.60	15.23	3.48	0.00	13.33	2.04	0.04	13.05	0.83	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

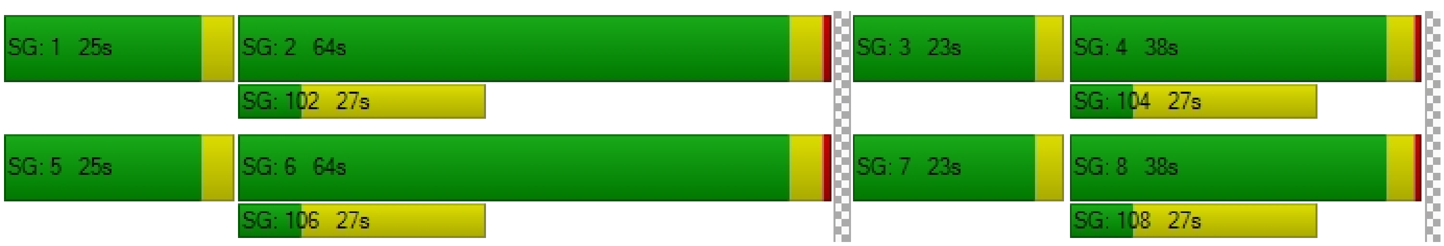
X, volume / capacity	0.85	0.72	0.26	0.86	0.74	0.00	0.81	0.71	0.02	0.85	0.50	0.00
d, Delay for Lane Group [s/veh]	80.46	63.65	56.35	82.60	63.19	0.00	79.67	2.86	0.80	79.07	8.09	0.00
Lane Group LOS	F	E	E	F	E	A	E	A	A	E	A	A
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	5.16	7.89	2.00	5.73	8.41	0.00	3.68	1.26	0.03	4.85	4.53	0.00
50th-Percentile Queue Length [ft]	129.06	197.16	50.06	143.27	210.23	0.00	91.97	31.56	0.65	121.18	113.26	0.00
95th-Percentile Queue Length [veh]	8.89	12.49	3.60	9.66	13.16	0.00	6.62	2.27	0.05	8.46	8.02	0.00
95th-Percentile Queue Length [ft]	222.21	312.30	90.11	241.42	329.12	0.00	165.55	56.81	1.17	211.45	200.53	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	80.46	63.65	56.35	82.60	63.19	0.00	79.67	2.86	0.80	79.07	8.09	0.00
Movement LOS	F	E	E	F	E	A	E	A	A	E	A	A
d_A, Approach Delay [s/veh]	67.85			70.46			7.22			15.08		
Approach LOS	E			E			A			B		
d_I, Intersection Delay [s/veh]	22.96											
Intersection LOS	C											
Intersection V/C	0.684											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	12.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.677

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	172	50	137	50	58	43	0	1406	41	0	1451	87
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	10.00	0.70	2.00	5.20	7.00	0.00	1.40	2.40	0.00	1.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	73	0	0	99
Total Hourly Volume [veh/h]	172	50	137	50	58	43	0	1406	0	0	1451	0
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	1.0000	0.9700	0.9700	1.0000	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	44	13	35	13	15	11	0	362	0	0	374	0
Total Analysis Volume [veh/h]	177	52	141	52	60	44	0	1449	0	0	1496	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	20			27			66			41		
Bicycle Volume [bicycles/h]	14			12			4			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	142.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	3	0	0	4	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	10	0	0	10	0
Maximum Green [s]	0	24	0	0	24	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.7	0.0	0.0	3.7	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	37	0	0	37	0	0	76	0	0	76	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.2	0.0	0.0	2.2	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	20	20	20	13	13	104	104	104	104
g / C, Green / Cycle	0.14	0.14	0.14	0.09	0.09	0.69	0.69	0.69	0.69
(v / s)_i Volume / Saturation Flow Rate	0.11	0.03	0.12	0.03	0.08	0.45	0.00	0.46	0.00
s, saturation flow rate [veh/h]	1601	1555	1193	1597	1381	3211	1419	3217	1429
c, Capacity [veh/h]	216	210	161	142	123	2231	986	2235	993
d1, Uniform Delay [s]	62.90	57.88	63.44	64.17	67.14	0.00	0.00	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.46	0.61	14.04	1.58	14.62	1.48	0.00	1.61	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

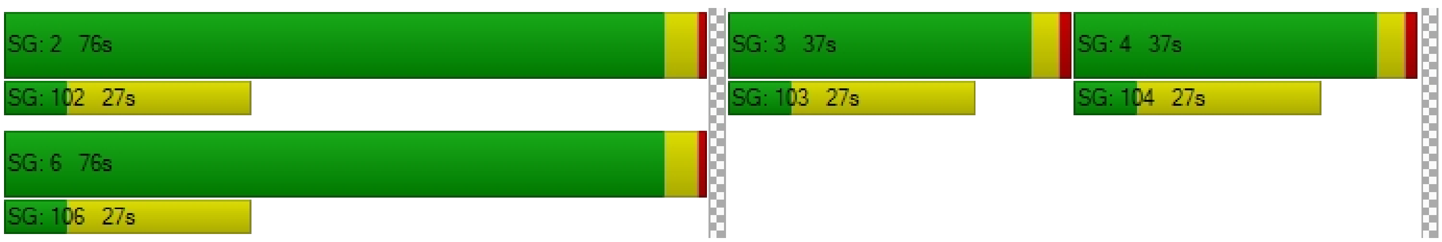
X, volume / capacity	0.82	0.25	0.88	0.37	0.85	0.65	0.00	0.67	0.00
d, Delay for Lane Group [s/veh]	70.36	58.49	77.48	65.75	81.75	1.48	0.00	1.61	0.00
Lane Group LOS	E	E	E	E	F	A	A	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	7.03	1.82	5.92	1.96	4.46	0.46	0.00	0.50	0.00
50th-Percentile Queue Length [ft]	175.79	45.39	147.95	48.91	111.53	11.48	0.00	12.52	0.00
95th-Percentile Queue Length [veh]	11.38	3.27	9.91	3.52	7.92	0.83	0.00	0.90	0.00
95th-Percentile Queue Length [ft]	284.50	81.70	247.69	88.03	198.12	20.66	0.00	22.53	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.36	58.49	77.48	65.75	81.75	81.75	0.00	1.48	0.00	0.00	1.61	0.00
Movement LOS	E	E	E	E	F	F		A	A		A	A
d_A, Approach Delay [s/veh]		71.41			76.42			1.48			1.61	
Approach LOS		E			E			A			A	
d_I, Intersection Delay [s/veh]	12.36											
Intersection LOS	B											
Intersection V/C	0.677											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	45.8
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.794

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	44	348	108	451	249	80	113	1339	590	180	1154	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	1.10	0.00	0.40	0.40	1.30	0.90	1.80	1.70	0.60	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	80	0	0	454	0	0	33
Total Hourly Volume [veh/h]	44	348	108	451	249	0	113	1339	136	180	1154	6
Peak Hour Factor	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800	0.9800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	89	28	115	64	0	29	342	35	46	294	2
Total Analysis Volume [veh/h]	45	355	110	460	254	0	115	1366	139	184	1178	6
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	31			12			0			37		
Bicycle Volume [bicycles/h]	13			14			5			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	3	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	4	4	4	8	10	10	8	10	10
Maximum Green [s]	0	30	0	16	16	16	4	16	16	4	16	16
Amber [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.2	3.7	3.7	3.2	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	25	0	30	30	30	25	70	70	25	70	70
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	0	0	7	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	0	0	20	20	20	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.2	2.7	2.7	2.2	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.70	4.70	4.20	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.70	2.70	2.20	2.70	2.70
g_i, Effective Green Time [s]	21	21	23	23	23	11	72	72	17	78	78
g / C, Green / Cycle	0.14	0.14	0.15	0.15	0.15	0.08	0.48	0.48	0.11	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.15	0.15	0.13	0.13	0.00	0.06	0.38	0.09	0.10	0.33	0.00
s, saturation flow rate [veh/h]	1864	1554	3500	1892	1594	1793	3554	1554	1799	3568	1567
c, Capacity [veh/h]	261	218	531	287	242	137	1712	749	204	1851	813
d1, Uniform Delay [s]	64.43	64.43	62.08	62.28	0.00	66.40	21.45	14.86	59.92	5.87	4.87
k, delay calibration	0.47	0.49	0.11	0.28	0.11	0.11	0.50	0.50	0.24	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	67.17	84.46	4.42	19.55	0.00	12.63	3.98	0.55	24.56	1.68	0.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

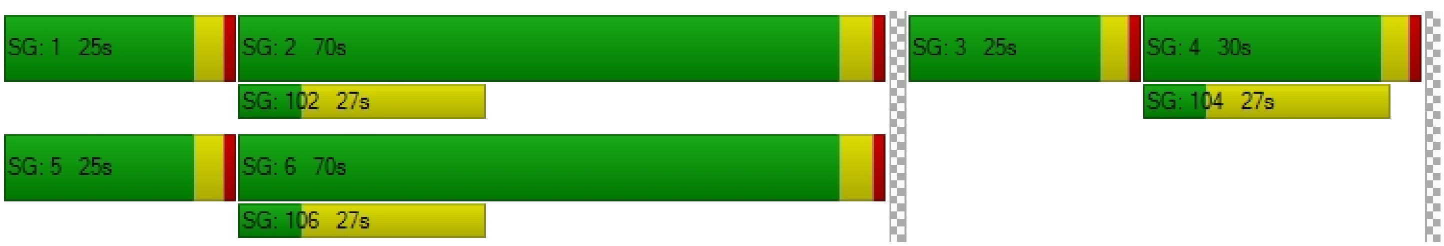
X, volume / capacity	1.05	1.08	0.87	0.88	0.00	0.84	0.80	0.19	0.90	0.64	0.01
d, Delay for Lane Group [s/veh]	131.60	148.89	66.51	81.83	0.00	79.03	25.43	15.41	84.48	7.56	4.89
Lane Group LOS	F	F	E	F	A	E	C	B	F	A	A
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	14.88	13.45	8.91	11.07	0.00	4.70	16.04	2.01	7.73	3.53	0.03
50th-Percentile Queue Length [ft]	372.07	336.26	222.87	276.87	0.00	117.41	401.02	50.16	193.21	88.25	0.81
95th-Percentile Queue Length [veh]	21.70	20.19	13.81	16.53	0.00	8.25	22.61	3.61	12.29	6.35	0.06
95th-Percentile Queue Length [ft]	542.46	504.87	345.29	413.31	0.00	206.26	565.23	90.28	307.19	158.84	1.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	131.60	137.74	148.89	66.51	81.83	0.00	79.03	25.43	15.41	84.48	7.56	4.89
Movement LOS	F	F	F	E	F	A	E	C	B	F	A	A
d_A, Approach Delay [s/veh]	139.60			71.96			28.37			17.89		
Approach LOS	F			E			C			B		
d_I, Intersection Delay [s/veh]	45.82											
Intersection LOS	D											
Intersection V/C	0.794											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	9.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.570

Intersection Setup

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	66	6	36	58	45	48	72	1845	20	68	1586	54
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	39	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	6	36	58	45	9	72	1845	20	68	1586	54
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	2	9	15	12	2	19	476	5	18	409	14
Total Analysis Volume [veh/h]	68	6	37	60	46	9	74	1902	21	70	1635	56
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			16			0		
Bicycle Volume [bicycles/h]	9			16			5			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	19.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	8	8	4	8	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	8	8	0	8	0	4	10	10	4	10	10
Maximum Green [s]	30	30	30	0	30	0	20	40	40	20	40	40
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.7	3.7	3.0	3.7	3.7
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	40	40	40	0	40	0	25	85	85	25	85	85
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	7	7	0	7	0	0	7	7	0	7	7
Pedestrian Clearance [s]	20	20	20	0	20	0	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.7	2.7	2.0	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	0.0	6.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.70	4.70	4.00	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.70	2.70	2.00	2.70	2.70
g_i, Effective Green Time [s]	25	25	25	8	105	105	7	104	104
g / C, Green / Cycle	0.17	0.17	0.17	0.05	0.70	0.70	0.05	0.69	0.69
(v / s)_i Volume / Saturation Flow Rate	0.14	0.08	0.01	0.04	0.35	0.35	0.04	0.31	0.31
s, saturation flow rate [veh/h]	797	1359	1562	1810	3575	1865	1810	3582	1843
c, Capacity [veh/h]	173	267	264	94	2492	1300	89	2488	1280
d1, Uniform Delay [s]	65.28	55.76	52.09	69.00	1.85	1.85	69.28	1.91	1.91
k, delay calibration	0.15	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.26	0.95	0.05	13.60	0.74	1.42	13.93	0.59	1.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.64	0.40	0.03	0.79	0.51	0.51	0.79	0.45	0.45
d, Delay for Lane Group [s/veh]	70.54	56.72	52.15	82.60	2.59	3.27	83.21	2.50	3.06
Lane Group LOS	E	E	D	F	A	A	F	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	4.48	3.79	0.30	3.11	1.77	2.10	2.96	1.60	1.85
50th-Percentile Queue Length [ft]	111.95	94.65	7.43	77.72	44.26	52.40	73.88	39.93	46.22
95th-Percentile Queue Length [veh]	7.95	6.81	0.54	5.60	3.19	3.77	5.32	2.88	3.33
95th-Percentile Queue Length [ft]	198.71	170.37	13.38	139.90	79.68	94.31	132.98	71.88	83.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.54	70.54	70.54	56.72	56.72	52.15	82.60	2.82	3.27	83.21	2.67	3.06
Movement LOS	E	E	E	E	E	D	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	70.54			56.36			5.78			5.89		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	9.09											
Intersection LOS	A											
Intersection V/C	0.570											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	17.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.693

Intersection Setup

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound				Northwestbound			Southeastbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	55.00	100.0	100.0	100.0	100.0	275.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				30.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Crosswalk	Yes			Yes				No			Yes		

volumes

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	249	0	182	0	0	0	0	323	1917	0	0	1334	86
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	0.00	1.60	0.00	0.00	0.00	0.00	0.90	1.70	0.00	0.00	1.60	1.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	211	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	249	0	0	0	0	0	0	323	1917	0	0	1334	86
Peak Hour Factor	0.9700	1.0000	0.9700	1.000	1.000	1.000	1.000	0.9700	0.9700	1.0000	1.0000	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	64	0	0	0	0	0	0	83	494	0	0	344	22
Total Analysis Volume [veh/h]	257	0	0	0	0	0	0	333	1976	0	0	1375	89
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27			0				0			17		
Bicycle Volume [bicycles/h]	2			0				7			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	34.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Permi	Permi	Permi	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	4	0	0	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	10	0	0	0	0	10	0	10	10	0	0	10	0
Maximum Green [s]	25	0	0	0	0	25	0	30	45	0	0	45	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	40	0	0	0	0	40	0	35	75	0	0	75	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	25	0	0	0	0	25	0	0	20	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No					No		No	No			No	
Maximum Recall	No					No		No	No			No	
Pedestrian Recall	No					No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	L	C	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	32	32	30	111	78	78
g / C, Green / Cycle	0.21	0.21	0.21	0.20	0.74	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.19	0.00	0.00	0.19	0.39	0.27	0.27
s, saturation flow rate [veh/h]	1374	1590	1900	1793	5089	3561	1803
c, Capacity [veh/h]	324	339	430	354	3765	1861	942
d1, Uniform Delay [s]	58.93	0.00	0.00	54.44	0.28	13.83	13.77
k, delay calibration	0.29	0.11	0.11	0.38	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.26	0.00	0.00	29.36	0.53	1.06	2.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

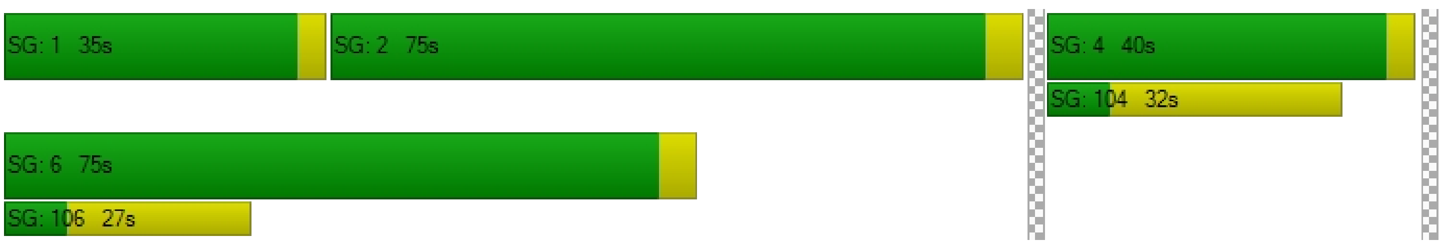
X, volume / capacity	0.79	0.00	0.00	0.94	0.52	0.52	0.52
d, Delay for Lane Group [s/veh]	70.18	0.00	0.00	83.80	0.80	14.89	15.80
Lane Group LOS	E	A	A	F	A	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	10.63	0.00	0.00	14.77	0.45	6.78	6.99
50th-Percentile Queue Length [ft]	265.83	0.00	0.00	369.33	11.29	169.52	174.79
95th-Percentile Queue Length [veh]	15.98	0.00	0.00	21.08	0.81	11.05	11.33
95th-Percentile Queue Length [ft]	399.53	0.00	0.00	526.92	20.31	276.29	283.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.18	0.00	0.00	0.00	0.00	0.00	0.00	83.80	0.80	0.00	0.00	15.15	15.80
Movement LOS	E		A	A	A	A	A	F	A			B	B
d_A, Approach Delay [s/veh]	70.18			0.00				12.77			15.19		
Approach LOS	E			A				B			B		
d_I, Intersection Delay [s/veh]	17.31												
Intersection LOS	B												
Intersection V/C	0.693												

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	11.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.566

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	26	0	39	4	3	0	310	2332	6	30	1660	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	2.85	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.90	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	35	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	0	4	4	3	0	310	2332	6	30	1660	4
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	1	1	1	0	82	620	2	8	441	1
Total Analysis Volume [veh/h]	28	0	4	4	3	0	330	2481	6	32	1766	4
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			2			0			3		
Bicycle Volume [bicycles/h]	0			0			17			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	89.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	11	0	4	10	0	4	10	0
Maximum Green [s]	0	29	0	0	29	0	26	35	0	26	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Split [s]	0	35	0	0	35	0	30	85	0	30	85	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	15	0	0	15	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	26	125	125	3	102	102
g / C, Green / Cycle	0.07	0.07	0.07	0.17	0.83	0.83	0.02	0.68	0.68
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.01	0.18	0.46	0.46	0.02	0.32	0.32
s, saturation flow rate [veh/h]	1268	1570	1084	1810	3575	1875	1810	3585	1881
c, Capacity [veh/h]	132	104	110	314	2968	1556	42	2438	1279
d1, Uniform Delay [s]	66.92	65.48	65.60	57.62	0.00	0.00	72.23	2.61	2.61
k, delay calibration	0.11	0.11	0.11	0.48	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.79	0.15	0.24	64.08	0.74	1.40	24.28	0.67	1.27
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.21	0.04	0.06	1.05	0.55	0.55	0.76	0.48	0.48
d, Delay for Lane Group [s/veh]	67.71	65.63	65.84	121.71	0.74	1.40	96.51	3.28	3.88
Lane Group LOS	E	E	E	F	A	A	F	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.07	0.15	0.27	16.96	0.30	0.61	1.50	2.13	2.45
50th-Percentile Queue Length [ft]	26.71	3.74	6.63	424.07	7.59	15.18	37.43	53.29	61.28
95th-Percentile Queue Length [veh]	1.92	0.27	0.48	24.35	0.55	1.09	2.70	3.84	4.41
95th-Percentile Queue Length [ft]	48.07	6.73	11.93	608.73	13.67	27.33	67.38	95.92	110.30

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	67.71	67.71	65.63	65.84	65.84	65.84	121.71	0.97	1.40	96.51	3.48	3.88
Movement LOS	E	E	E	E	E	E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]		67.45			65.84			15.11			5.14	
Approach LOS		E			E			B			A	
d_I, Intersection Delay [s/veh]	11.69											
Intersection LOS	B											
Intersection V/C	0.566											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	11.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.575

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	30.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	350	328	88	398	363	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.60	0.90	0.50	2.30	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	350	328	88	398	363	165
Peak Hour Factor	0.9200	0.9200	0.9200	0.9200	0.9200	0.9200
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	95	89	24	108	99	45
Total Analysis Volume [veh/h]	380	357	96	433	395	179
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		31	
Bicycle Volume [bicycles/h]	10		15		8	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	0
Maximum Green [s]	30	30	15	40	25	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	30	30	0	30	0	0
Vehicle Extension [s]	2.0	2.0	2.0	2.0	2.0	0.0
Walk [s]	7	7	0	0	7	0
Pedestrian Clearance [s]	10	10	0	0	12	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	0.0
Minimum Recall	Yes		Yes	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	12	12	3	19	10	10
g / C, Green / Cycle	0.32	0.32	0.07	0.50	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.21	0.24	0.05	0.23	0.22	0.12
s, saturation flow rate [veh/h]	1852	1476	1801	1857	1810	1556
c, Capacity [veh/h]	598	476	125	931	506	436
d1, Uniform Delay [s]	10.82	11.35	17.15	6.08	12.44	10.99
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.42	0.90	3.70	0.13	1.00	0.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

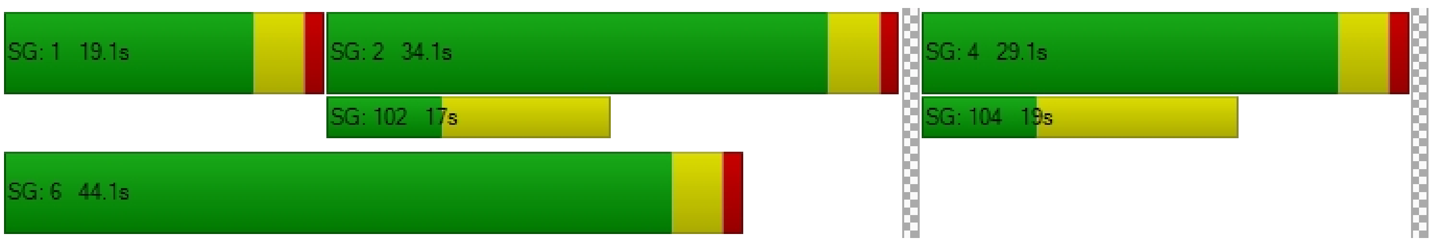
X, volume / capacity	0.64	0.75	0.77	0.46	0.78	0.41
d, Delay for Lane Group [s/veh]	11.24	12.25	20.85	6.21	13.44	11.22
Lane Group LOS	B	B	C	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	2.05	2.07	0.84	1.46	2.46	0.96
50th-Percentile Queue Length [ft]	51.33	51.82	20.96	36.43	61.55	23.93
95th-Percentile Queue Length [veh]	3.70	3.73	1.51	2.62	4.43	1.72
95th-Percentile Queue Length [ft]	92.40	93.27	37.74	65.58	110.79	43.07

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.24	12.25	20.85	6.21	13.44	11.22
Movement LOS	B	B	C	A	B	B
d_A, Approach Delay [s/veh]	11.73		8.87		12.75	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	11.22					
Intersection LOS	B					
Intersection V/C	0.575					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 39: Sand Hill Rd/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	43.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.684

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	361	611	215	424	1038	208	158	691	188	101	526	178
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	0.80	0.90	0.00	0.80	1.00	1.90	0.70	0.50	0.00	0.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	361	611	215	424	1038	208	158	691	188	101	526	178
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	93	157	55	109	268	54	41	178	48	26	136	46
Total Analysis Volume [veh/h]	372	630	222	437	1070	214	163	712	194	104	542	184
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			12			5			3		
Bicycle Volume [bicycles/h]	28			9			33			20		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	133
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	8	8	4	8	8	8	8	8	8	8	8
Maximum Green [s]	30	60	60	30	60	60	25	30	30	25	30	30
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.1	3.6	3.6	3.1	3.6	3.6
All red [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Split [s]	37	45	45	37	45	45	19	32	32	19	32	32
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	24	24	0	24	24	0	24	24	0	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	3.6	3.6	2.0	3.6	3.6	2.1	3.6	3.6	2.1	3.6	3.6
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	5.60	5.60	4.00	5.60	5.60	4.10	5.60	5.60	4.10	5.60	5.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.60	3.60	2.00	3.60	3.60	2.10	3.60	3.60	2.10	3.60	3.60
g_i, Effective Green Time [s]	17	57	57	20	60	60	8	29	29	8	29	29
g / C, Green / Cycle	0.13	0.43	0.43	0.15	0.45	0.45	0.06	0.22	0.22	0.06	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.11	0.18	0.14	0.12	0.30	0.14	0.05	0.20	0.13	0.03	0.15	0.12
s, saturation flow rate [veh/h]	3476	3589	1553	3514	3589	1570	3449	3592	1510	3514	3610	1534
c, Capacity [veh/h]	445	1533	663	518	1603	701	221	792	333	210	781	332
d1, Uniform Delay [s]	56.73	26.51	25.50	55.29	29.06	23.61	61.26	50.47	46.44	60.69	48.14	46.49
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.21	0.82	1.36	3.82	2.22	1.12	4.77	3.99	1.61	1.80	1.12	1.45
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

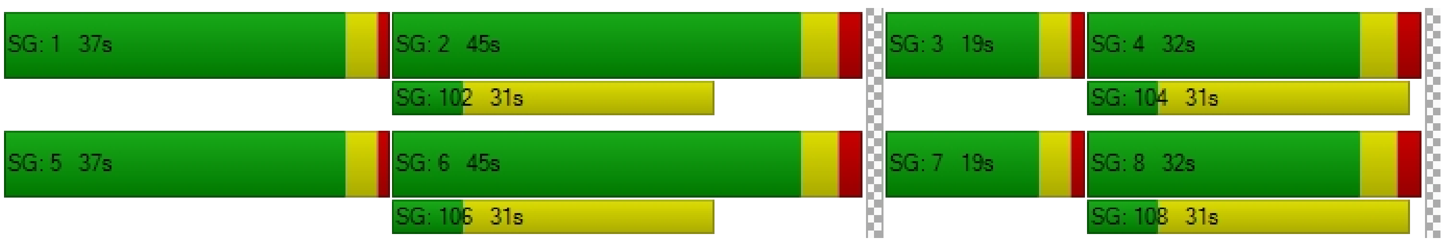
X, volume / capacity	0.84	0.41	0.33	0.84	0.67	0.31	0.74	0.90	0.58	0.49	0.69	0.55
d, Delay for Lane Group [s/veh]	60.94	27.33	26.86	59.11	31.28	24.74	66.03	54.47	48.05	62.49	49.26	47.93
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	6.33	7.07	4.93	7.37	13.71	4.52	2.84	11.85	5.87	1.75	8.36	5.54
50th-Percentile Queue Length [ft]	158.31	176.86	123.22	184.23	342.78	112.88	71.06	296.14	146.70	43.74	209.05	138.42
95th-Percentile Queue Length [veh]	10.46	11.44	8.57	11.82	19.78	8.00	5.12	17.49	9.84	3.15	13.10	9.40
95th-Percentile Queue Length [ft]	261.48	285.91	214.24	295.53	494.60	200.00	127.92	437.25	246.01	78.74	327.62	234.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	60.94	27.33	26.86	59.11	31.28	24.74	66.03	54.47	48.05	62.49	49.26	47.93
Movement LOS	E	C	C	E	C	C	E	D	D	E	D	D
d_A, Approach Delay [s/veh]	37.46			37.53			55.07			50.62		
Approach LOS	D			D			E			D		
d_I, Intersection Delay [s/veh]	43.63											
Intersection LOS	D											
Intersection V/C	0.684											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	88.0
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Base Volume Input [veh/h]	11	1786	0	0	360	15	25	0	26	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.40	2.00	2.00	2.50	2.00	4.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	1786	0	0	360	15	25	0	26	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	447	0	0	90	4	6	0	7	0	0	0
Total Analysis Volume [veh/h]	11	1786	0	0	360	15	25	0	26	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.02	0.00	0.00	0.00	0.00	0.21	0.00	0.03	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	8.04	0.00	0.00	0.00	0.00	0.00	40.60	87.95	14.69	0.00	0.00	0.00
Movement LOS	A	A			A	A	E	F	B			
95th-Percentile Queue Length [veh]	0.03	0.00	0.00	0.00	0.00	0.00	0.91	0.91	0.91	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.70	0.00	0.00	0.00	0.00	0.00	22.83	22.83	22.83	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.05			0.00			27.39			0.00		
Approach LOS	A			A			D			A		
d_I, Intersection Delay [s/veh]	0.67											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 71: Chilco Street/Terminal Avenue

Control Type:	All-way stop	Delay (sec / veh):	19.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street		Chilco Street		Terminal Avenue	
Approach	Eastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Chilco Street		Chilco Street		Terminal Avenue	
Base Volume Input [veh/h]	40	14	21	112	502	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	40	14	21	112	502	162
Peak Hour Factor	0.8440	0.8440	0.9240	0.9240	0.9430	0.9430
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	4	6	30	133	43
Total Analysis Volume [veh/h]	47	17	23	121	532	172
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.34	0.72	9.00
95th-Percentile Queue Length [ft]	8.49	17.96	224.99
Approach Delay [s/veh]	9.40	9.04	22.38
Approach LOS	A	A	C
Intersection Delay [s/veh]	19.37		
Intersection LOS	C		

Intersection Level Of Service Report
Intersection 74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	10.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.695

Intersection Setup

Name	University Avenue				O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue				O'Brien Drive	
Base Volume Input [veh/h]	11	1724	356	10	171	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	2.40	2.50	0.00	4.70	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	1724	356	10	171	77
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	454	94	3	45	20
Total Analysis Volume [veh/h]	12	1815	375	11	180	81
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	6		0		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	94.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Protected	Permissive
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	8	8	0	6	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	19	55	74	0	26	0
Vehicle Extension [s]	2.0	4.0	4.0	0.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	5	79	83	83	11	11
g / C, Green / Cycle	0.05	0.79	0.83	0.83	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.01	0.51	0.10	0.11	0.10	0.05
s, saturation flow rate [veh/h]	1659	3533	1854	1835	1728	1572
c, Capacity [veh/h]	89	2779	1535	1519	194	176
d1, Uniform Delay [s]	48.87	4.69	1.65	1.66	43.99	41.55
k, delay calibration	0.50	0.50	0.22	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.16	1.21	0.07	0.17	7.80	0.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

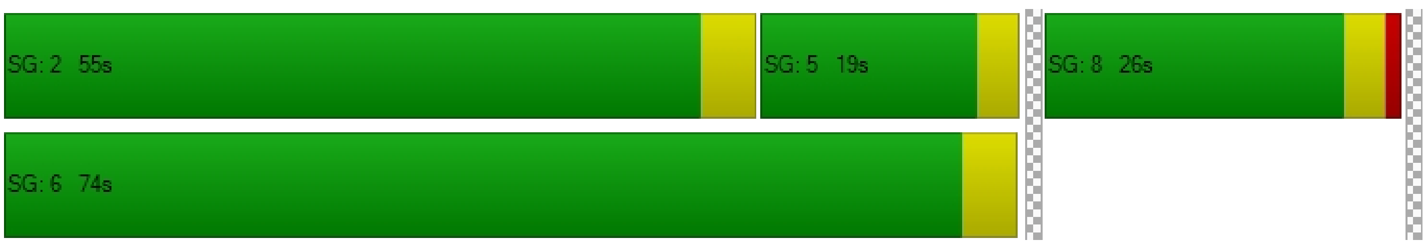
X, volume / capacity	0.14	0.65	0.13	0.13	0.93	0.46
d, Delay for Lane Group [s/veh]	52.03	5.90	1.73	1.83	51.80	42.25
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.38	6.61	0.49	0.54	4.79	1.89
50th-Percentile Queue Length [ft]	9.44	165.30	12.33	13.38	119.79	47.30
95th-Percentile Queue Length [veh]	0.68	10.83	0.89	0.96	8.38	3.41
95th-Percentile Queue Length [ft]	16.99	270.72	22.20	24.08	209.54	85.14

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.03	5.90	1.78	1.83	51.80	42.25
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	6.20		1.78		48.83	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	10.01					
Intersection LOS	B					
Intersection V/C	0.695					

Sequence

Ring 1	5	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 77: University Avenue/Donohoe Street

Control Type:	Signalized	Delay (sec / veh):	126.2
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.124

Intersection Setup

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	150.00	100.00	70.00	200.00	100.00	100.00	200.00	100.00	200.00	200.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	430	533	750	56	546	167	9	98	177	295	732	651
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	0.00	0.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	430	533	750	56	546	167	9	98	177	295	732	651
Peak Hour Factor	0.9390	0.9390	0.9390	0.8700	0.8700	0.8700	0.8660	0.8660	0.8660	0.9340	0.9340	0.9340
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	114	142	200	16	157	48	3	28	51	79	196	174
Total Analysis Volume [veh/h]	458	568	799	64	628	192	10	113	204	316	784	697
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			46			35			0		
Bicycle Volume [bicycles/h]	5			3			3			5		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	6	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	4	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	30	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	16	46	46	9	39	0	0	11	0	0	34	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	20	0	0	0	0	0	19	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No	No	No	No			No			No	
Maximum Recall	No	Yes	Yes	No	Yes			No			No	
Pedestrian Recall	No	No	No	No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	R	L	C	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	12	42	42	5	35	35	7	7	7	30	30	30	30
g / C, Green / Cycle	0.12	0.42	0.42	0.05	0.35	0.35	0.07	0.07	0.07	0.30	0.30	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.15	0.18	0.57	0.04	0.25	0.26	0.01	0.07	0.14	0.19	0.37	0.32	0.35
s, saturation flow rate [veh/h]	3101	3192	1404	1597	1710	1538	1597	1676	1422	1629	1676	1285	1281
c, Capacity [veh/h]	372	1342	590	79	599	538	112	117	100	489	503	385	384
d1, Uniform Delay [s]	44.00	20.44	28.98	47.04	28.15	28.38	43.52	46.37	46.50	30.40	35.00	35.00	35.00
k, delay calibration	0.13	0.50	0.50	0.16	0.50	0.50	0.11	0.30	0.50	0.19	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	110.21	0.98	170.15	24.39	7.09	8.48	0.34	55.68	505.11	2.54	122.9	66.40	96.83
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.23	0.42	1.35	0.81	0.71	0.73	0.09	0.96	2.05	0.65	1.24	1.07	1.16
d, Delay for Lane Group [s/veh]	154.21	21.42	199.14	71.43	35.24	36.86	43.86	102.05	551.61	32.94	157.9	101.4	131.8
Lane Group LOS	F	C	F	E	D	D	D	F	F	C	F	F	F
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	10.25	4.75	41.35	2.11	9.81	9.28	0.24	4.60	16.43	6.84	29.08	16.22	19.43
50th-Percentile Queue Length [ft]	256.34	118.73	1033.75	52.63	245.17	232.06	6.04	114.90	410.63	170.9	727.0	405.6	485.8
95th-Percentile Queue Length [veh]	16.78	8.32	62.54	3.79	14.94	14.28	0.43	8.11	27.12	11.13	42.91	23.82	29.07
95th-Percentile Queue Length [ft]	419.45	208.07	1563.55	94.74	373.57	356.98	10.87	202.79	678.00	278.1	1072.	595.4	726.7

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	154.21	21.42	199.14	71.43	35.76	36.86	43.86	102.05	551.61	32.94	146.32	123.42
Movement LOS	F	C	F	E	D	D	D	F	F	C	F	F
d_A, Approach Delay [s/veh]	132.55			38.58			380.73			116.50		
Approach LOS	F			D			F			F		
d_I, Intersection Delay [s/veh]	126.19											
Intersection LOS	F											
Intersection V/C	1.124											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	17.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.667

Intersection Setup

Name	Valparaiso Ave						University Drive (North)					
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

volumes

Name	Valparaiso Ave						University Drive (North)					
Base Volume Input [veh/h]	24	467	105	44	456	29	182	24	57	45	41	72
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.00	0.00	1.80	0.00	0.50	8.30	1.80	0.00	7.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	467	105	44	456	29	182	24	57	45	41	72
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	122	27	11	119	8	47	6	15	12	11	19
Total Analysis Volume [veh/h]	25	486	109	46	475	30	190	25	59	47	43	75
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			11		
Bicycle Volume [bicycles/h]	11			7			1			8		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	25	30	0	25	30	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	14	0	0	0	0	0	0	0	0	13	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	0.00	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	28	22	28	23	17	17	17
g / C, Green / Cycle	0.51	0.40	0.51	0.42	0.32	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.02	0.33	0.05	0.27	0.27	0.04	0.08
s, saturation flow rate [veh/h]	1013	1795	975	1844	1006	1335	1561
c, Capacity [veh/h]	524	726	455	771	433	155	498
d1, Uniform Delay [s]	7.81	14.44	9.06	12.69	19.07	27.02	13.65
k, delay calibration	0.23	0.26	0.11	0.23	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.08	5.41	0.10	2.02	1.53	1.09	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.82	0.10	0.65	0.63	0.30	0.24
d, Delay for Lane Group [s/veh]	7.89	19.86	9.16	14.71	20.60	28.11	13.89
Lane Group LOS	A	B	A	B	C	C	B
Critical Lane Group	No	Yes	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.12	6.36	0.21	4.40	3.20	0.63	1.01
50th-Percentile Queue Length [ft]	2.98	158.91	5.31	110.04	80.00	15.82	25.13
95th-Percentile Queue Length [veh]	0.21	10.49	0.38	7.84	5.76	1.14	1.81
95th-Percentile Queue Length [ft]	5.36	262.27	9.56	196.05	144.01	28.48	45.23

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.89	19.86	19.86	9.16	14.71	14.71	20.60	20.60	20.60	28.11	13.89	13.89
Movement LOS	A	B	B	A	B	B	C	C	C	C	B	B
d_A, Approach Delay [s/veh]		19.37			14.24			20.60			17.94	
Approach LOS		B			B			C			B	
d_I, Intersection Delay [s/veh]	17.68											
Intersection LOS	B											
Intersection V/C	0.667											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	16.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.692

Intersection Setup

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	209	3	108	19	3	66	18	794	93	69	1750	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.50	33.30	3.70	5.30	0.00	0.00	11.10	1.50	3.20	7.20	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	3	108	19	3	66	18	794	93	69	1750	16
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	1	28	5	1	17	5	205	24	18	451	4
Total Analysis Volume [veh/h]	215	3	111	20	3	68	19	819	96	71	1804	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			3		
Bicycle Volume [bicycles/h]	1			0			17			19		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	60.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	13	0	0	13	0	12	52	0	12	52	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	3.0	0.0	3.0	6.0	0.0	2.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	11	11	11	7	7	4	57	57	7	60	60
g / C, Green / Cycle	0.12	0.12	0.12	0.08	0.08	0.04	0.63	0.63	0.08	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.07	0.07	0.07	0.01	0.04	0.01	0.23	0.06	0.04	0.49	0.49
s, saturation flow rate [veh/h]	1801	1360	1524	1718	1625	1629	3564	1518	1688	1874	1867
c, Capacity [veh/h]	212	160	180	143	135	66	2259	962	129	1255	1250
d1, Uniform Delay [s]	37.73	37.73	37.89	38.38	39.67	42.06	7.86	6.46	40.21	9.58	9.61
k, delay calibration	0.11	0.11	0.13	0.11	0.11	0.11	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.52	3.32	4.08	0.44	3.11	2.38	0.45	0.21	1.37	3.68	3.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

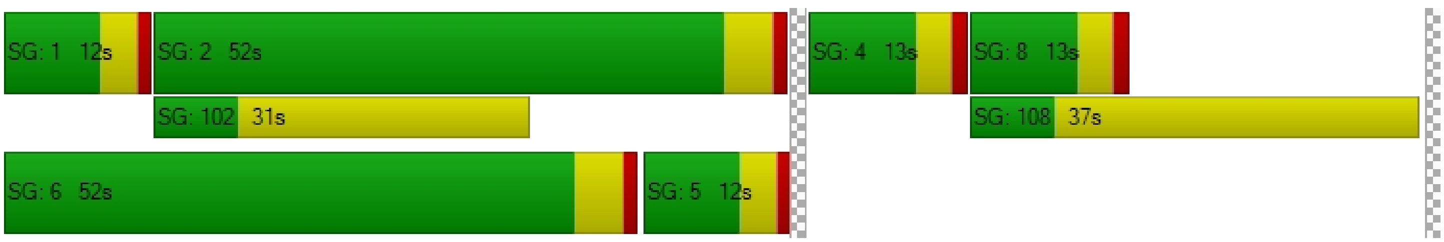
X, volume / capacity	0.58	0.58	0.62	0.14	0.52	0.29	0.36	0.10	0.55	0.73	0.73
d, Delay for Lane Group [s/veh]	40.25	41.06	41.97	38.82	42.78	44.44	8.31	6.67	41.58	13.26	13.35
Lane Group LOS	D	D	D	D	D	D	A	A	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	2.74	2.10	2.53	0.43	1.63	0.44	3.23	0.65	1.52	9.98	10.02
50th-Percentile Queue Length [ft]	68.51	52.61	63.23	10.71	40.63	11.04	80.74	16.26	37.94	249.41	250.42
95th-Percentile Queue Length [veh]	4.93	3.79	4.55	0.77	2.93	0.79	5.81	1.17	2.73	15.16	15.21
95th-Percentile Queue Length [ft]	123.32	94.71	113.82	19.28	73.14	19.87	145.33	29.27	68.29	378.91	380.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.59	41.06	41.97	38.82	42.78	42.78	44.44	8.31	6.67	41.58	13.30	13.35
Movement LOS	D	D	D	D	D	D	D	A	A	D	B	B
d_A, Approach Delay [s/veh]		41.06			41.91			8.88			14.37	
Approach LOS		D			D			A			B	
d_I, Intersection Delay [s/veh]	16.27											
Intersection LOS	B											
Intersection V/C	0.692											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	47.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	373	638	423	398	535	100
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.30	1.10	0.00	0.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	373	638	423	398	535	100
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	96	164	109	103	138	26
Total Analysis Volume [veh/h]	385	658	436	410	552	103
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	29		41		20	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal group	0	4	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	10	7	0	8	0
Maximum Green [s]	0	40	30	0	50	0
Amber [s]	0.0	3.6	3.1	0.0	3.9	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	61	44	0	33	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.6	2.1	0.0	2.9	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60	4.10	4.10	4.90	4.90
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60	2.10	2.10	2.90	2.90
g_i, Effective Green Time [s]	33	33	33	63	63	26	26
g / C, Green / Cycle	0.24	0.24	0.24	0.46	0.46	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.21	0.21	0.21	0.27	0.29	0.17	0.07
s, saturation flow rate [veh/h]	1629	1701	1556	1624	1392	3256	1392
c, Capacity [veh/h]	398	415	380	748	641	635	271
d1, Uniform Delay [s]	49.38	49.38	49.38	27.02	28.02	53.04	47.57
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.14	5.89	6.39	3.30	4.83	3.82	0.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.87	0.87	0.58	0.64	0.87	0.38
d, Delay for Lane Group [s/veh]	55.52	55.27	55.77	30.33	32.85	56.87	48.44
Lane Group LOS	E	E	E	C	C	E	D
Critical Lane Group	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	12.02	12.53	11.51	11.10	11.01	9.49	3.13
50th-Percentile Queue Length [ft]	300.61	313.23	287.80	277.45	275.31	237.24	78.23
95th-Percentile Queue Length [veh]	17.71	18.33	17.08	16.56	16.45	14.54	5.63
95th-Percentile Queue Length [ft]	442.78	458.35	426.91	414.04	411.36	363.54	140.81

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.50	55.52	30.33	32.85	56.87	48.44
Movement LOS	E	E	C	C	E	D
d_A, Approach Delay [s/veh]	55.51		31.55		55.54	
Approach LOS	E		C		E	
d_I, Intersection Delay [s/veh]	47.55					
Intersection LOS	D					
Intersection V/C	0.731					

Sequence

Ring 1	-	6	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 110: Marsh Road/101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	15.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.929

Intersection Setup

Name	Marsh Road		Marsh Road		101 NB Ramps	
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Marsh Road		Marsh Road		101 NB Ramps	
Base Volume Input [veh/h]	2255	0	0	567	544	239
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	0.00	0.00	3.00	5.10	12.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2255	0	0	567	544	239
Peak Hour Factor	0.9600	1.0000	1.0000	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	587	0	0	148	142	62
Total Analysis Volume [veh/h]	2349	0	0	591	567	249
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	1		2		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	76.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	60	0	0	60	20	8
Vehicle Extension [s]	3.0	0.0	0.0	3.0	2.0	2.0
Walk [s]	7	0	0	0	5	0
Pedestrian Clearance [s]	12	0	0	0	15	0
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	Yes			Yes	No	No
Maximum Recall	No			No	No	No
Pedestrian Recall	No			No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	59	59	17	78
g / C, Green / Cycle	0.73	0.73	0.22	0.97
(v / s)_i Volume / Saturation Flow Rate	0.68	0.17	0.17	0.17
s, saturation flow rate [veh/h]	3465	3512	3344	1441
c, Capacity [veh/h]	2545	2580	720	1365
d1, Uniform Delay [s]	8.74	3.38	29.60	0.13
k, delay calibration	0.50	0.50	0.04	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.04	0.21	0.74	0.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.23	0.79	0.18
d, Delay for Lane Group [s/veh]	15.77	3.59	30.34	0.43
Lane Group LOS	B	A	C	A
Critical Lane Group	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	13.50	1.15	5.03	0.11
50th-Percentile Queue Length [ft]	337.43	28.67	125.82	2.79
95th-Percentile Queue Length [veh]	19.52	2.06	8.71	0.20
95th-Percentile Queue Length [ft]	488.05	51.61	217.80	5.02

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.77	0.00	0.00	3.59	30.34	0.43
Movement LOS	B			A	C	A
d_A, Approach Delay [s/veh]	15.77		3.59		21.21	
Approach LOS	B		A		C	
d_I, Intersection Delay [s/veh]	15.04					
Intersection LOS	B					
Intersection V/C	0.929					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 111: University Avenue/Woodland Avenue

Control Type:	Signalized	Delay (sec / veh):	71.2
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.841

Intersection Setup

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	1	0	0	0
Pocket Length [ft]	170.00	100.00	100.00	220.00	100.00	100.00	100.00	100.00	40.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Base Volume Input [veh/h]	28	834	18	209	604	317	13	73	318	439	92	49
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	834	18	209	604	317	13	73	318	439	92	49
Peak Hour Factor	0.9240	0.9240	0.9240	0.9580	0.9580	0.9580	0.8710	0.8710	0.8710	0.8480	0.8480	0.8480
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	226	5	55	158	83	4	21	91	129	27	14
Total Analysis Volume [veh/h]	30	903	19	218	630	331	15	84	365	518	108	58
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	58			0			6			37		
Bicycle Volume [bicycles/h]	10			7			4			6		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	7	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	32	0	21	43	0	0	20	0	0	27	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	15	0	0	0	0	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	2	33	33	15	46	46	16	16	19	19
g / C, Green / Cycle	0.02	0.33	0.33	0.15	0.46	0.46	0.16	0.16	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.02	0.28	0.28	0.14	0.20	0.25	0.06	0.26	0.17	0.11
s, saturation flow rate [veh/h]	1597	1676	1661	1597	3192	1333	1664	1400	3101	1510
c, Capacity [veh/h]	38	558	553	246	1479	618	266	224	598	291
d1, Uniform Delay [s]	48.56	30.72	30.74	41.43	17.94	19.15	37.51	42.00	39.11	36.60
k, delay calibration	0.04	0.50	0.50	0.24	0.50	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.62	13.29	13.52	19.79	0.90	3.31	0.86	302.73	3.96	1.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

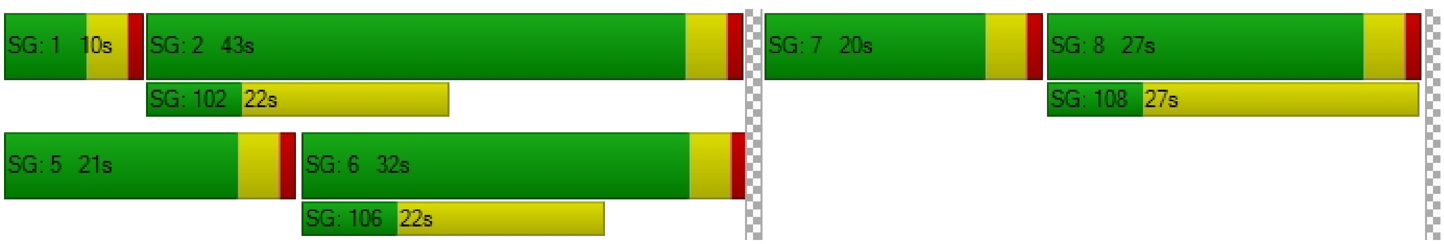
X, volume / capacity	0.79	0.83	0.83	0.89	0.43	0.54	0.37	1.63	0.87	0.57
d, Delay for Lane Group [s/veh]	61.18	44.01	44.26	61.23	18.84	22.46	38.37	344.73	43.07	38.36
Lane Group LOS	E	D	D	E	B	C	D	F	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.87	12.05	12.00	6.56	4.89	5.85	2.22	24.29	6.41	3.79
50th-Percentile Queue Length [ft]	21.86	301.24	300.02	163.95	122.34	146.28	55.41	607.24	160.15	94.69
95th-Percentile Queue Length [veh]	1.57	17.74	17.68	10.76	8.52	9.82	3.99	38.79	10.56	6.82
95th-Percentile Queue Length [ft]	39.35	443.56	442.06	268.94	213.03	245.45	99.73	969.77	263.93	170.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.18	44.13	44.26	61.23	18.84	22.46	38.37	38.37	344.73	43.07	38.36	38.36
Movement LOS	E	D	D	E	B	C	D	D	F	D	D	D
d_A, Approach Delay [s/veh]	44.67			27.69			279.37			41.93		
Approach LOS	D			C			F			D		
d_I, Intersection Delay [s/veh]	71.20											
Intersection LOS	E											
Intersection V/C	0.841											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 131: Chilco Street/Hamilton Avenue

Control Type:	All-way stop	Delay (sec / veh):	16.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	✛			✛			✛			✛		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	19	63	18	71	407	36	21	124	21	7	16	47
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	19	63	18	71	407	36	21	124	21	7	16	47
Peak Hour Factor	0.9260	0.9260	0.9260	0.9240	0.9240	0.9240	0.8830	0.8830	0.8830	0.9210	0.9210	0.9210
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	17	5	19	110	10	6	35	6	2	4	13
Total Analysis Volume [veh/h]	21	68	19	77	440	39	24	140	24	8	17	51
Pedestrian Volume [ped/h]	3			4			2			5		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.58	6.98	1.25	0.40
95th-Percentile Queue Length [ft]	14.48	174.47	31.29	10.07
Approach Delay [s/veh]	9.49	21.09	11.15	9.39
Approach LOS	A	C	B	A
Intersection Delay [s/veh]	16.77			
Intersection LOS	C			

Intersection Level Of Service Report
Intersection 132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	8.6
Analysis Method:	HCM 2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.564

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	912	1585	100	29	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.10	0.80	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	912	1585	100	29	88
Peak Hour Factor	1.0000	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	235	409	26	7	23
Total Analysis Volume [veh/h]	0	940	1634	103	30	91
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23		0		2	
Bicycle Volume [bicycles/h]	16		34		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	89
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal group	0	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	4	0
Maximum Green [s]	0	64	64	0	32	0
Amber [s]	0.0	3.6	3.6	0.0	3.1	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	66	66	0	23	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.6	0.6	0.0	2.1	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.60	2.60	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.60	0.60	2.10	2.10
g_i, Effective Green Time [s]	63	63	19	19
g / C, Green / Cycle	0.71	0.71	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.26	0.49	0.02	0.06
Total Saturation Flow Adjustment	0.94	0.94	0.95	0.85
s, saturation flow rate [veh/h]	3578	3557	1805	1615
c, Capacity [veh/h]	2549	2534	383	343
d1, Uniform Delay [s]	4.99	7.20	28.07	29.26
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.41	1.53	0.40	1.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.37	0.69	0.08	0.27
d, Delay for Lane Group [s/veh]	5.41	8.73	28.47	31.14
Lane Group LOS	A	A	C	C
Critical Lane Group	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	5.57	15.54	0.64	2.07
50th-Percentile Queue Length [ft]	139.19	388.50	16.08	51.75
95th-Percentile Queue Length [veh]	10.74	25.56	1.59	4.68
95th-Percentile Queue Length [ft]	268.41	638.97	39.86	117.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	5.41	8.73	8.73	28.47	31.14
Movement LOS		A	A	A	C	C
d_A, Approach Delay [s/veh]	5.41		8.73		30.48	
Approach LOS	A		A		C	
d_I, Intersection Delay [s/veh]	8.55					
Intersection LOS	A					
Intersection V/C	0.564					

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	32.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	11.337

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	108	0	113	90	0	103	65	945	6	28	1307	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.60	0.00	2.70	2.20	0.00	1.90	3.10	0.50	0.00	14.30	0.50	5.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	0	113	90	0	103	65	945	6	28	1307	20
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	0	30	24	0	27	17	251	2	7	348	5
Total Analysis Volume [veh/h]	115	0	120	96	0	110	69	1005	6	30	1390	21
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			16			3			0		
Bicycle Volume [bicycles/h]	12			0			22			22		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	20.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	12	0	0	12	0	4	10	0	6	10	0
Maximum Green [s]	0	25	0	0	25	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	29	0	0	29	0	14	47	0	14	47	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	27	27	27	27	7	52	52	5	51	51
g / C, Green / Cycle	0.30	0.30	0.30	0.30	0.07	0.58	0.58	0.06	0.56	0.56
(v / s)_i Volume / Saturation Flow Rate	10.92	0.08	10.11	0.07	0.04	0.27	0.27	0.02	0.37	0.38
s, saturation flow rate [veh/h]	11	1540	9	1580	1755	1891	1886	1583	1891	1877
c, Capacity [veh/h]	83	460	83	472	128	1090	1087	92	1063	1055
d1, Uniform Delay [s]	45.02	24.02	45.02	23.81	40.30	11.02	11.02	40.71	13.79	13.82
k, delay calibration	0.50	0.11	0.50	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	231.12	0.30	148.30	0.25	3.52	1.42	1.43	2.02	3.30	3.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

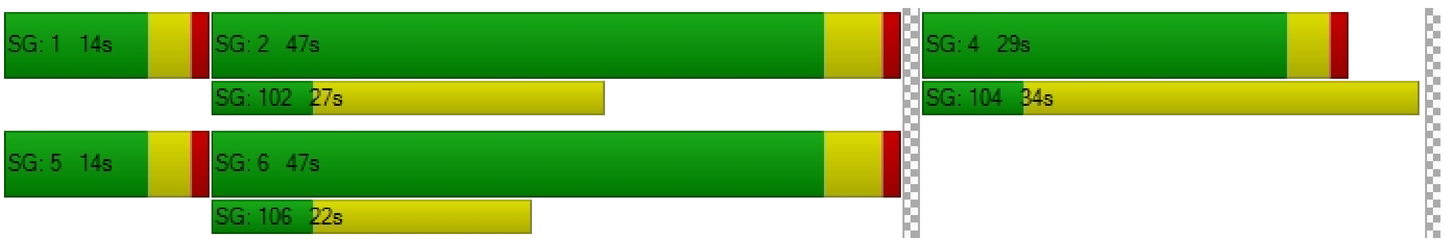
X, volume / capacity	1.38	0.26	1.16	0.23	0.54	0.46	0.46	0.33	0.67	0.67
d, Delay for Lane Group [s/veh]	276.14	24.32	193.32	24.06	43.82	12.44	12.45	42.73	17.09	17.17
Lane Group LOS	F	C	F	C	D	B	B	D	B	B
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	7.19	1.97	5.26	1.79	1.55	5.45	5.44	0.68	10.09	10.08
50th-Percentile Queue Length [ft]	179.80	49.32	131.52	44.76	38.78	136.16	135.93	17.10	252.34	252.04
95th-Percentile Queue Length [veh]	12.95	3.55	9.47	3.22	2.79	9.27	9.26	1.23	15.30	15.29
95th-Percentile Queue Length [ft]	323.64	88.77	236.73	80.56	69.80	231.84	231.54	30.79	382.60	382.22

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	276.14	276.14	24.32	193.32	193.32	24.06	43.82	12.45	12.45	42.73	17.13	17.17
Movement LOS	F	F	C	F	F	C	D	B	B	D	B	B
d_A, Approach Delay [s/veh]	147.55			102.94			14.45			17.66		
Approach LOS	F			F			B			B		
d_I, Intersection Delay [s/veh]	32.73											
Intersection LOS	C											
Intersection V/C	11.337											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	5.7
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.487

Intersection Setup

Name	Branner Drive						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Branner Drive						Sand Hill Road					
Base Volume Input [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	5.00	0.00	2.30	4.50	1.10	0.00	5.90	2.00	4.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	4	5	0	11	6	280	2	4	344	6
Total Analysis Volume [veh/h]	2	0	18	21	0	45	23	1121	7	18	1376	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			0			5		
Bicycle Volume [bicycles/h]	2			0			35			15		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	58.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	15	0	0	15	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	20	0	0	20	0	12	58	0	12	58	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	2.9	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	9	9	4	71	71	4	71	71
g / C, Green / Cycle	0.10	0.10	0.04	0.79	0.79	0.04	0.79	0.79
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.01	0.30	0.30	0.01	0.38	0.38
s, saturation flow rate [veh/h]	1579	1594	1732	1879	1874	1709	1863	1849
c, Capacity [veh/h]	205	215	75	1487	1483	68	1468	1457
d1, Uniform Delay [s]	36.76	37.77	41.76	2.80	2.80	41.93	3.24	3.25
k, delay calibration	0.10	0.10	0.04	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.20	0.76	0.85	0.74	0.74	0.76	1.12	1.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

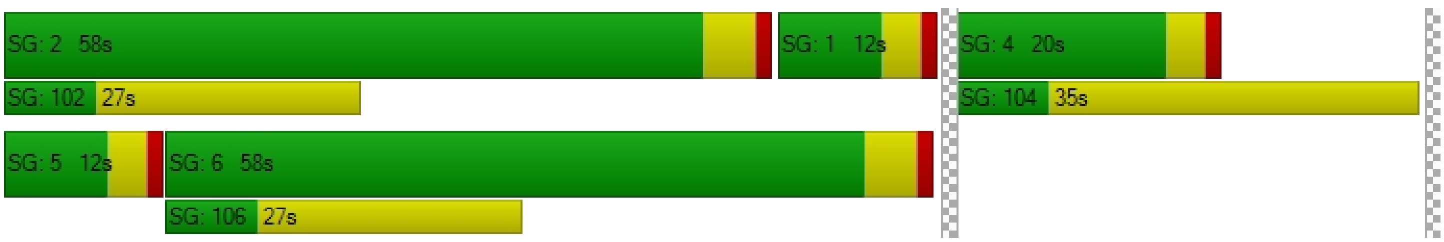
X, volume / capacity	0.10	0.31	0.31	0.38	0.38	0.26	0.48	0.48
d, Delay for Lane Group [s/veh]	36.96	38.53	42.61	3.54	3.54	42.68	4.36	4.38
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.41	1.41	0.50	1.80	1.80	0.39	2.64	2.63
50th-Percentile Queue Length [ft]	10.31	35.13	12.45	44.98	44.92	9.77	65.91	65.78
95th-Percentile Queue Length [veh]	0.74	2.53	0.90	3.24	3.23	0.70	4.75	4.74
95th-Percentile Queue Length [ft]	18.55	63.24	22.41	80.96	80.86	17.58	118.65	118.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.96	36.96	36.96	38.53	38.53	38.53	42.61	3.54	3.54	42.68	4.37	4.38
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	36.96			38.53			4.32			4.86		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.70											
Intersection LOS	A											
Intersection V/C	0.487											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	33.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.887

Intersection Setup

Name				Sand Hill Road						Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name				Sand Hill Road						Sharon Park Drive		
Base Volume Input [veh/h]	164	916	1	16	1220	252	12	6	17	178	3	172
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.60	1.30	100.00	0.00	1.10	0.80	0.00	0.00	17.60	0.00	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	916	1	16	1220	252	12	6	17	178	3	172
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	241	0	4	321	66	3	2	4	47	1	45
Total Analysis Volume [veh/h]	173	964	1	17	1284	265	13	6	18	187	3	181
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			6			10		
Bicycle Volume [bicycles/h]	32			32			2			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	69.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	6	10	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	16	41	0	14	39	0	0	35	0	0	35	0
Vehicle Extension [s]	3.0	7.0	0.0	3.0	7.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.50	2.50	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.50	0.50	0.00	0.00	0.00
g_i, Effective Green Time [s]	12	49	49	4	41	41	30	30	30
g / C, Green / Cycle	0.14	0.55	0.55	0.05	0.45	0.45	0.34	0.34	0.34
(v / s)_i Volume / Saturation Flow Rate	0.10	0.26	0.26	0.01	0.42	0.44	0.07	0.25	0.11
s, saturation flow rate [veh/h]	1799	1876	1875	1810	1879	1730	500	751	1581
c, Capacity [veh/h]	244	1029	1029	82	851	783	224	334	536
d1, Uniform Delay [s]	37.19	12.34	12.34	41.40	23.23	24.02	22.63	27.29	22.18
k, delay calibration	0.28	0.50	0.50	0.11	0.50	0.50	0.11	0.29	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.43	1.53	1.54	1.24	17.57	25.61	0.34	4.06	0.37
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

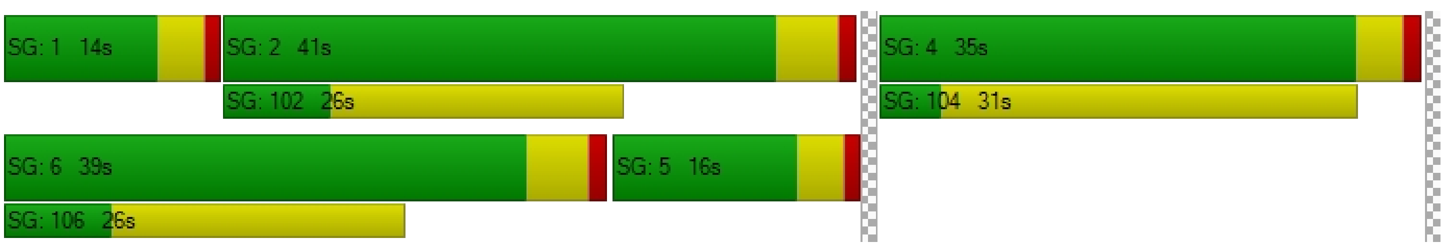
X, volume / capacity	0.71	0.47	0.47	0.21	0.93	0.97	0.17	0.57	0.34
d, Delay for Lane Group [s/veh]	46.62	13.87	13.87	42.64	40.80	49.63	22.97	31.35	22.55
Lane Group LOS	D	B	B	D	D	D	C	C	C
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	4.14	5.59	5.58	0.38	18.50	19.86	0.55	4.04	2.89
50th-Percentile Queue Length [ft]	103.40	139.63	139.59	9.61	462.58	496.50	13.66	101.11	72.32
95th-Percentile Queue Length [veh]	7.45	9.46	9.46	0.69	25.56	27.17	0.98	7.28	5.21
95th-Percentile Queue Length [ft]	186.13	236.52	236.47	17.30	638.94	679.21	24.58	182.00	130.17

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	46.62	13.87	13.87	42.64	44.21	49.63	22.97	22.97	22.97	31.35	31.35	22.55
Movement LOS	D	B	B	D	D	D	C	C	C	C	C	C
d_A, Approach Delay [s/veh]		18.85			45.11			22.97			27.06	
Approach LOS		B			D			C			C	
d_I, Intersection Delay [s/veh]	33.09											
Intersection LOS	C											
Intersection V/C	0.887											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	43.8
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.785

Intersection Setup

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Base Volume Input [veh/h]	125	31	2131	16	25	3	8	477	136	1287	63	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	19.20	0.00	2.90	0.00	0.00	0.00	0.00	0.40	2.20	2.90	14.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	31	2131	16	25	3	8	477	136	1287	63	13
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	8	555	4	7	1	2	124	35	335	16	3
Total Analysis Volume [veh/h]	130	32	2220	17	26	3	8	497	142	1341	66	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			2			0			0		
Bicycle Volume [bicycles/h]	0			2			0			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	200
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	55.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	3	3	6	4	6	4	1	4	8	2	8
Auxiliary Signal Groups			2,3									
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	6	6	0	4	0	4	12	4	0	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	4.7	3.6	3.6	0.0	3.6	0.0	3.6	3.6	3.6	0.0	4.7	0.0
All red [s]	1.0	1.0	1.0	0.0	0.5	0.0	0.5	0.0	0.5	0.0	1.0	0.0
Split [s]	99	35	35	0	31	0	31	35	31	0	99	0
Vehicle Extension [s]	4.5	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	4.5	0.0
Walk [s]	5	0	0	0	5	0	5	5	5	0	5	0
Pedestrian Clearance [s]	16	0	0	0	22	0	22	26	22	0	16	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No		No			No			Yes	
Maximum Recall		No	No		No			No			No	
Pedestrian Recall		No	No		No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	35	165	8	8	31	31	31	118	118
g / C, Green / Cycle	0.17	0.82	0.04	0.04	0.16	0.16	0.16	0.59	0.59
(v / s)_i Volume / Saturation Flow Rate	0.09	0.80	0.02	0.01	0.14	0.14	0.09	0.26	0.05
s, saturation flow rate [veh/h]	1827	2778	1268	1683	1890	1722	1580	5123	1605
c, Capacity [veh/h]	318	2236	81	65	296	270	247	3025	948
d1, Uniform Delay [s]	74.81	18.94	94.66	93.76	82.71	82.70	78.16	22.72	17.65
k, delay calibration	0.09	0.50	0.04	0.04	0.40	0.40	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.03	17.40	0.64	1.32	26.30	28.13	2.07	0.47	0.18
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.51	0.99	0.27	0.38	0.89	0.89	0.57	0.44	0.08
d, Delay for Lane Group [s/veh]	75.84	36.34	95.30	95.09	109.01	110.83	80.23	23.19	17.83
Lane Group LOS	E	D	F	F	F	F	F	C	B
Critical Lane Group	No	Yes	Yes	No	Yes	No	No	No	No
50th-Percentile Queue Length [veh]	7.74	49.35	1.13	1.28	15.67	14.41	7.00	12.15	1.72
50th-Percentile Queue Length [ft]	193.41	1233.80	28.17	31.93	391.72	360.36	175.07	303.70	42.92
95th-Percentile Queue Length [veh]	12.30	60.87	2.03	2.30	22.16	20.64	11.34	17.86	3.09
95th-Percentile Queue Length [ft]	307.45	1521.82	50.71	57.48	554.01	516.02	283.57	446.60	77.26

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	75.84	75.84	36.34	95.30	95.12	95.09	109.01	109.89	80.23	23.19	17.83	17.83
Movement LOS	E	E	D	F	F	F	F	F	F	C	B	B
d_A, Approach Delay [s/veh]	39.03			95.19			103.37			22.89		
Approach LOS	D			F			F			C		
d_I, Intersection Delay [s/veh]	43.76											
Intersection LOS	D											
Intersection V/C	0.785											

Sequence

Ring 1	-	2	1	3	4	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	7.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name	Santa Cruz Avenue				Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Santa Cruz Avenue				Elder Ave	
Base Volume Input [veh/h]	61	669	641	79	46	41
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	61	669	641	79	46	41
Peak Hour Factor	0.9400	0.9400	0.9400	0.9400	0.9400	0.9400
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	178	170	21	12	11
Total Analysis Volume [veh/h]	65	712	682	84	49	44
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		2		12	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	4	10	10	0	4	0
Maximum Green [s]	20	60	40	0	20	0
Amber [s]	3.1	3.5	3.5	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	4.0	4.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	13	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.5	2.5	0.0	2.1	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.50	4.50	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.50	2.50	2.10	2.10
g_i, Effective Green Time [s]	2	25	19	2	2
g / C, Green / Cycle	0.05	0.70	0.53	0.07	0.07
(v / s)_i Volume / Saturation Flow Rate	0.04	0.38	0.41	0.03	0.03
s, saturation flow rate [veh/h]	1810	1872	1858	1810	1615
c, Capacity [veh/h]	97	1302	983	123	110
d1, Uniform Delay [s]	16.89	2.72	6.86	16.24	16.25
k, delay calibration	0.11	0.15	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.62	0.51	1.95	2.08	2.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

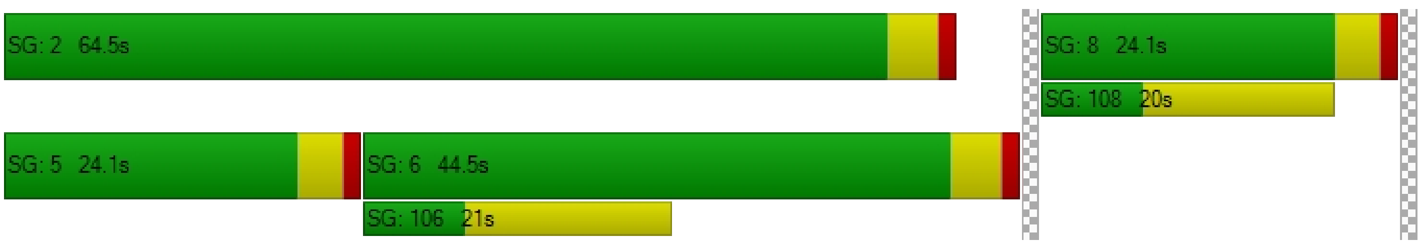
X, volume / capacity	0.67	0.55	0.78	0.40	0.40
d, Delay for Lane Group [s/veh]	24.51	3.23	8.81	18.33	18.60
Lane Group LOS	C	A	A	B	B
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.67	0.66	2.96	0.40	0.37
50th-Percentile Queue Length [ft]	16.75	16.47	74.10	9.97	9.15
95th-Percentile Queue Length [veh]	1.21	1.19	5.33	0.72	0.66
95th-Percentile Queue Length [ft]	30.14	29.65	133.37	17.95	16.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.51	3.23	8.81	8.81	18.33	18.60
Movement LOS	C	A	A	A	B	B
d_A, Approach Delay [s/veh]	5.01		8.81		18.46	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.56					
Intersection LOS	A					
Intersection V/C	0.610					

Sequence

Ring 1	-	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	11.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.820

Intersection Setup

Name	Chilco Street				Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	1
Pocket Length [ft]	80.00	100.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Chilco Street				Bayfront Expy	
Base Volume Input [veh/h]	201	196	19	767	2416	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.50	3.10	21.10	4.80	3.10	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	201	196	19	767	2416	156
Peak Hour Factor	0.9300	0.9300	0.9300	0.9300	0.9300	0.9300
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	54	53	5	206	649	42
Total Analysis Volume [veh/h]	216	211	20	825	2598	168
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	5		1		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	4	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	Lead	-	-	-
Minimum Green [s]	10	0	4	10	10	0
Maximum Green [s]	36	0	20	50	50	0
Amber [s]	3.0	0.0	3.0	5.0	5.0	0.0
All red [s]	0.5	0.0	0.0	0.5	0.5	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	2.0	0.0	2.0	3.0	3.0	0.0
Walk [s]	5	0	0	0	0	0
Pedestrian Clearance [s]	38	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	1.0	3.5	3.5	0.0
Minimum Recall	No		No	Yes	Yes	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	3.00	5.50	5.50	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	1.00	3.50	3.50	3.50
g_i, Effective Green Time [s]	11	11	1	30	26	26
g / C, Green / Cycle	0.24	0.24	0.02	0.62	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.13	0.14	0.01	0.17	0.52	0.11
s, saturation flow rate [veh/h]	1715	1540	1494	4939	5020	1561
c, Capacity [veh/h]	404	363	30	3065	2706	842
d1, Uniform Delay [s]	16.26	16.47	23.68	4.20	10.70	5.79
k, delay calibration	0.04	0.04	0.04	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.41	0.55	9.65	0.05	2.96	0.12
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

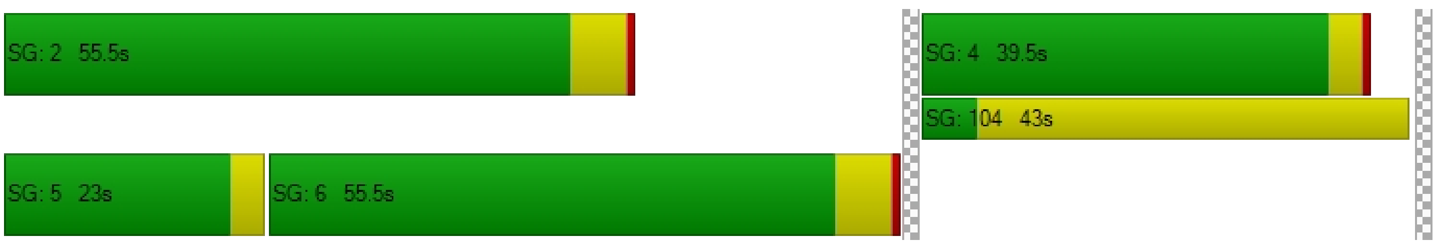
X, volume / capacity	0.53	0.58	0.68	0.27	0.96	0.20
d, Delay for Lane Group [s/veh]	16.67	17.02	33.33	4.25	13.67	5.90
Lane Group LOS	B	B	C	A	B	A
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.88	1.87	0.29	0.75	6.73	0.65
50th-Percentile Queue Length [ft]	46.96	46.72	7.21	18.79	168.21	16.37
95th-Percentile Queue Length [veh]	3.38	3.36	0.52	1.35	10.98	1.18
95th-Percentile Queue Length [ft]	84.54	84.09	12.98	33.83	274.56	29.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	16.67	17.02	33.33	4.25	13.67	5.90
Movement LOS	B	B	C	A	B	A
d_A, Approach Delay [s/veh]	16.84		4.94		13.19	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	11.85					
Intersection LOS	B					
Intersection V/C	0.820					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	30.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.011

Intersection Setup

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	1	0
Pocket Length [ft]	140.00	100.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	382	43	2516	107	5	978
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.80	0.00	2.80	0.90	0.00	4.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	382	43	2516	107	5	978
Peak Hour Factor	0.9700	0.9700	0.9700	0.9700	0.9700	0.9700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	98	11	648	28	1	252
Total Analysis Volume [veh/h]	394	44	2594	110	5	1008
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		2		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	0	10	0	7	10
Maximum Green [s]	41	0	40	0	21	40
Amber [s]	3.0	0.0	5.0	0.0	3.0	5.0
All red [s]	0.5	0.0	0.5	0.0	0.0	0.5
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	2.0	3.0
Walk [s]	5	0	0	0	0	0
Pedestrian Clearance [s]	35	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	3.5	0.0	1.0	3.5
Minimum Recall	No		Yes		No	Yes
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	5.50	5.50	3.00	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	3.50	3.50	1.00	3.50
g_i, Effective Green Time [s]	5	5	18	18	0	22
g / C, Green / Cycle	0.15	0.15	0.55	0.55	0.01	0.65
(v / s)_i Volume / Saturation Flow Rate	0.22	0.03	0.52	0.07	0.00	0.20
s, saturation flow rate [veh/h]	1778	1615	5035	1566	1810	4934
c, Capacity [veh/h]	260	236	2753	857	17	3186
d1, Uniform Delay [s]	14.36	12.60	7.12	3.71	16.54	2.65
k, delay calibration	0.11	0.11	0.11	0.11	0.04	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	236.53	0.38	2.13	0.07	3.29	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

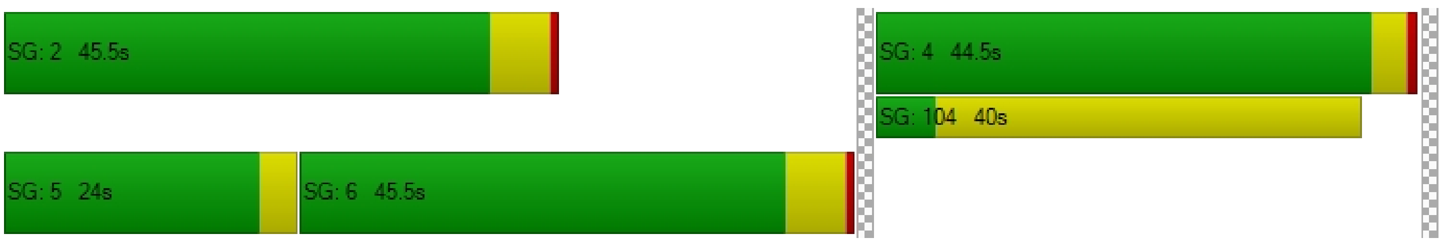
X, volume / capacity	1.52	0.19	0.94	0.13	0.29	0.32
d, Delay for Lane Group [s/veh]	250.89	12.98	9.25	3.78	19.83	2.71
Lane Group LOS	F	B	A	A	B	A
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	18.69	0.26	1.71	0.09	0.04	0.02
50th-Percentile Queue Length [ft]	467.15	6.60	42.77	2.33	1.11	0.42
95th-Percentile Queue Length [veh]	30.08	0.48	3.08	0.17	0.08	0.03
95th-Percentile Queue Length [ft]	751.92	11.88	76.99	4.20	1.99	0.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	250.89	12.98	9.25	3.78	19.83	2.71
Movement LOS	F	B	A	A	B	A
d_A, Approach Delay [s/veh]	226.99		9.03		2.79	
Approach LOS	F		A		A	
d_I, Intersection Delay [s/veh]	30.49					
Intersection LOS	C					
Intersection V/C	1.011					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 204: Chilco Street/Newbridge Street

Control Type:	All-way stop	Delay (sec / veh):	10.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Peak Hour Factor	0.6880	0.6880	0.6880	0.8530	0.8530	0.8530	0.8300	0.8300	0.8300	0.7360	0.7360	0.7360
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	2	2	49	5	4	2	42	1	4	45	22
Total Analysis Volume [veh/h]	1	7	7	197	19	16	6	167	2	16	181	87
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.07	1.47	0.94	1.70
95th-Percentile Queue Length [ft]	1.65	36.85	23.58	42.60
Approach Delay [s/veh]	8.28	10.80	9.55	10.38
Approach LOS	A	B	A	B
Intersection Delay [s/veh]	10.27			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 206: Chilco Street/Ivy Drive

Control Type:	All-way stop	Delay (sec / veh):	12.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Ivy Drive			Ivy Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Ivy Drive			Ivy Drive		
Base Volume Input [veh/h]	27	62	11	192	218	14	4	16	12	10	18	53
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	62	11	192	218	14	4	16	12	10	18	53
Peak Hour Factor	0.7140	0.7140	0.7140	0.9140	0.9140	0.9140	0.7270	0.7270	0.7270	0.8380	0.8380	0.8380
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	22	4	53	60	4	1	6	4	3	5	16
Total Analysis Volume [veh/h]	38	87	15	210	239	15	6	22	17	12	21	63
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.69	3.90	0.21	0.47
95th-Percentile Queue Length [ft]	17.24	97.43	5.33	11.63
Approach Delay [s/veh]	8.96	13.83	8.70	8.85
Approach LOS	A	B	A	A
Intersection Delay [s/veh]	11.96			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	23.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name	Terminal Avenue			Chilco Street			Constitution Drive					
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Terminal Avenue			Chilco Street			Constitution Drive					
Base Volume Input [veh/h]	14	136	5	17	160	2	28	2	114	158	10	398
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	21.40	1.50	20.00	11.80	3.80	0.00	3.60	50.00	2.60	2.50	50.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	136	5	17	160	2	28	2	114	158	10	398
Peak Hour Factor	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100	0.9100
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	37	1	5	44	1	8	1	31	43	3	109
Total Analysis Volume [veh/h]	15	149	5	19	176	2	31	2	125	174	11	437
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.30	1.60	1.01	10.83
95th-Percentile Queue Length [ft]	32.45	40.02	25.16	270.68
Approach Delay [s/veh]	12.44	13.06	10.76	33.32
Approach LOS	B	B	B	D
Intersection Delay [s/veh]	23.65			
Intersection LOS	C			

Intersection Level Of Service Report
Intersection 209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	15.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.037

Intersection Setup

Name							Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name							Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	11	0	4	2	481	3	2	24	1	13	0	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.70	0.00	0.00	16.70	0.00	7.70	0.00	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	4	2	481	3	2	24	1	13	0	56
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	1	137	1	1	7	0	4	0	16
Total Analysis Volume [veh/h]	13	0	5	2	547	3	2	27	1	15	0	64
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.04	0.00	0.12
d_M, Delay for Movement [s/veh]	15.49	13.85	8.77	7.25	0.00	0.00	8.50	0.00	0.00	15.13	14.84	13.19
Movement LOS	C	B	A	A	A	A	A	A	A	C	B	B
95th-Percentile Queue Length [veh]	0.13	0.13	0.13	1.56	1.56	1.56	0.09	0.09	0.09	0.56	0.56	0.56
95th-Percentile Queue Length [ft]	3.23	3.23	3.23	39.09	39.09	39.09	2.25	2.25	2.25	13.95	13.95	13.95
d_A, Approach Delay [s/veh]	13.62			0.03			0.57			13.56		
Approach LOS	B			A			A			B		
d_I, Intersection Delay [s/veh]	1.99											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.0
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Chrysler Drive									Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive									Independence Drive		
Base Volume Input [veh/h]	0	101	0	1	2	3	0	0	15	35	3	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	5.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	101	0	1	2	3	0	0	15	35	3	6
Peak Hour Factor	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600	0.8600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	29	0	0	1	1	0	0	4	10	1	2
Total Analysis Volume [veh/h]	0	117	0	1	2	3	0	0	17	41	3	7
Pedestrian Volume [ped/h]	0			0			5			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05	0.00	0.01
d_M, Delay for Movement [s/veh]	7.21	0.00	0.00	8.52	0.00	0.00	9.40	9.80	8.94	9.68	10.00	8.59
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.02	0.02	0.02	0.06	0.06	0.06	0.19	0.19	0.19
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	0.44	0.44	0.44	1.40	1.40	1.40	4.83	4.83	4.83
d_A, Approach Delay [s/veh]	0.00			1.42			8.94			9.55		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	3.39											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.002

Intersection Setup

Name	Chrysler Drive				Jefferson Drive	
Approach	Southbound		Northeastbound		Northwestbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chrysler Drive				Jefferson Drive	
Base Volume Input [veh/h]	9	7	132	7	2	134
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	22.20	42.90	0.80	71.40	0.00	2.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	9	7	132	7	2	134
Peak Hour Factor	0.8700	0.8700	0.8700	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	2	38	2	1	39
Total Analysis Volume [veh/h]	10	8	152	8	2	154
Pedestrian Volume [ped/h]	1		0		1	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.17
d_M, Delay for Movement [s/veh]	7.78	0.00	0.00	0.00	10.36	9.94
Movement LOS	A	A	A	A	B	A
95th-Percentile Queue Length [veh]	0.04	0.04	0.00	0.00	0.64	0.64
95th-Percentile Queue Length [ft]	1.05	1.05	0.00	0.00	15.96	15.96
d_A, Approach Delay [s/veh]	4.32		0.00		9.94	
Approach LOS	A		A		A	
d_I, Intersection Delay [s/veh]	4.88					
Intersection LOS	B					

Intersection Level Of Service Report

Intersection 215: Chrysler Dr/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	14.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chrysler Drive						Constitution Drive					
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive						Constitution Drive					
Base Volume Input [veh/h]	190	6	1	66	285	9	2	2	78	1	234	14
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	0.00	100.00	1.50	1.80	11.10	50.00	50.00	5.10	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	190	6	1	66	285	9	2	2	78	1	234	14
Peak Hour Factor	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	53	2	0	18	79	3	1	1	22	0	65	4
Total Analysis Volume [veh/h]	211	7	1	73	317	10	2	2	87	1	260	16
Pedestrian Volume [ped/h]	2			0			2			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.70	4.32	0.50	2.25
95th-Percentile Queue Length [ft]	42.53	107.97	12.58	56.34
Approach Delay [s/veh]	12.62	17.35	9.68	13.19
Approach LOS	B	C	A	B
Intersection Delay [s/veh]	14.42			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 233: Sand Hill Circle/Sand Hill Road

Control Type:	Signalized	Delay (sec / veh):	74.0
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.165

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Base Volume Input [veh/h]	2	52	0	0	98	239	0	0	0	8	2362	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.70	2.00	2.00	5.70	1.10	2.00	2.00	2.00	0.00	0.90	11.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	52	0	0	98	239	0	0	0	8	2362	7
Peak Hour Factor	0.8900	0.8900	1.0000	1.0000	0.8900	0.8900	1.0000	1.0000	1.0000	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	0	0	28	67	0	0	0	2	663	2
Total Analysis Volume [veh/h]	2	58	0	0	110	269	0	0	0	9	2654	8
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	2			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Split	Split	Split
Signal group	1	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	55	0	0	55	0	0	0	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	55	0	0	55	0	0	0	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	14	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No						No	
Maximum Recall		No			No						Yes	
Pedestrian Recall		No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R		C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		0.00	0.00
g_i, Effective Green Time [s]	14	14	14		33	33
g / C, Green / Cycle	0.28	0.28	0.28		0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.17		0.74	0.74
s, saturation flow rate [veh/h]	1789	1798	1577		1882	1712
c, Capacity [veh/h]	557	484	425		1224	1113
d1, Uniform Delay [s]	13.78	14.20	16.07		8.73	8.73
k, delay calibration	0.11	0.11	0.11		0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	0.08	0.24	1.56		74.13	75.37
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00

Lane Group Results

X, volume / capacity	0.11	0.23	0.63		1.14	1.14
d, Delay for Lane Group [s/veh]	13.87	14.44	17.64		82.86	84.11
Lane Group LOS	B	B	B		F	F
Critical Lane Group	No	No	Yes		No	Yes
50th-Percentile Queue Length [veh]	0.46	0.88	2.54		33.10	30.48
50th-Percentile Queue Length [ft]	11.58	22.04	63.44		827.46	762.02
95th-Percentile Queue Length [veh]	0.83	1.59	4.57		47.30	43.95
95th-Percentile Queue Length [ft]	20.84	39.68	114.19		1182.53	1098.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.87	13.87	0.00	0.00	14.44	17.64	0.00	0.00	0.00	82.86	83.45	84.11
Movement LOS	B	B			B	B				F	F	F
d_A, Approach Delay [s/veh]		13.87			16.71			0.00			83.45	
Approach LOS		B			B			A			F	
d_I, Intersection Delay [s/veh]	73.98											
Intersection LOS	E											
Intersection V/C	1.165											

Sequence

Ring 1	8	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	11.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.408

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Base Volume Input [veh/h]	0	23	193	129	0	0	38	697	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.00	4.30	0.00	2.00	2.00	5.30	1.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	23	193	129	0	0	38	697	0	0	0	0
Peak Hour Factor	1.0000	0.9300	0.9300	0.9300	1.0000	1.0000	0.9300	0.9300	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	6	52	35	0	0	10	187	0	0	0	0
Total Analysis Volume [veh/h]	0	25	208	139	0	0	41	749	0	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			23			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Protecte	Permiss	Overlap	Permiss	Permiss	Protecte	Protecte	Permiss
Signal group	0	8	5	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups			5,8				1,6					
Lead / Lag	-	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	0	5	5	5	0	0	5	5	0	0	0	0
Maximum Green [s]	0	14	30	25	0	0	16	30	0	0	0	0
Amber [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0
All red [s]	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Split [s]	0	14	30	25	0	0	16	30	0	0	0	0
Vehicle Extension [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	10	0	0	0	0	5	10	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	0	0	10	10	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No	No			No	No				
Maximum Recall		No	No	No			No	No				
Pedestrian Recall		No	No	No			No	No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	L	C	
L, Total Lost Time per Cycle [s]	2.00	2.50	2.00	2.00	2.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	
g_i, Effective Green Time [s]	7	13	6	19	14	
g / C, Green / Cycle	0.20	0.33	0.16	0.50	0.36	
(v / s)_i Volume / Saturation Flow Rate	0.01	0.13	0.08	0.02	0.21	
s, saturation flow rate [veh/h]	1900	1548	1810	1718	3582	
c, Capacity [veh/h]	379	484	283	744	1287	
d1, Uniform Delay [s]	12.32	10.35	14.61	6.24	9.84	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.07	0.60	1.31	0.03	0.42	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

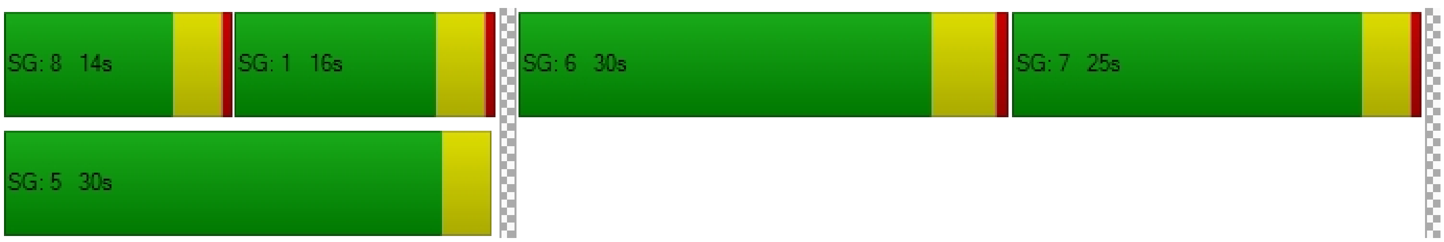
X, volume / capacity	0.07	0.43	0.49	0.06	0.58	
d, Delay for Lane Group [s/veh]	12.39	10.95	15.92	6.27	10.26	
Lane Group LOS	B	B	B	A	B	
Critical Lane Group	No	Yes	Yes	Yes	Yes	
50th-Percentile Queue Length [veh]	0.14	1.01	0.93	0.12	1.67	
50th-Percentile Queue Length [ft]	3.39	25.23	23.27	2.89	41.80	
95th-Percentile Queue Length [veh]	0.24	1.82	1.68	0.21	3.01	
95th-Percentile Queue Length [ft]	6.10	45.41	41.88	5.20	75.24	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	12.39	10.95	15.92	0.00	0.00	6.27	10.26	0.00	0.00	0.00	0.00
Movement LOS		B	B	B			A	B				
d_A, Approach Delay [s/veh]	11.10			15.92			10.05			0.00		
Approach LOS	B			B			B			A		
d_I, Intersection Delay [s/veh]	10.97											
Intersection LOS	B											
Intersection V/C	0.408											

Sequence

Ring 1	8	1	6	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 243: University Avenue/US 101 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	59.3
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.888

Intersection Setup

Name	University Avenue		University Avenue		US 101 SB Ramps	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	0	1
Pocket Length [ft]	100.00	160.00	230.00	100.00	100.00	220.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		US 101 SB Ramps	
Base Volume Input [veh/h]	1310	325	496	806	294	746
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1310	325	496	806	294	746
Peak Hour Factor	0.9460	0.9460	0.8820	0.8820	0.9590	0.9590
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	346	86	141	228	77	194
Total Analysis Volume [veh/h]	1385	344	562	914	307	778
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	9		7		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Protected	Permissive	Protected	Permissive
Signal group	6	7	5	2	7	0
Auxiliary Signal Groups		6,7				
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	10	6	4	10	6	0
Maximum Green [s]	30	30	30	30	30	0
Amber [s]	4.0	3.5	3.0	4.5	3.5	0.0
All red [s]	0.5	0.5	0.5	0.5	0.5	0.0
Split [s]	44	25	31	75	25	0
Vehicle Extension [s]	3.0	2.0	2.0	3.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.5	2.0	1.5	3.0	2.0	0.0
Minimum Recall	Yes	No	No	Yes	No	
Maximum Recall	No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R
L, Total Lost Time per Cycle [s]	4.50	4.00	3.50	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.50	0.00	1.50	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	47	72	20	70	21	21	21
g / C, Green / Cycle	0.47	0.72	0.20	0.70	0.21	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.43	0.14	0.18	0.29	0.19	0.27	0.27
s, saturation flow rate [veh/h]	3192	2460	3101	3192	1597	1425	1425
c, Capacity [veh/h]	1489	1775	631	2234	335	299	299
d1, Uniform Delay [s]	25.13	4.51	38.75	6.31	38.63	39.50	39.50
k, delay calibration	0.50	0.04	0.04	0.50	0.35	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.70	0.02	1.81	0.56	24.66	157.33	157.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.93	0.19	0.89	0.41	0.92	1.30	1.30
d, Delay for Lane Group [s/veh]	36.83	4.52	40.56	6.86	63.29	196.83	196.83
Lane Group LOS	D	A	D	A	E	F	F
Critical Lane Group	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	17.00	0.97	6.77	3.66	9.54	20.30	20.30
50th-Percentile Queue Length [ft]	425.07	24.30	169.17	91.55	238.53	507.44	507.44
95th-Percentile Queue Length [veh]	23.77	1.75	11.03	6.59	14.61	31.38	31.38
95th-Percentile Queue Length [ft]	594.13	43.75	275.82	164.80	365.18	784.57	784.57

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.83	4.52	40.56	6.86	63.29	196.83
Movement LOS	D	A	D	A	E	F
d_A, Approach Delay [s/veh]	30.40		19.69		159.04	
Approach LOS	C		B		F	
d_I, Intersection Delay [s/veh]	59.25					
Intersection LOS	E					
Intersection V/C	0.888					

Sequence

Ring 1	2	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 245: University Avenue/Runnymede Street

Control Type:	Signalized	Delay (sec / veh):	15.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.545

Intersection Setup

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	120.00	100.00	100.00	130.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Base Volume Input [veh/h]	24	970	43	26	632	22	14	86	16	89	84	106
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	970	43	26	632	22	14	86	16	89	84	106
Peak Hour Factor	0.9600	0.9600	0.9600	0.9290	0.9290	0.9290	0.8290	0.8290	0.8290	0.9180	0.9180	0.9180
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	253	11	7	170	6	4	26	5	24	23	29
Total Analysis Volume [veh/h]	25	1010	45	28	680	24	17	104	19	97	92	115
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			8			16			8		
Bicycle Volume [bicycles/h]	6			7			0			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	76.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	70	0	0	70	0	0	30	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	68	68	68	68	68	68	24	24
g / C, Green / Cycle	0.68	0.68	0.68	0.68	0.68	0.68	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.04	0.32	0.32	0.06	0.21	0.21	0.09	0.23
s, saturation flow rate [veh/h]	665	1676	1647	479	1676	1652	1529	1339
c, Capacity [veh/h]	445	1132	1112	310	1132	1115	415	375
d1, Uniform Delay [s]	10.01	7.73	7.74	13.49	6.69	6.70	31.18	36.93
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.35
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.24	1.40	1.43	0.58	0.72	0.74	0.48	12.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.47	0.47	0.09	0.31	0.31	0.34	0.81
d, Delay for Lane Group [s/veh]	10.25	9.13	9.17	14.07	7.41	7.43	31.65	49.48
Lane Group LOS	B	A	A	B	A	A	C	D
Critical Lane Group	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.28	5.39	5.33	0.39	3.08	3.06	2.86	8.52
50th-Percentile Queue Length [ft]	6.93	134.85	133.27	9.67	77.11	76.40	71.48	213.05
95th-Percentile Queue Length [veh]	0.50	9.20	9.12	0.70	5.55	5.50	5.15	13.31
95th-Percentile Queue Length [ft]	12.48	230.08	227.93	17.41	138.79	137.53	128.67	332.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.25	9.15	9.17	14.07	7.42	7.43	31.65	31.65	31.65	49.48	49.48	49.48
Movement LOS	B	A	A	B	A	A	C	C	C	D	D	D
d_A, Approach Delay [s/veh]	9.18			7.68			31.65			49.48		
Approach LOS	A			A			C			D		
d_I, Intersection Delay [s/veh]	15.52											
Intersection LOS	B											
Intersection V/C	0.545											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 246: University Avenue/Bell Street

Control Type:	Signalized	Delay (sec / veh):	13.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.543

Intersection Setup

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	60.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Base Volume Input [veh/h]	48	999	102	48	659	23	15	82	40	93	96	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	999	102	48	659	23	15	82	40	93	96	22
Peak Hour Factor	0.9640	0.9640	0.9640	0.9220	0.9220	0.9220	0.9260	0.9260	0.9260	0.8650	0.8650	0.8650
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	259	26	13	179	6	4	22	11	27	28	6
Total Analysis Volume [veh/h]	50	1036	106	52	715	25	16	89	43	108	111	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			17			19			7		
Bicycle Volume [bicycles/h]	3			4			1			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	70	0	0	70	0	0	30	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	70	70	70	70	70	70	22	22
g / C, Green / Cycle	0.70	0.70	0.70	0.70	0.70	0.70	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.08	0.35	0.35	0.12	0.22	0.22	0.10	0.19
s, saturation flow rate [veh/h]	644	1676	1613	442	1676	1652	1549	1258
c, Capacity [veh/h]	443	1178	1134	292	1178	1161	376	325
d1, Uniform Delay [s]	9.72	6.75	6.78	14.25	5.68	5.68	33.81	38.37
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.26
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.52	1.47	1.55	1.33	0.70	0.72	0.67	8.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.11	0.49	0.50	0.18	0.32	0.32	0.39	0.75
d, Delay for Lane Group [s/veh]	10.24	8.23	8.33	15.58	6.38	6.40	34.47	46.42
Lane Group LOS	B	A	A	B	A	A	C	D
Critical Lane Group	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.56	5.43	5.30	0.77	2.90	2.87	3.19	6.54
50th-Percentile Queue Length [ft]	13.90	135.63	132.50	19.27	72.44	71.77	79.76	163.50
95th-Percentile Queue Length [veh]	1.00	9.25	9.08	1.39	5.22	5.17	5.74	10.73
95th-Percentile Queue Length [ft]	25.02	231.13	226.89	34.68	130.39	129.18	143.57	268.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.24	8.27	8.33	15.58	6.39	6.40	34.47	34.47	34.47	46.42	46.42	46.42
Movement LOS	B	A	A	B	A	A	C	C	C	D	D	D
d_A, Approach Delay [s/veh]	8.36			7.00			34.47			46.42		
Approach LOS	A			A			C			D		
d_I, Intersection Delay [s/veh]	13.44											
Intersection LOS	B											
Intersection V/C	0.543											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 247: University Avenue/Bay Road

Control Type:	Signalized	Delay (sec / veh):	100.6
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.975

Intersection Setup

Name	University Avenue			University Avenue						Bay Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	170.00	100.00	170.00	170.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue						Bay Road		
Base Volume Input [veh/h]	33	1114	42	90	402	34	140	205	474	148	244	113
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	1114	42	90	402	34	140	205	474	148	244	113
Peak Hour Factor	0.9090	0.9090	0.9090	0.9010	0.9010	0.9010	0.9310	0.9310	0.9310	0.9350	0.9350	0.9350
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	306	12	25	112	9	38	55	127	40	65	30
Total Analysis Volume [veh/h]	36	1226	46	100	446	38	150	220	509	158	261	121
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	60			27			12			35		
Bicycle Volume [bicycles/h]	1			5			2			7		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	15	45	0	15	45	0	0	30	0	0	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	23	0	0	17	0	0	27	0	0	26	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	43	43	9	49	49	31	31	31	21	21	21
g / C, Green / Cycle	0.03	0.35	0.35	0.08	0.40	0.40	0.25	0.25	0.25	0.18	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.02	0.38	0.38	0.06	0.15	0.15	0.09	0.13	0.37	0.10	0.16	0.10
s, saturation flow rate [veh/h]	1597	1676	1652	1597	1676	1610	1597	1676	1361	1597	1676	1254
c, Capacity [veh/h]	44	595	586	121	676	649	405	425	345	280	294	220
d1, Uniform Delay [s]	58.52	39.03	39.03	55.13	25.25	25.32	37.20	38.79	45.16	45.68	48.75	45.56
k, delay calibration	0.11	0.50	0.50	0.17	0.50	0.50	0.11	0.11	0.50	0.11	0.24	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	28.83	58.66	60.16	19.59	1.51	1.61	0.56	0.98	228.69	1.79	17.64	2.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

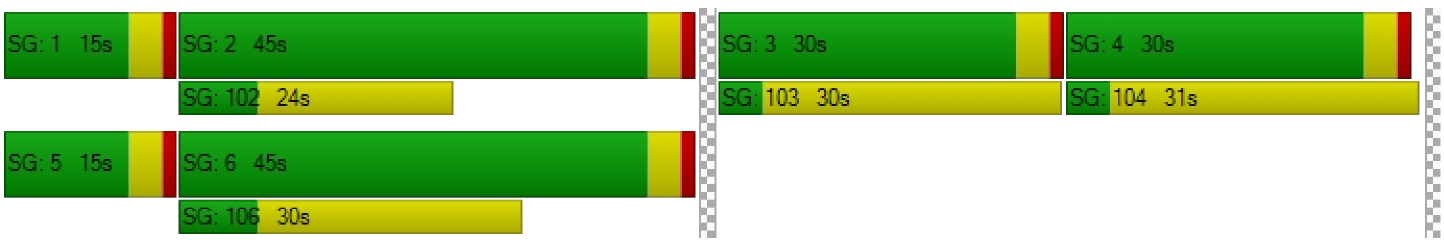
X, volume / capacity	0.82	1.07	1.08	0.83	0.36	0.37	0.37	0.52	1.47	0.56	0.89	0.55
d, Delay for Lane Group [s/veh]	87.35	97.69	99.19	74.72	26.75	26.93	37.76	39.77	273.85	47.47	66.39	47.71
Lane Group LOS	F	F	F	E	C	C	D	D	F	D	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.46	27.26	27.10	3.69	5.28	5.18	3.77	5.79	32.29	4.53	9.19	3.49
50th-Percentile Queue Length [ft]	36.49	681.40	677.55	92.22	131.90	129.58	94.35	144.77	807.33	113.36	229.68	87.20
95th-Percentile Queue Length [veh]	2.63	37.64	37.53	6.64	9.04	8.92	6.79	9.74	50.12	8.03	14.16	6.28
95th-Percentile Queue Length [ft]	65.68	940.95	938.31	166.00	226.07	222.93	169.82	243.43	1253.06	200.67	353.96	156.96

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	87.35	98.41	99.19	74.72	26.83	26.93	37.76	39.77	273.85	47.47	66.39	47.71
Movement LOS	F	F	F	E	C	C	D	D	F	D	E	D
d_A, Approach Delay [s/veh]	98.13			35.04			174.97			56.67		
Approach LOS	F			D			F			E		
d_I, Intersection Delay [s/veh]	100.64											
Intersection LOS	F											
Intersection V/C	0.975											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 249: Donohoe Street/US 101 NB Off-ramp/Capitol Avenue

Control Type:	Signalized	Delay (sec / veh):	32.2
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.794

Intersection Setup

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	857	0	646	0	0	0	0	893	0	0	687	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	857	0	646	0	0	0	0	893	0	0	687	0
Peak Hour Factor	0.9080	1.0000	0.9080	1.0000	1.0000	1.0000	0.9500	0.9500	1.0000	1.0000	0.8990	0.8990
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	236	0	178	0	0	0	0	235	0	0	191	0
Total Analysis Volume [veh/h]	944	0	711	0	0	0	0	940	0	0	764	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			23			0			2		
Bicycle Volume [bicycles/h]	0			0			1			3		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Protecte	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	0	5	0	0	6	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	4	0	4	0	0	4	0	4	0	0	4	0
Maximum Green [s]	30	0	30	0	0	30	0	30	0	0	30	0
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	57	0	57	0	0	8	0	35	0	0	35	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	7	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	26	0	26	0	0	0	0	19	0	0	19	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No		No			No		No			No	
Maximum Recall	No		No			Yes		No			No	
Pedestrian Recall	No		No			No		No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	R	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	52	52	5	31	31	31
g / C, Green / Cycle	0.52	0.52	0.05	0.31	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.30	0.50	0.00	0.29	0.16	0.15
s, saturation flow rate [veh/h]	3101	1423	1425	3192	3192	1676
c, Capacity [veh/h]	1610	739	73	988	988	519
d1, Uniform Delay [s]	16.62	23.10	0.00	33.79	28.36	28.11
k, delay calibration	0.11	0.43	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.34	22.72	0.00	6.04	0.42	0.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

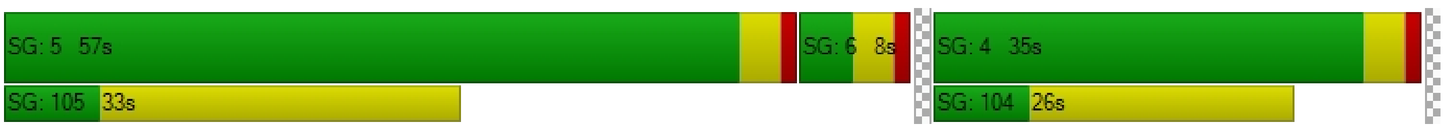
X, volume / capacity	0.59	0.96	0.00	0.95	0.52	0.49
d, Delay for Lane Group [s/veh]	16.96	45.81	0.00	39.83	28.78	28.83
Lane Group LOS	B	D	A	D	C	C
Critical Lane Group	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	7.19	19.56	0.00	11.69	5.00	5.00
50th-Percentile Queue Length [ft]	179.82	489.02	0.00	292.16	124.90	124.94
95th-Percentile Queue Length [veh]	11.59	26.81	0.00	17.29	8.66	8.66
95th-Percentile Queue Length [ft]	289.78	670.36	0.00	432.32	216.54	216.60

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	16.96	0.00	45.81	0.00	0.00	0.00	0.00	39.83	0.00	0.00	28.80	28.83
Movement LOS	B		D			A		D			C	C
d_A, Approach Delay [s/veh]	29.36			0.00			39.83			28.80		
Approach LOS	C			A			D			C		
d_I, Intersection Delay [s/veh]	32.16											
Intersection LOS	C											
Intersection V/C	0.794											

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



General Plan & Facebook Expansion EIR

Vistro File: J:\...\Existing Conditions_PM.vistro

Scenario 1: Existing PM

Report File: J:\...\Existing Conditions PM.pdf

5/19/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	980	893	1547	401	3821

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	29	1083	4	66	1014	203	27	9	467	229	13	1	3145

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	185	720	84	30	697	377	475	15	130	98	41	72	2924

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	2	681	108	194	841	54	45	29	6	84	18	143	2205

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
5	Middlefield Rd/Marsh Rd	426	399	324	288	502	393	2332

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	199	610	457	673	357	60	2356

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringwood Ave	58	70	38	63	1	272	10	775	97	379	568	5	2336

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
13	Middlefield Rd/Lytton Ave	238	179	68	2	66	8	84	445	16	16	512	179	1813

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14	Middlefield Rd/University Ave	66	338	35	81	374	86	27	319	87	101	370	55	1939

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	3800	62	304	813	78	1577	6634

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	24	46	1404	116	191	116	35	2362	75	359	675	10	5413

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	50	1299	3	13	623	30	163	15	39	139	17	61	2452

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	68	1339	885	15	33	141	2481

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1368	217	72	966	218	44	2885

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	301	1484	263	74	1016	22	28	137	210	210	249	76	4070

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	35	1276	922	261	504	68	3066

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	8	935	10	54	719	29	117	2	28	21	2	97	2022

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	11	738	3	5	680	84	102	4	31	1	1	4	1664

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	30	671	13	26	597	6	61	51	69	56	43	28	1651

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	46	94	256	356	93	332	92	429	216	236	453	29	2632

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	57	596	125	32	523	24	267	215	64	52	135	26	2116

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	13	335	94	30	262	48	78	232	38	28	116	29	1303

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	19	15	31	107	9	238	24	1750	100	65	1215	13	3586

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	363	144	79	59	171	41	98	1525	46	56	992	304	3878

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	118	202	133	129	215	77	87	1426	94	114	1047	97	3739

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	172	50	137	50	58	43	1406	41	1451	87	3495

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	44	348	108	451	249	80	113	1339	590	180	1154	39	4695

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	66	6	36	58	45	48	72	1845	20	68	1586	54	3904

ID	Intersection Name	Northeastbound		Southwestbound				Northwestbound		Southeastbound		Total Volume
		Left	Right	U-T	Left	Thru	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	249	182	0	0	0	0	323	1917	1334	86	4091

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	26	0	39	4	3	0	310	2332	6	30	1660	4	4414

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	350	328	88	398	363	165	1692

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Sand Hill Rd/Santa Cruz Ave	361	611	215	424	1038	208	158	691	188	101	526	178	4699

ID	Intersection Name	Northbound		Southbound		Eastbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
58	University Avenue and Adams Drive	11	1786	360	15	25	0	26	2223

ID	Intersection Name	Eastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
71	Chilco Street/Terminal Avenue	40	14	21	112	502	162	851

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	11	1724	356	10	171	77	2349

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
77	University Avenue/Donohoe Street	430	533	750	56	546	167	9	98	177	295	732	651	4444

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	24	467	105	44	456	29	182	24	57	45	41	72	1546

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	209	3	108	19	3	66	18	794	93	69	1750	16	3148

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	373	638	423	398	535	100	2467

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road/101 NB Ramps	2255	567	544	239	3605

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
111	University Avenue/Woodland Avenue	28	834	18	209	604	317	13	73	318	439	92	49	2994

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
131	Chilco Street/Hamilton Avenue	19	63	18	71	407	36	21	124	21	7	16	47	850

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	912	1585	100	29	88	2714

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	108	0	113	90	0	103	65	945	6	28	1307	20	2785

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	2	0	17	20	0	43	22	1076	7	17	1321	24	2549

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	164	916	1	16	1220	252	12	6	17	178	3	172	2957

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	125	31	2131	16	25	3	8	477	136	1287	63	13	4315

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	61	669	641	79	46	41	1537

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	201	196	19	767	2416	156	3755

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	382	43	2516	107	5	978	4031

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
204	Chilco Street/Newbridge Street	1	5	5	168	16	14	5	139	2	12	133	64	564

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
206	Chilco Street/Ivy Drive	27	62	11	192	218	14	4	16	12	10	18	53	637

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	14	136	5	17	160	2	28	2	114	158	10	398	1044

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	11	0	4	2	481	3	2	24	1	13	0	56	597

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	0	101	0	1	2	3	0	0	15	35	3	6	166

ID	Intersection Name	Southbound		Northeastbound		Northwestbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
214	Chrysler Dr/Jefferson Dr	9	7	132	7	2	134	291

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	190	6	1	66	285	9	2	2	78	1	234	14	888

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Circle/Sand Hill Road	2	52	98	239	8	2362	7	2768

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	23	193	129	38	697	1080

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
243	University Avenue/US 101 SB Ramps	1310	325	496	806	294	746	3977

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
245	University Avenue/Runnymede Street	24	970	43	26	632	22	14	86	16	89	84	106	2112

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
246	University Avenue/Bell Street	48	999	102	48	659	23	15	82	40	93	96	22	2227

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
247	University Avenue/Bay Road	33	1114	42	90	402	34	140	205	474	148	244	113	3039

ID	Intersection Name	Northbound		Southbound	Eastbound	Westbound		Total Volume
		Left	Right	Right	Thru	Thru	Right	
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	857	646	0	893	687	0	3083

2040 No Project – AM Peak Hour

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General Plan & Facebook Expansion

Vistro File: J:\...\2040(b)_AM.vistro

Scenario 1: Existing GP plus Facebook Conditions AM

Report File: J:\...\Cumulative 2040 Existing General Plan Plus Facebook Project Conditions Conditions AM.pdf

5/19/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM 2010	SEB Left	0.907	19.7	B
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM 2010	NEB Left	0.730	27.8	C
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM 2010	WB Right	0.712	32.4	C
4	Marsh Rd/Bay Rd	Signalized	HCM 2010	SB Left	0.831	26.7	C
5	Middlefield Rd/Marsh Rd	Signalized	HCM 2010	EB Left	0.864	30.7	C
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM 2010	NWB Left	0.678	40.4	D
10	Middlefield Rd/Ringswood Ave	Signalized	HCM 2010	NWB Left	0.438	22.6	C
13	Middlefield Rd/Lytton Ave	Signalized	HCM 2010	SWB Thru	0.572	37.3	D
14	Middlefield Rd/University Ave	Signalized	HCM 2010	SEB Left	0.516	36.1	D
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM 2010	NWB Left	1.155	97.6	F
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM 2010	NB Left	1.104	141.9	F
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM 2010	SB Left	0.766	9.6	A
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM 2010	NB Left	0.602	13.7	B
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM 2010	SB Left	0.676	16.9	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM 2010	SB Left	0.764	39.1	D
21	Willow Rd/Bay Rd	Signalized	HCM 2010	NEB Left	0.721	11.9	B
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM 2010	SB Left	0.672	15.5	B
23	Willow Rd/Coleman Ave	Signalized	HCM 2010	EB Left	0.754	19.4	B
24	Willow Rd/Gilbert Ave	Signalized	HCM 2010	EB Left	0.628	21.3	C
25	Middlefield Rd-Willow Rd	Signalized	HCM 2010	NEB Thru	0.563	58.9	E
26	Ravenswood Ave/Laurel St	Signalized	HCM 2010	NWB Left	0.735	24.0	C
28	Oak Grove Ave/Laurel St	Signalized	HCM 2010	SEB Thru	0.512	8.1	A

29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM 2010	SWB Left	0.976	33.5	C
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM 2010	NWB Left	0.983	64.9	E
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM 2010	NWB Left	0.876	35.1	D
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM 2010	NEB Right	0.828	12.7	B
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM 2010	NWB Left	1.005	73.0	E
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM 2010	SEB Left	0.655	6.3	A
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM 2010	NEB Left	0.749	15.4	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM 2010	SEB Left	0.635	4.6	A
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM 2010	SWB Left	0.562	10.2	B
39	Santa Cruz Ave/Sand Hill Rd	Signalized	HCM 2010	SEB Left	0.803	46.1	D
58	University Avenue and Adams Drive	Two-way stop	HCM 2010	EB Left	0.593	221.9	F
71	Chilco Street/Terminal Avenue	All-way stop	HCM 2010	NB Thru		9.4	A
74	University Ave/O'Brien Dr	Signalized	HCM 2010	NB Left	0.508	7.6	A
77	University Avenue/Donohoe Street	Signalized	HCM 2010	EB Right	1.078	120.2	F
88	Valparaiso Ave/ University Dr	Signalized	HCM 2010	SEB Left	0.640	19.9	B
103	Addison Wesley/Sand Hill Rd	Signalized	HCM 2010	WB Left	0.698	12.8	B
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM 2010	WB Right	0.811	44.6	D
110	Marsh Road and US 101 NB Ramps	Signalized	HCM 2010	NWB Left	0.717	12.0	B
111	University Avenue / Woodland Avenue	Signalized	HCM 2010	NEB Left	0.759	49.0	D
131	Chilco Street/Hamilton Avenue	All-way stop	HCM 2010	NB Thru		9.2	A
132	Oak Ave/Sand Hill Rd	Signalized	HCM 2000	SEB Right	0.815	20.4	C
156	Saga Ln/Sand Hill Rd	Signalized	HCM 2010	SB Left	8.333	35.1	D

157	Branner Dr/Sand Hill Rd	Signalized	HCM 2010	EB Left	0.539	6.5	A
162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM 2010	SEB Left	1.163	40.3	D
163	Bayfront Expy/Marsh Rd	Signalized	HCM 2010	EB Right	0.933	42.2	D
181	Santa Cruz Ave/Elder Ave	Signalized	HCM 2010	NEB Left	0.625	9.0	A
195	Bayfront Expy/Chilco St	Signalized	HCM 2010	WB Left	0.840	20.8	C
196	Bayfront Expy/Chrysler Drive	Signalized	HCM 2010	WB Left	0.813	9.0	A
199	Bayfront Expwy/Bldg 21	Signalized	HCM 2010	WB Left	0.903	44.7	D
201	Bayfront Expwy/Bldg 20	Signalized	HCM 2010	WB Left	0.885	52.9	D
204	Chilco Street/Newbridge Street	All-way stop	HCM 2010	SB Left		8.6	A
206	Chilco Street/Ivy Drive	All-way stop	HCM 2010	NB Thru		8.6	A
207	Chilco St/Constitution Dr	All-way stop	HCM 2010	SB Left		155.8	F
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM 2000	NEB Thru	0.000	9.5	A
213	Chrysler Dr/Independence Dr	Two-way stop	HCM 2010	NWB Thru	0.016	10.9	B
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM 2010	NWB Thru	0.000	14.6	B
215	Chrysler Dr/Constitution Dr	Signalized	HCM 2010	NEB Right	0.392	26.1	C
233	Sand Hill Road and Sand Hill Circle	Signalized	HCM 2010	NB Thru	0.576	14.5	B
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM 2010	NB Right	0.807	85.6	F
243	University Avenue/US 101 SB Ramps	Signalized	HCM 2010	WB Right	0.863	39.8	D
245	University Avenue/Runnymede Street	Signalized	HCM 2010	SB Left	0.624	11.4	B
246	University Avenue/Bell Street	Signalized	HCM 2010	WB Thru	0.743	18.6	B
247	University Avenue/Bay Road	Signalized	HCM 2010	SWB Left	0.625	37.2	D
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	Signalized	HCM 2010	NB Left	0.468	44.1	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	19.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.907

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	888	1749	279	1091	320
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	3.60	2.15	5.10	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	888	1749	279	1091	320
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	222	437	70	273	80
Total Analysis Volume [veh/h]	0	888	1749	279	1091	320
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	4		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	52.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	0	6	2	0	4	5
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	32	32	0	32	10
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	50	50	0	30	21
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	7	0	0	5	0
Pedestrian Clearance [s]	0	16	0	0	20	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	2.1	0.0	0.0	1.1
Minimum Recall		Yes	Yes		No	No
Maximum Recall		No	No		No	No
Pedestrian Recall		No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	4.10	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.10	0.00	0.00
g_i, Effective Green Time [s]	48	46	28	28
g / C, Green / Cycle	0.60	0.57	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.22	0.50	0.33	0.20
s, saturation flow rate [veh/h]	4000	3492	3344	1562
c, Capacity [veh/h]	2395	1999	1174	549
d1, Uniform Delay [s]	8.27	14.63	24.95	21.14
k, delay calibration	0.50	0.50	0.04	0.16
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.44	5.72	1.64	1.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

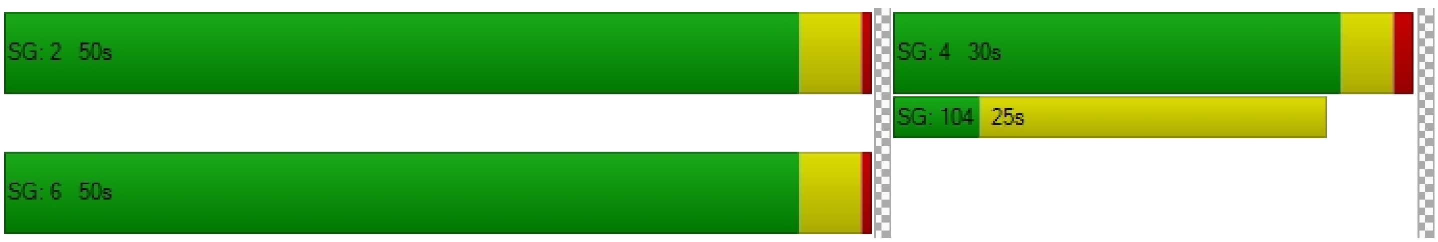
X, volume / capacity	0.37	0.88	0.93	0.58
d, Delay for Lane Group [s/veh]	8.71	20.35	26.59	22.61
Lane Group LOS	A	C	C	C
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	3.45	12.75	9.61	4.87
50th-Percentile Queue Length [ft]	86.23	318.71	240.20	121.67
95th-Percentile Queue Length [veh]	6.21	18.60	14.69	8.48
95th-Percentile Queue Length [ft]	155.21	465.10	367.29	212.12

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	8.71	20.35	0.00	26.59	22.61
Movement LOS		A	C		C	C
d_A, Approach Delay [s/veh]	8.71		20.35		25.69	
Approach LOS	A		C		C	
d_I, Intersection Delay [s/veh]	19.66					
Intersection LOS	B					
Intersection V/C	0.907					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	27.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.730

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Base Volume Input [veh/h]	28	1189	14	439	1422	296	15	4	71	250	13	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	3.00	7.10	3.90	4.00	1.00	0.00	0.00	12.70	1.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	59	0	0	0
Total Hourly Volume [veh/h]	28	1189	14	439	1422	296	15	4	12	250	13	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	297	4	110	356	74	4	1	3	63	3	1
Total Analysis Volume [veh/h]	28	1189	14	439	1422	296	15	4	12	250	13	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			1			2		
Bicycle Volume [bicycles/h]	2			0			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	70.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	0	6	0	4	4	4
Maximum Green [s]	15	40	40	15	40	40	0	20	0	20	20	20
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	10	45	45	26	61	61	0	42	0	47	47	47
Vehicle Extension [s]	2.5	3.5	3.5	2.0	3.5	3.5	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	0	7	7	0	7	7	0	8	0	8	8	8
Pedestrian Clearance [s]	0	21	21	0	21	21	0	28	0	24	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	5	95	95	24	113	113	7	7	26	26
g / C, Green / Cycle	0.03	0.59	0.59	0.15	0.71	0.71	0.04	0.04	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.23	0.23	0.13	0.47	0.50	0.01	0.00	0.14	0.01
s, saturation flow rate [veh/h]	1747	3512	1833	3382	1827	1721	1828	2536	1779	1803
c, Capacity [veh/h]	57	2082	1086	506	1297	1222	77	107	294	298
d1, Uniform Delay [s]	75.97	17.10	17.10	66.38	12.70	13.44	74.09	73.67	64.77	56.23
k, delay calibration	0.08	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.10	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.73	0.53	1.01	1.80	2.68	3.40	1.22	0.34	6.39	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

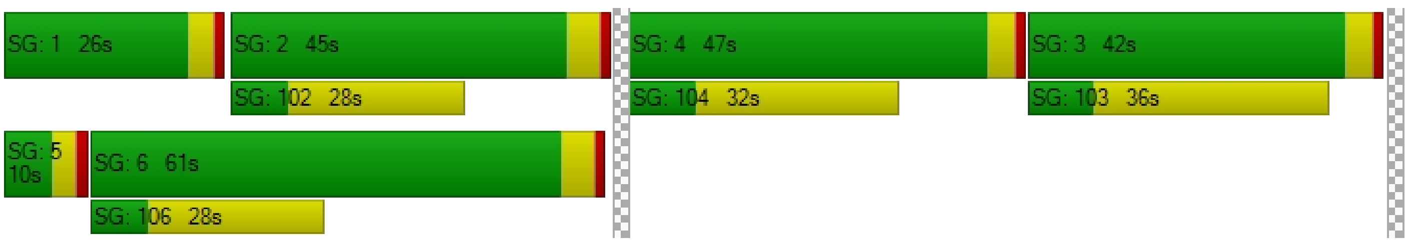
X, volume / capacity	0.49	0.38	0.38	0.87	0.66	0.70	0.25	0.11	0.85	0.06
d, Delay for Lane Group [s/veh]	80.71	17.63	18.11	68.19	15.38	16.84	75.31	74.01	71.17	56.30
Lane Group LOS	F	B	B	E	B	B	E	E	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.21	7.80	8.29	8.87	16.83	17.93	0.79	0.25	10.53	0.63
50th-Percentile Queue Length [ft]	30.24	194.88	207.20	221.68	420.64	448.25	19.80	6.14	263.23	15.77
95th-Percentile Queue Length [veh]	2.18	12.37	13.01	13.75	23.55	24.87	1.43	0.44	15.85	1.14
95th-Percentile Queue Length [ft]	54.42	309.35	325.23	343.77	588.82	621.86	35.65	11.05	396.27	28.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	80.71	17.79	18.11	68.19	15.96	16.84	75.31	75.31	74.01	71.17	56.30	56.30
Movement LOS	F	B	B	E	B	B	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	19.22			26.71			74.81			70.17		
Approach LOS	B			C			E			E		
d_I, Intersection Delay [s/veh]	27.77											
Intersection LOS	C											
Intersection V/C	0.730											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	32.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.712

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Base Volume Input [veh/h]	99	767	90	27	1068	435	454	48	201	30	18	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	1.60	5.60	7.40	5.10	3.00	6.50	8.50	4.50	25.90	37.50	28.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	15	0	0	0
Total Hourly Volume [veh/h]	99	767	90	27	1068	435	454	48	186	30	18	28
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	192	23	7	267	109	114	12	47	8	5	7
Total Analysis Volume [veh/h]	99	767	90	27	1068	435	454	48	186	30	18	28
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			5			3			3		
Bicycle Volume [bicycles/h]	10			5			2			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	50.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	23	77	77	10	64	64	37	36	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	12	12	0	16	16	25	25	25	0	25	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	13	109	109	5	101	101	29	29	29	9	9
g / C, Green / Cycle	0.08	0.68	0.68	0.03	0.63	0.63	0.18	0.18	0.18	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.06	0.23	0.23	0.02	0.43	0.45	0.15	0.15	0.12	0.02	0.04
s, saturation flow rate [veh/h]	1740	1870	1790	1685	1808	1608	1699	1683	1508	1437	1214
c, Capacity [veh/h]	139	1276	1221	54	1147	1021	303	300	269	83	70
d1, Uniform Delay [s]	71.78	10.53	10.55	76.10	18.72	19.44	63.41	63.39	61.59	72.52	73.80
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.55	0.73	0.77	2.63	3.22	4.20	4.51	4.52	2.38	1.98	7.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

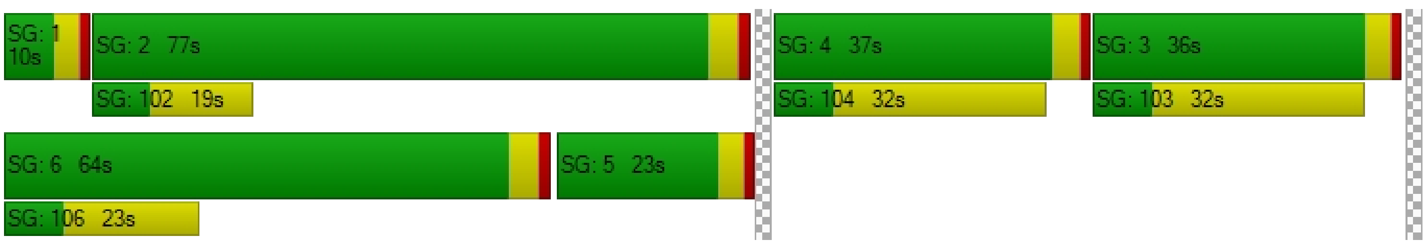
X, volume / capacity	0.71	0.34	0.34	0.50	0.68	0.71	0.83	0.83	0.69	0.36	0.66
d, Delay for Lane Group [s/veh]	74.33	11.26	11.32	78.73	21.94	23.64	67.93	67.91	63.97	74.49	81.41
Lane Group LOS	E	B	B	E	C	C	E	E	E	E	F
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	4.06	6.54	6.32	1.13	18.95	18.57	10.41	10.29	7.36	1.25	2.02
50th-Percentile Queue Length [ft]	101.57	163.42	158.09	28.35	473.79	464.34	260.24	257.37	183.94	31.17	50.55
95th-Percentile Queue Length [veh]	7.31	10.73	10.45	2.04	26.09	25.64	15.70	15.56	11.81	2.24	3.64
95th-Percentile Queue Length [ft]	182.82	268.24	261.20	51.03	652.28	641.03	392.52	388.92	295.15	56.10	91.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	74.33	11.29	11.32	78.73	22.40	23.64	67.92	67.91	63.97	74.49	81.41	81.41
Movement LOS	E	B	B	E	C	C	E	E	E	E	F	F
d_A, Approach Delay [s/veh]	17.82			23.75			66.85			78.68		
Approach LOS	B			C			E			E		
d_I, Intersection Delay [s/veh]	32.41											
Intersection LOS	C											
Intersection V/C	0.712											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	26.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.831

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	1	803	82	268	867	31	236	161	14	58	24	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.20	2.40	7.10	6.20	3.20	3.50	2.60	0.00	0.00	5.30	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	803	82	268	867	31	236	161	14	58	24	221
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	201	21	67	217	8	59	40	4	15	6	55
Total Analysis Volume [veh/h]	1	803	82	268	867	31	236	161	14	58	24	221
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			4			0		
Bicycle Volume [bicycles/h]	4			4			6			8		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	40	60	40	25	40	60	31	31	31	0	31	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	46	28	46	18	46	28	34	34	34	0	34	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	26	26	16	44	44	32	32
g / C, Green / Cycle	0.33	0.33	0.20	0.55	0.55	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.25	0.25	0.16	0.25	0.25	0.38	0.19
s, saturation flow rate [veh/h]	1855	1642	1690	1789	1764	1092	1578
c, Capacity [veh/h]	650	535	338	986	972	506	683
d1, Uniform Delay [s]	24.27	24.42	30.49	10.81	10.82	25.24	17.93
k, delay calibration	0.50	0.50	0.42	0.50	0.50	0.50	0.10
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.81	10.73	14.84	1.53	1.56	13.24	0.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.72	0.78	0.79	0.46	0.46	0.81	0.44
d, Delay for Lane Group [s/veh]	31.08	35.16	45.33	12.35	12.39	38.48	18.35
Lane Group LOS	C	D	D	B	B	D	B
Critical Lane Group	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	8.66	8.25	6.07	4.58	4.54	9.18	4.01
50th-Percentile Queue Length [ft]	216.45	206.32	151.79	114.57	113.50	229.61	100.26
95th-Percentile Queue Length [veh]	13.48	12.96	10.11	8.09	8.03	14.15	7.22
95th-Percentile Queue Length [ft]	337.09	324.11	252.82	202.34	200.86	353.87	180.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.08	32.78	35.16	45.33	12.37	12.39	38.48	38.48	38.48	18.35	18.35	18.35
Movement LOS	C	C	D	D	B	B	D	D	D	B	B	B
d_A, Approach Delay [s/veh]	33.00			19.94			38.48			18.35		
Approach LOS	C			B			D			B		
d_I, Intersection Delay [s/veh]	26.71											
Intersection LOS	C											
Intersection V/C	0.831											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Middlefield Rd/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	30.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.864

Intersection Setup

Name	Marsh Road		Middlefield Road		Middlefield Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	225.00	150.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	505	307	374	391	225	455
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	242	0	0	0	427
Total Hourly Volume [veh/h]	505	65	374	391	225	28
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	126	16	94	98	56	7
Total Analysis Volume [veh/h]	505	65	374	391	225	28
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	9		0		0	
Bicycle Volume [bicycles/h]	1		28		19	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Overlap	Protected	Permissive	Permissive	Permissive
Signal group	3	1	1	2	2	2
Auxiliary Signal Groups		1,3				4,6
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	20	20	20	20	20
Maximum Green [s]	53	23	23	17	17	17
Amber [s]	3.2	3.0	3.0	3.2	3.2	3.2
All red [s]	2.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	0	0	30	30	30
Vehicle Extension [s]	2.5	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	0	0	8	8	8
Pedestrian Clearance [s]	0	0	0	12	12	12
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	3.2	2.0	2.0	2.2	2.2	2.2
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	5.20	4.00	4.00	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.20	0.00	2.00	2.20	2.20	2.20
g_i, Effective Green Time [s]	21	40	14	17	17	17
g / C, Green / Cycle	0.32	0.61	0.21	0.26	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.28	0.04	0.21	0.21	0.12	0.02
s, saturation flow rate [veh/h]	1774	1551	1774	1863	1863	1523
c, Capacity [veh/h]	573	955	379	483	483	395
d1, Uniform Delay [s]	21.01	5.05	25.70	22.76	20.46	18.32
k, delay calibration	0.08	0.04	0.09	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.52	0.01	16.76	13.66	3.21	0.35
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.07	0.99	0.81	0.47	0.07
d, Delay for Lane Group [s/veh]	24.54	5.07	42.46	36.42	23.66	18.67
Lane Group LOS	C	A	D	D	C	B
Critical Lane Group	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	7.22	0.28	7.17	7.06	3.13	0.34
50th-Percentile Queue Length [ft]	180.47	7.05	179.32	176.52	78.34	8.49
95th-Percentile Queue Length [veh]	11.63	0.51	11.57	11.42	5.64	0.61
95th-Percentile Queue Length [ft]	290.63	12.70	289.13	285.46	141.02	15.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.54	5.07	42.46	36.42	23.66	18.67
Movement LOS	C	A	D	D	C	B
d_A, Approach Delay [s/veh]	22.32		39.37		23.11	
Approach LOS	C		D		C	
d_I, Intersection Delay [s/veh]	30.66					
Intersection LOS	C					
Intersection V/C	0.864					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	40.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.678

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	93	573	446	364	420	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	11.80	4.20	3.10	2.50	3.30	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	93	0	446	364	420	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	0	112	91	105	19
Total Analysis Volume [veh/h]	93	0	446	364	420	75
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2		21		0	
Bicycle Volume [bicycles/h]	22		39		37	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	10	10	0
Maximum Green [s]	50	35	35	70	35	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	50	35	35	70	35	0
Vehicle Extension [s]	2.5	3.6	3.0	3.6	3.6	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	10	12	0	12	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	2.6	0.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	Yes	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	4.60	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	2.60	0.00
g_i, Effective Green Time [s]	11	11	33	102	70
g / C, Green / Cycle	0.10	0.10	0.28	0.85	0.58
(v / s)_i Volume / Saturation Flow Rate	0.06	0.00	0.28	0.22	0.31
s, saturation flow rate [veh/h]	1457	1395	1580	1668	1599
c, Capacity [veh/h]	140	134	434	1416	926
d1, Uniform Delay [s]	52.36	0.00	43.50	1.75	15.41
k, delay calibration	0.08	0.08	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.97	0.00	50.18	0.44	2.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

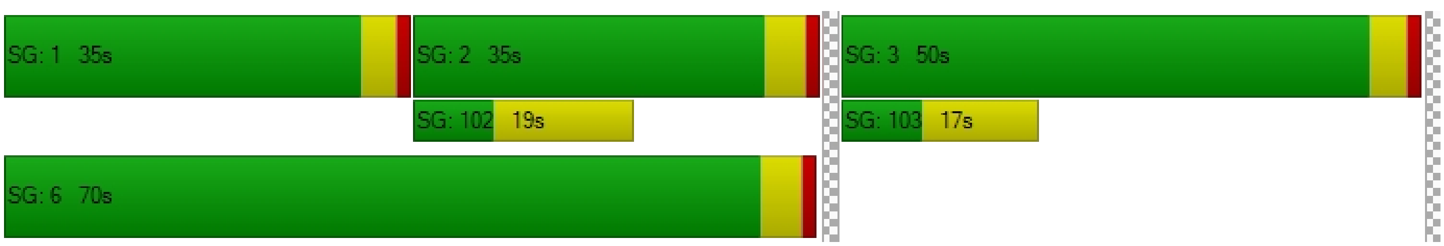
X, volume / capacity	0.66	0.00	1.03	0.26	0.53
d, Delay for Lane Group [s/veh]	56.33	0.00	93.68	2.19	17.63
Lane Group LOS	E	A	F	A	B
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	2.86	0.00	18.67	1.06	8.38
50th-Percentile Queue Length [ft]	71.59	0.00	466.77	26.45	209.60
95th-Percentile Queue Length [veh]	5.15	0.00	26.19	1.90	13.13
95th-Percentile Queue Length [ft]	128.86	0.00	654.65	47.61	328.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.33	0.00	93.68	2.19	17.63	17.63
Movement LOS	E	A	F	A	B	B
d_A, Approach Delay [s/veh]	56.33		52.57		17.63	
Approach LOS	E		D		B	
d_I, Intersection Delay [s/veh]	40.44					
Intersection LOS	D					
Intersection V/C	0.678					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Middlefield Rd/Ringswood Ave

Control Type:	Signalized	Delay (sec / veh):	22.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.438

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	5	3	12	136	44	251	55	559	84	225	679	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	8.30	4.40	0.00	4.00	0.00	3.20	0.00	4.60	4.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	222	0	0	96	0	0	0
Total Hourly Volume [veh/h]	5	3	12	136	44	29	55	559	0	225	679	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	3	34	11	7	14	140	0	56	170	16
Total Analysis Volume [veh/h]	5	3	12	136	44	29	55	559	0	225	679	64
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			27			5			11		
Bicycle Volume [bicycles/h]	6			23			39			34		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	2	8	2	6	8	6	1	6	8	5	2	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	30	25	30	30	25	30	15	30	25	30	30	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.0	3.6	3.2	3.5	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	35	35	35	50	35	50	50	50	35	35	35	0
Vehicle Extension [s]	3.6	2.9	3.6	3.6	2.9	3.6	3.0	3.6	2.9	3.0	3.6	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	12	12	12	12	12	0	12	12	0	12	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.6	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.50	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.60	2.60
g_i, Effective Green Time [s]	24	24	24	24	7	70	70	18	81	81
g / C, Green / Cycle	0.20	0.20	0.20	0.20	0.06	0.58	0.58	0.15	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.00	0.01	0.13	0.02	0.03	0.16	0.00	0.13	0.21	0.21
s, saturation flow rate [veh/h]	1384	1629	1341	1471	1810	3505	1615	1730	1827	1758
c, Capacity [veh/h]	119	327	322	295	102	2034	937	256	1226	1180
d1, Uniform Delay [s]	55.22	38.69	45.83	39.10	55.08	12.57	0.00	50.05	8.18	8.20
k, delay calibration	0.10	0.10	0.12	0.10	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	0.05	1.71	0.14	4.32	0.33	0.00	9.32	0.65	0.68
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

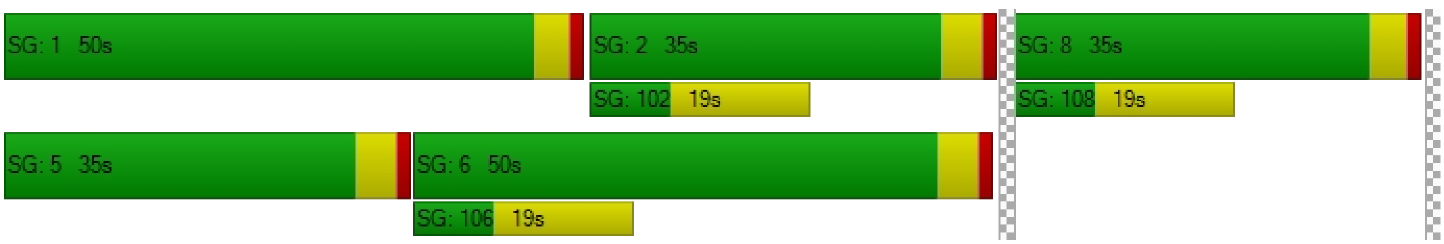
X, volume / capacity	0.04	0.05	0.56	0.10	0.54	0.27	0.00	0.88	0.31	0.31
d, Delay for Lane Group [s/veh]	55.36	38.74	47.54	39.24	59.40	12.91	0.00	59.37	8.83	8.88
Lane Group LOS	E	D	D	D	E	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.15	0.37	5.16	0.71	1.73	3.71	0.00	7.20	3.95	3.85
50th-Percentile Queue Length [ft]	3.81	9.29	129.05	17.86	43.26	92.75	0.00	180.08	98.75	96.21
95th-Percentile Queue Length [veh]	0.27	0.67	8.89	1.29	3.11	6.68	0.00	11.60	7.11	6.93
95th-Percentile Queue Length [ft]	6.86	16.72	222.20	32.14	77.87	166.95	0.00	290.11	177.75	173.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.36	38.74	38.74	47.54	47.54	39.24	59.40	12.91	0.00	59.37	8.85	8.88
Movement LOS	E	D	D	D	D	D	E	B	A	E	A	A
d_A, Approach Delay [s/veh]	42.90			46.39			17.07			20.60		
Approach LOS	D			D			B			C		
d_I, Intersection Delay [s/veh]	22.63											
Intersection LOS	C											
Intersection V/C	0.438											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Middlefield Rd/Lytton Ave

Control Type:	Signalized	Delay (sec / veh):	37.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.572

Intersection Setup

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	125	41	75	4	111	6	129	273	7	5	464	337
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	41	75	4	111	6	129	273	7	5	464	337
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	10	19	1	28	2	32	68	2	1	116	84
Total Analysis Volume [veh/h]	125	41	75	4	111	6	129	273	7	5	464	337
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			3			7			7		
Bicycle Volume [bicycles/h]	4			28			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	32.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	4	0	0	1	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	4	0	0	12	0	0	12	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	20	0	0	18	0	0	20	0	0	42	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	6	0	0	5	0	0	6	0	0	6	0
Pedestrian Clearance [s]	0	10	0	0	9	0	0	10	0	0	8	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	9	9	36	36	30	30
g / C, Green / Cycle	0.09	0.09	0.09	0.36	0.36	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.07	0.07	0.07	0.12	0.11	0.25	0.20
s, saturation flow rate [veh/h]	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	163	163	151	649	649	540	540
d1, Uniform Delay [s]	44.25	44.10	44.82	23.19	22.96	32.72	30.49
k, delay calibration	0.08	0.08	0.08	0.50	0.50	0.30	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.26	4.48	7.02	1.35	1.20	9.14	2.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

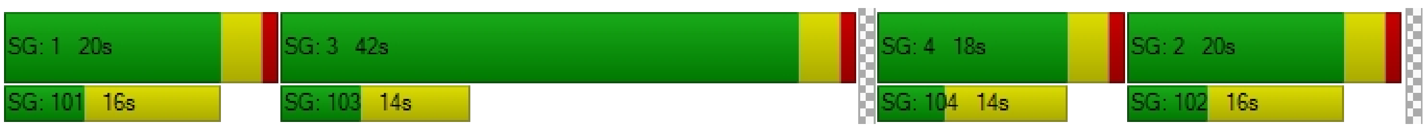
X, volume / capacity	0.76	0.72	0.80	0.33	0.30	0.84	0.66
d, Delay for Lane Group [s/veh]	49.51	48.59	51.84	24.54	24.16	41.86	33.37
Lane Group LOS	D	D	D	C	C	D	C
Critical Lane Group	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	3.23	3.05	3.25	3.88	3.54	11.51	7.83
50th-Percentile Queue Length [ft]	80.63	76.28	81.23	96.96	88.60	287.68	195.69
95th-Percentile Queue Length [veh]	5.81	5.49	5.85	6.98	6.38	17.07	12.42
95th-Percentile Queue Length [ft]	145.13	137.30	146.21	174.52	159.48	426.76	310.40

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.47	48.59	48.59	51.84	51.84	51.84	24.54	24.28	24.16	41.86	41.55	33.37
Movement LOS	D	D	D	D	D	D	C	C	C	D	D	C
d_A, Approach Delay [s/veh]	49.06			51.84			24.36			38.13		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	37.28											
Intersection LOS	D											
Intersection V/C	0.572											

Sequence

Ring 1	1	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Middlefield Rd/University Ave

Control Type:	Signalized	Delay (sec / veh):	36.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.516

Intersection Setup

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	140.00	100.00	100.00	180.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	26	246	26	126	555	160	34	240	65	111	356	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	246	26	126	555	160	34	240	65	111	356	68
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	62	7	32	139	40	9	60	16	28	89	17
Total Analysis Volume [veh/h]	26	246	26	126	555	160	34	240	65	111	356	68
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			5			14			29		
Bicycle Volume [bicycles/h]	3			23			4			10		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	16.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	2	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	8	0	0	8	0	0	8	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	43	0	0	43	0	0	24	0	0	33	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	12	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	24	24	24	24	24	44	44	20	20
g / C, Green / Cycle	0.24	0.24	0.24	0.24	0.24	0.44	0.44	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.01	0.16	0.07	0.21	0.20	0.10	0.09	0.16	0.14
s, saturation flow rate [veh/h]	1750	1750	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	117	424	228	424	424	782	782	366	366
d1, Uniform Delay [s]	29.15	34.01	30.95	36.46	35.74	17.76	17.52	37.66	36.91
k, delay calibration	0.08	0.08	0.08	0.09	0.08	0.50	0.50	0.24	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.71	1.21	1.55	5.23	2.83	0.69	0.58	7.37	4.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

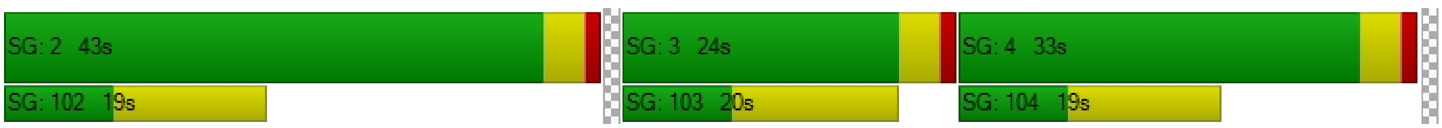
X, volume / capacity	0.22	0.64	0.55	0.88	0.81	0.23	0.20	0.77	0.69
d, Delay for Lane Group [s/veh]	29.86	35.22	32.50	41.69	38.57	18.45	18.11	45.04	41.78
Lane Group LOS	C	D	C	D	D	B	B	D	D
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	0.51	6.07	2.57	9.18	8.11	2.76	2.39	7.29	6.20
50th-Percentile Queue Length [ft]	12.71	151.72	64.15	229.59	202.63	69.09	59.80	182.28	155.08
95th-Percentile Queue Length [veh]	0.92	10.11	4.62	14.15	12.77	4.97	4.31	11.72	10.29
95th-Percentile Queue Length [ft]	22.88	252.73	115.47	353.83	319.35	124.36	107.64	292.99	257.20

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.86	35.22	35.22	32.50	40.66	38.57	18.45	18.32	18.11	45.04	43.35	41.78
Movement LOS	C	D	D	C	D	D	B	B	B	D	D	D
d_A, Approach Delay [s/veh]	34.75			39.04			18.29			43.50		
Approach LOS	C			D			B			D		
d_I, Intersection Delay [s/veh]	36.10											
Intersection LOS	D											
Intersection V/C	0.516											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	97.6
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.155

Intersection Setup

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	873	85	1341	4069	888	359
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	3.50	1.60	3.10	2.20	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	873	85	1341	4069	888	359
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	218	21	335	1017	222	90
Total Analysis Volume [veh/h]	873	85	1341	4069	888	359
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal group	6	2	5	2	4	4
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	4
Maximum Green [s]	35	110	75	110	15	15
Amber [s]	5.0	5.4	3.0	5.4	3.0	3.0
All red [s]	1.0	0.5	0.5	0.5	1.0	1.0
Split [s]	30	0	0	0	30	30
Vehicle Extension [s]	3.5	3.5	2.0	3.5	2.0	2.0
Walk [s]	5	0	0	0	5	5
Pedestrian Clearance [s]	35	0	0	0	29	29
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	4.0	3.9	1.5	3.9	2.0	2.0
Minimum Recall	Yes		No	Yes	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	6.00	6.00	3.50	5.90	4.00	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	1.50	3.90	2.00	0.00
g_i, Effective Green Time [s]	50	50	55	109	15	74
g / C, Green / Cycle	0.37	0.37	0.41	0.81	0.11	0.56
(v / s)_i Volume / Saturation Flow Rate	0.18	0.06	0.39	0.81	0.26	0.09
s, saturation flow rate [veh/h]	4910	1541	3459	5020	3438	4139
c, Capacity [veh/h]	1827	573	1434	4084	386	2305
d1, Uniform Delay [s]	32.03	27.88	37.39	12.25	59.30	14.37
k, delay calibration	0.13	0.13	0.04	0.13	0.50	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.23	0.14	1.39	6.38	593.28	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

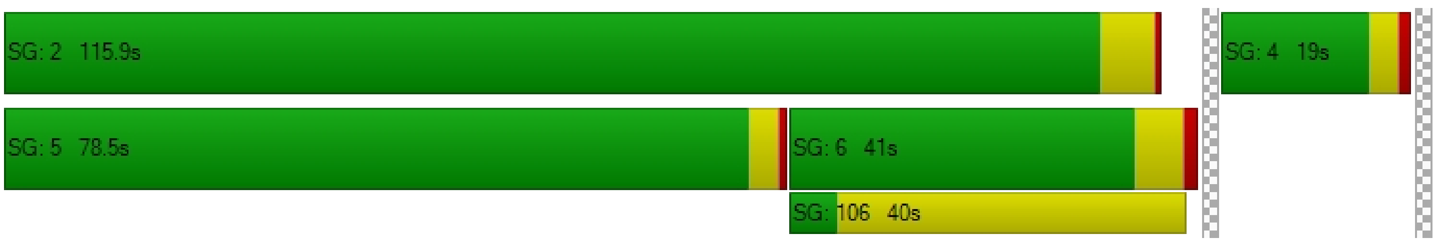
X, volume / capacity	0.48	0.15	0.94	1.00	2.30	0.16
d, Delay for Lane Group [s/veh]	32.27	28.02	38.78	18.63	652.58	14.38
Lane Group LOS	C	C	D	B	F	B
Critical Lane Group	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	6.86	1.76	19.67	23.15	38.29	1.75
50th-Percentile Queue Length [ft]	171.48	43.90	491.63	578.66	957.33	43.75
95th-Percentile Queue Length [veh]	11.15	3.16	26.94	31.04	60.08	3.15
95th-Percentile Queue Length [ft]	278.86	79.03	673.44	775.91	1502.06	78.76

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	32.27	28.02	38.78	18.63	652.58	14.38
Movement LOS	C	C	D	B	F	B
d_A, Approach Delay [s/veh]	31.89		23.62		468.85	
Approach LOS	C		C		F	
d_I, Intersection Delay [s/veh]	97.57					
Intersection LOS	F					
Intersection V/C	1.155					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	141.9
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.104

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Base Volume Input [veh/h]	444	625	361	16	59	142	243	747	197	732	3641	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	10.90	4.20	10.20	37.50	30.50	40.50	4.60	6.20	12.30	6.70	3.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	16	0	0	106	0	0	0
Total Hourly Volume [veh/h]	444	625	361	16	59	126	243	747	91	732	3641	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	111	156	90	4	15	32	61	187	23	183	910	6
Total Analysis Volume [veh/h]	444	625	361	16	59	126	243	747	91	732	3641	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	17			6			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	68
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Split	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	7	7	4	8	4	1	6	2	5	2	6
Auxiliary Signal Groups			5,7									
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	6	8	8	0	6	0	6	10	10	6	10	10
Maximum Green [s]	18	15	15	0	18	0	16	40	90	65	90	40
Amber [s]	3.0	3.9	3.9	0.0	3.0	0.0	3.5	5.0	5.0	3.6	5.0	5.0
All red [s]	1.5	0.5	0.5	0.0	1.5	0.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	0	0	0	0	0	30	30	0	0	0	30
Vehicle Extension [s]	2.0	2.2	2.2	0.0	2.0	0.0	2.0	3.0	3.0	2.0	3.0	3.0
Walk [s]	5	0	0	0	5	0	0	5	0	0	0	5
Pedestrian Clearance [s]	29	0	0	0	29	0	0	35	0	0	0	35
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.4	2.4	0.0	2.5	0.0	1.5	4.0	4.0	2.6	4.0	4.0
Minimum Recall		No	No		No		No	Yes		No	Yes	
Maximum Recall		No	No		No		No	No		No	No	
Pedestrian Recall		No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	20.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.40	4.40	4.40	4.40	4.50	4.50	4.50	3.50	6.00	6.00	4.60	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.40	2.40	2.40	0.00	2.50	2.50	2.50	1.50	4.00	4.00	2.60	4.00	4.00
g_i, Effective Green Time [s]	15	15	15	98	18	18	18	13	24	24	78	90	90
g / C, Green / Cycle	0.10	0.10	0.10	0.63	0.12	0.12	0.12	0.09	0.15	0.15	0.51	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.21	0.21	0.21	0.10	0.01	0.02	0.11	0.07	0.13	0.06	0.22	0.62	0.01
s, saturation flow rate [veh/h]	1632	1800	1659	3774	1316	2772	1123	3360	5836	1438	3293	5846	1615
c, Capacity [veh/h]	158	175	161	2386	153	323	131	287	905	223	1665	3403	940
d1, Uniform Delay [s]	69.81	69.81	69.81	11.57	61.10	61.67	67.99	69.70	63.30	58.93	24.32	32.31	13.71
k, delay calibration	0.50	0.50	0.50	0.06	0.04	0.04	0.36	0.04	0.11	0.11	0.04	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	550.3	541.1	539.9	0.02	0.11	0.10	57.96	2.65	1.98	1.20	0.07	33.17	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	2.18	2.16	2.16	0.15	0.10	0.18	0.96	0.85	0.83	0.41	0.44	1.07	0.03
d, Delay for Lane Group [s/veh]	620.1	610.9	609.7	11.58	61.21	61.77	125.95	72.35	65.28	60.12	24.38	65.48	13.72
Lane Group LOS	F	F	F	B	E	E	F	E	E	E	C	F	B
Critical Lane Group	Yes	No	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	30.41	33.10	30.46	1.66	0.58	1.07	7.14	4.87	9.71	3.32	8.64	51.32	0.37
50th-Percentile Queue Length [ft]	760.2	827.3	761.4	41.46	14.50	26.87	178.59	121.81	242.74	83.02	216.12	1282.97	9.24
95th-Percentile Queue Length [veh]	48.07	51.87	48.09	2.99	1.04	1.93	11.53	8.49	14.82	5.98	13.47	66.86	0.67
95th-Percentile Queue Length [ft]	1201.	1296.	1202.	74.63	26.09	48.37	288.18	212.32	370.50	149.44	336.67	1671.45	16.64

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	618.21	610.26	11.58	61.21	61.77	125.95	72.35	65.28	60.12	24.38	65.48	13.72
Movement LOS	F	F	B	E	E	F	E	E	E	C	F	B
d_A, Approach Delay [s/veh]	461.56			101.96			66.44			58.36		
Approach LOS	F			F			E			E		
d_I, Intersection Delay [s/veh]	141.92											
Intersection LOS	F											
Intersection V/C	1.104											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	9.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.766

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	163	1329	94	88	795	57	78	22	50	26	24	23
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	6.30	7.00	9.10	8.40	10.50	1.30	4.50	6.00	23.10	12.50	30.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	163	1329	94	88	795	57	78	22	50	26	24	23
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	332	24	22	199	14	20	6	13	7	6	6
Total Analysis Volume [veh/h]	163	1329	94	88	795	57	78	22	50	26	24	23
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			16			10			7		
Bicycle Volume [bicycles/h]	15			7			8			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	1	6	2	5	2	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	4	4	4	4	4	4
Maximum Green [s]	21	30	70	16	70	30	26	26	26	26	26	26
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.2	3.2	3.2
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	30	30	0	0	0	30	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	7	7	0	7	7	5	5	5	5	5	5
Pedestrian Clearance [s]	0	19	15	0	15	19	25	25	25	25	25	25
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.2	1.2	1.2
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	6.0	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	1.00	2.00	2.00	0.00	1.20
g_i, Effective Green Time [s]	5	21	21	2	19	19	5	5
g / C, Green / Cycle	0.12	0.55	0.55	0.07	0.50	0.50	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.09	0.40	0.41	0.05	0.25	0.25	0.09	0.05
s, saturation flow rate [veh/h]	1781	1787	1736	1659	1753	1702	1659	1507
c, Capacity [veh/h]	215	984	956	109	868	843	260	306
d1, Uniform Delay [s]	16.35	6.48	6.55	17.70	6.48	6.50	16.04	15.65
k, delay calibration	0.04	0.15	0.15	0.04	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.08	1.49	1.62	5.28	0.63	0.65	0.75	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

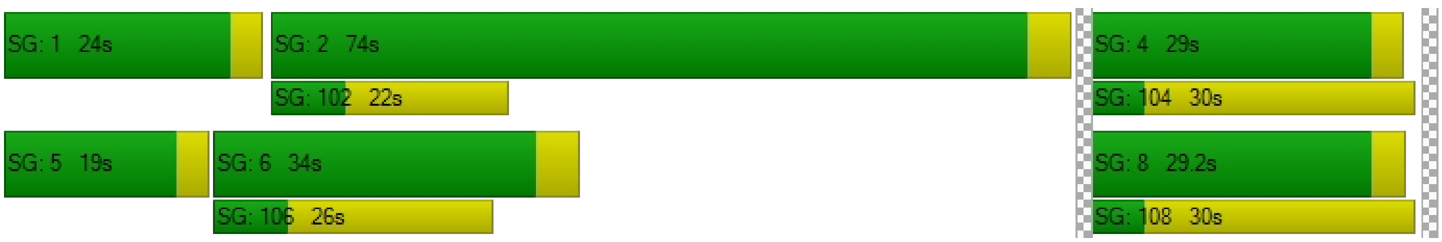
X, volume / capacity	0.76	0.73	0.74	0.81	0.50	0.50	0.58	0.24
d, Delay for Lane Group [s/veh]	18.43	7.98	8.17	22.98	7.11	7.15	16.79	15.80
Lane Group LOS	B	A	A	C	A	A	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	1.20	2.13	2.15	0.81	1.57	1.54	1.15	0.53
50th-Percentile Queue Length [ft]	30.09	53.37	53.77	20.37	39.22	38.50	28.79	13.17
95th-Percentile Queue Length [veh]	2.17	3.84	3.87	1.47	2.82	2.77	2.07	0.95
95th-Percentile Queue Length [ft]	54.17	96.07	96.79	36.67	70.59	69.29	51.83	23.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	18.43	8.07	8.17	22.98	7.13	7.15	16.79	16.79	16.79	15.80	15.80	15.80
Movement LOS	B	A	A	C	A	A	B	B	B	B	B	B
d_A, Approach Delay [s/veh]	9.14			8.61			16.79			15.80		
Approach LOS	A			A			B			B		
d_I, Intersection Delay [s/veh]	9.55											
Intersection LOS	A											
Intersection V/C	0.766											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	13.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.602

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	135.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	141	1569	842	9	17	147
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	5.70	10.30	22.20	0.00	6.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	141	1569	842	9	17	147
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	35	392	211	2	4	37
Total Analysis Volume [veh/h]	141	1569	842	9	17	147
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14		18		7	
Bicycle Volume [bicycles/h]	16		6		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	90.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lag	-
Minimum Green [s]	4	15	10	10	11	11
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	4.0	3.0	3.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	41	125	84	84	35	35
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	5	5
Pedestrian Clearance [s]	0	0	22	22	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	1.0	2.0	2.0	2.0	1.0	1.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	2.00	1.00	1.00
g_i, Effective Green Time [s]	15	135	117	117	18	18
g / C, Green / Cycle	0.09	0.84	0.73	0.73	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.08	0.46	0.25	0.25	0.01	0.10
s, saturation flow rate [veh/h]	1769	3423	1723	1715	1810	1440
c, Capacity [veh/h]	162	2883	1261	1255	206	164
d1, Uniform Delay [s]	71.71	3.67	7.63	7.64	63.41	69.95
k, delay calibration	0.04	0.50	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.43	0.74	0.73	0.73	0.06	6.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

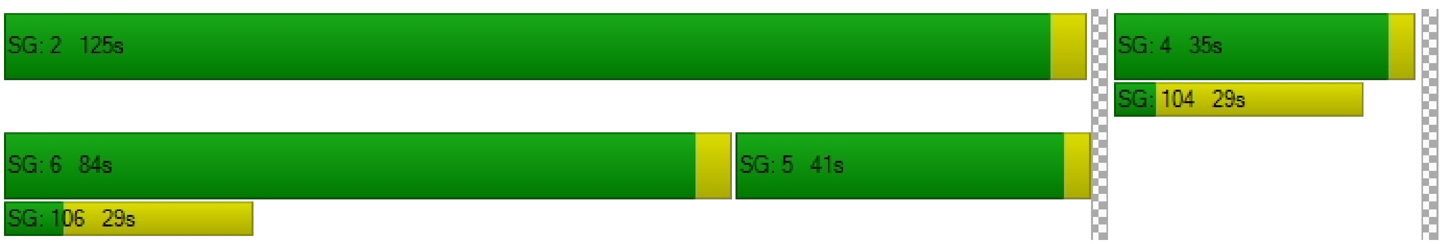
X, volume / capacity	0.87	0.54	0.34	0.34	0.08	0.90
d, Delay for Lane Group [s/veh]	77.14	4.41	8.35	8.37	63.47	76.64
Lane Group LOS	E	A	A	A	E	E
Critical Lane Group	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	5.92	5.63	5.11	5.12	0.63	6.28
50th-Percentile Queue Length [ft]	147.92	140.66	127.76	127.97	15.74	156.92
95th-Percentile Queue Length [veh]	9.91	9.52	8.82	8.83	1.13	10.39
95th-Percentile Queue Length [ft]	247.65	237.92	220.44	220.74	28.34	259.64

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.14	4.41	8.36	8.37	63.47	76.64
Movement LOS	E	A	A	A	E	E
d_A, Approach Delay [s/veh]	10.41		8.36		75.27	
Approach LOS	B		A		E	
d_I, Intersection Delay [s/veh]	13.67					
Intersection LOS	B					
Intersection V/C	0.602					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	16.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.676

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1617	307	54	969	313	93
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	5.30	7.40	9.70	10.30	8.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1617	307	54	969	313	93
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	404	77	14	242	78	23
Total Analysis Volume [veh/h]	1617	307	54	969	313	93
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		21	
Bicycle Volume [bicycles/h]	27		1		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	93.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	5	15	8	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	4.0	4.0	3.0	4.0	3.2	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	101	101	13	114	46	0
Vehicle Extension [s]	4.0	4.0	2.0	4.0	2.0	0.0
Walk [s]	7	7	0	0	0	0
Pedestrian Clearance [s]	17	17	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	1.0	2.0	1.2	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	3.00	4.00	3.20	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	1.00	2.00	1.20	1.20
g_i, Effective Green Time [s]	121	121	6	130	22	22
g / C, Green / Cycle	0.76	0.76	0.04	0.81	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.47	0.21	0.03	0.29	0.13	0.13
s, saturation flow rate [veh/h]	3432	1462	1685	3298	1641	1578
c, Capacity [veh/h]	2595	1105	68	2688	230	221
d1, Uniform Delay [s]	9.00	6.03	76.12	3.87	67.71	67.72
k, delay calibration	0.50	0.50	0.04	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.14	0.62	7.67	0.38	5.13	5.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.62	0.28	0.80	0.36	0.90	0.90
d, Delay for Lane Group [s/veh]	10.14	6.65	83.78	4.25	72.84	73.10
Lane Group LOS	B	A	F	A	E	E
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	11.90	3.11	2.34	3.50	8.69	8.38
50th-Percentile Queue Length [ft]	297.58	77.83	58.44	87.46	217.20	209.56
95th-Percentile Queue Length [veh]	17.56	5.60	4.21	6.30	13.52	13.13
95th-Percentile Queue Length [ft]	439.03	140.10	105.20	157.44	338.05	328.26

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.14	6.65	83.78	4.25	72.93	73.10
Movement LOS	B	A	F	A	E	E
d_A, Approach Delay [s/veh]	9.58		8.45		72.97	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	16.91					
Intersection LOS	B					
Intersection V/C	0.676					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	39.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.764

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	151	1826	166	51	1143	10	37	169	281	394	173	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	5.70	6.60	2.00	10.00	30.00	10.80	4.10	1.80	2.90	7.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	44	0	0	34
Total Hourly Volume [veh/h]	151	1826	166	51	1143	10	37	169	237	394	173	27
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	457	42	13	286	3	9	42	59	99	43	7
Total Analysis Volume [veh/h]	151	1826	166	51	1143	10	37	169	237	394	173	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			39			14			15		
Bicycle Volume [bicycles/h]	11			5			6			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	97.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	4	4	8	3	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	4	4	4	0	4	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0
Split [s]	30	68	68	12	50	50	50	50	50	0	30	0
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	0.0	2.0	0.0
Walk [s]	0	5	5	0	7	7	5	5	5	0	0	0
Pedestrian Clearance [s]	0	19	19	0	16	16	23	23	23	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	3.0	3.0	1.0	3.0	3.0	2.0	2.0	2.0	0.0	1.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	5.00	5.00	3.00	5.00	5.00	4.00	4.00	4.00	3.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	3.00	3.00	1.00	3.00	3.00	2.00	2.00	2.00	1.00	1.00	1.00
g_i, Effective Green Time [s]	16	90	90	6	81	81	28	28	28	21	21	21
g / C, Green / Cycle	0.10	0.57	0.57	0.04	0.51	0.51	0.17	0.17	0.17	0.13	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.09	0.39	0.39	0.03	0.23	0.23	0.02	0.09	0.16	0.12	0.10	0.02
s, saturation flow rate [veh/h]	1774	3423	1703	1774	3289	1718	1633	1825	1491	3415	1767	1593
c, Capacity [veh/h]	172	1937	964	65	1663	869	281	315	257	448	232	209
d1, Uniform Delay [s]	71.31	24.54	24.87	76.42	25.38	25.39	56.07	60.39	65.15	68.27	66.94	61.43
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.50	1.97	4.16	7.38	0.90	1.72	0.08	0.53	5.73	2.26	1.94	0.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

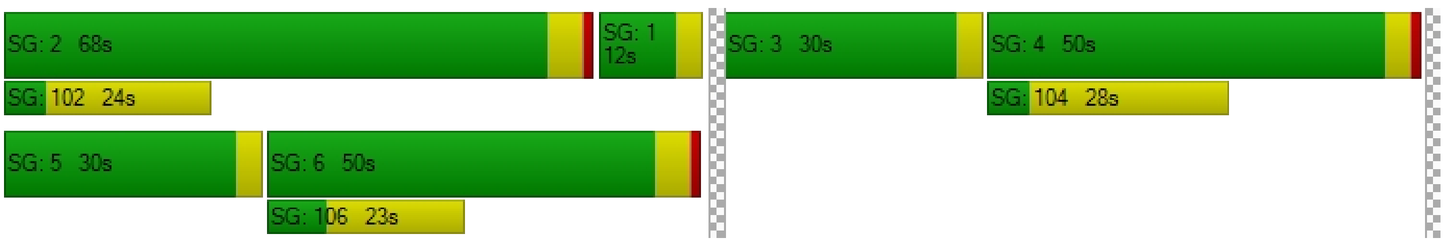
X, volume / capacity	0.88	0.68	0.70	0.78	0.46	0.46	0.13	0.54	0.92	0.88	0.75	0.13
d, Delay for Lane Group [s/veh]	76.81	26.51	29.03	83.80	26.28	27.11	56.14	60.92	70.88	70.53	68.88	61.53
Lane Group LOS	E	C	C	F	C	C	E	E	E	E	E	E
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	6.34	17.72	18.81	2.24	9.72	10.36	1.29	6.36	9.95	8.10	6.98	0.99
50th-Percentile Queue Length [ft]	158.39	442.94	470.17	56.05	242.88	259.07	32.21	158.88	248.85	202.44	174.41	24.68
95th-Percentile Queue Length [veh]	10.46	24.62	25.92	4.04	14.83	15.64	2.32	10.49	15.13	12.76	11.31	1.78
95th-Percentile Queue Length [ft]	261.59	615.52	647.97	100.89	370.67	391.06	57.98	262.24	378.21	319.11	282.70	44.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.81	27.20	29.03	83.80	26.56	27.11	56.14	60.92	70.88	70.53	68.88	61.53
Movement LOS	E	C	C	F	C	C	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	30.84			28.99			65.85			69.64		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	39.13											
Intersection LOS	D											
Intersection V/C	0.764											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	11.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.721

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	80.00	100.00	100.00	100.00	100.00	175.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	67	1278	1161	445	363	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	2.40	3.00	1.80	3.30	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	299	0	77
Total Hourly Volume [veh/h]	67	1278	1161	146	363	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	320	290	37	91	0
Total Analysis Volume [veh/h]	67	1278	1161	146	363	0
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		9	
Bicycle Volume [bicycles/h]	14		6		2	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	10	20	20	4	4
Maximum Green [s]	16	36	36	36	36	36
Amber [s]	3.0	4.5	4.5	4.5	3.2	3.2
All red [s]	0.5	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	0	0
Pedestrian Clearance [s]	0	0	18	18	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.5	3.5	3.5	3.5	2.2	2.2
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	5.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	3.50	2.20	2.20
g_i, Effective Green Time [s]	3	31	25	25	13	13
g / C, Green / Cycle	0.05	0.58	0.46	0.46	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.04	0.36	0.33	0.09	0.21	0.00
s, saturation flow rate [veh/h]	1783	3533	3512	1547	1752	1593
c, Capacity [veh/h]	86	2039	1632	719	429	390
d1, Uniform Delay [s]	25.64	7.64	11.67	8.63	19.59	0.00
k, delay calibration	0.04	0.15	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.57	0.46	0.83	0.20	1.80	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

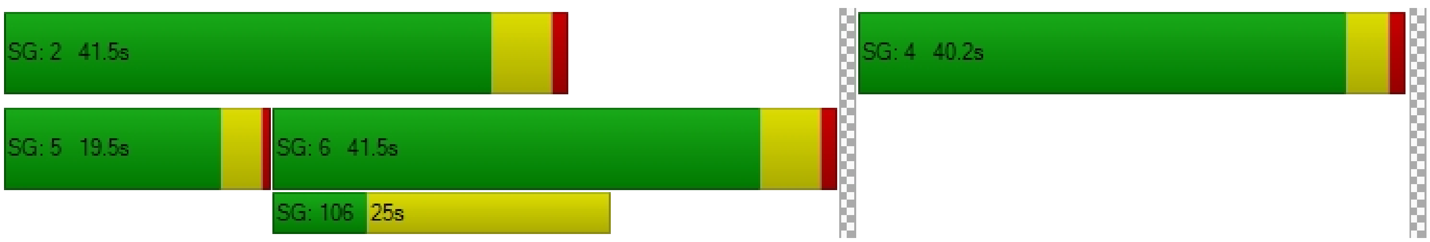
X, volume / capacity	0.78	0.63	0.71	0.20	0.85	0.00
d, Delay for Lane Group [s/veh]	31.22	8.09	12.50	8.82	21.40	0.00
Lane Group LOS	C	A	B	A	C	A
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	0.93	3.63	4.50	0.84	4.12	0.00
50th-Percentile Queue Length [ft]	23.32	90.86	112.52	21.02	102.91	0.00
95th-Percentile Queue Length [veh]	1.68	6.54	7.98	1.51	7.41	0.00
95th-Percentile Queue Length [ft]	41.98	163.55	199.51	37.84	185.23	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.22	8.09	12.50	8.82	21.40	0.00
Movement LOS	C	A	B	A	C	A
d_A, Approach Delay [s/veh]	9.24		12.09		21.40	
Approach LOS	A		B		C	
d_I, Intersection Delay [s/veh]	11.94					
Intersection LOS	B					
Intersection V/C	0.721					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	15.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.672

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	26	1040	16	36	925	89	40	3	10	58	14	84
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	6	0	0	0
Total Hourly Volume [veh/h]	26	1040	16	36	925	89	40	3	4	58	14	84
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	260	4	9	231	22	10	1	1	15	4	21
Total Analysis Volume [veh/h]	26	1040	16	36	925	89	40	3	4	58	14	84
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			10			10			20		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	30	30	4	30	30	4	4	4	4	4	4
Maximum Green [s]	30	100	100	20	100	100	30	30	30	30	30	30
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	30	30	0	30	30	30	30	30	30	30	30
Vehicle Extension [s]	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	7	7	7	7	7	7
Pedestrian Clearance [s]	0	11	11	0	15	15	15	15	15	15	15	15
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
g_i, Effective Green Time [s]	2	54	54	2	55	16	16	16	16
g / C, Green / Cycle	0.02	0.63	0.63	0.03	0.64	0.18	0.18	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.01	0.28	0.28	0.02	0.54	0.05	0.00	0.04	0.06
s, saturation flow rate [veh/h]	1810	1900	1889	1810	1870	805	1615	1402	1627
c, Capacity [veh/h]	39	1201	1194	49	1192	229	297	167	299
d1, Uniform Delay [s]	41.65	8.05	8.05	41.43	12.32	34.54	28.65	39.62	30.42
k, delay calibration	0.11	0.23	0.23	0.11	0.23	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	17.60	0.55	0.55	19.28	3.78	0.39	0.02	1.24	0.63
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.66	0.44	0.44	0.74	0.85	0.19	0.01	0.35	0.33
d, Delay for Lane Group [s/veh]	59.24	8.59	8.60	60.71	16.10	34.94	28.67	40.86	31.05
Lane Group LOS	E	A	A	E	B	C	C	D	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.74	4.66	4.64	1.01	14.50	0.88	0.07	1.25	1.80
50th-Percentile Queue Length [ft]	18.39	116.57	116.01	25.36	362.46	21.92	1.79	31.29	45.03
95th-Percentile Queue Length [veh]	1.32	8.20	8.17	1.83	20.74	1.58	0.13	2.25	3.24
95th-Percentile Queue Length [ft]	33.09	205.10	204.33	45.64	518.57	39.46	3.21	56.32	81.05

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.24	8.60	8.60	60.71	16.10	16.10	34.94	34.94	28.67	40.86	31.05	31.05
Movement LOS	E	A	A	E	B	B	C	C	C	D	C	C
d_A, Approach Delay [s/veh]		9.81			17.63			34.40			34.70	
Approach LOS		A			B			C			C	
d_I, Intersection Delay [s/veh]	15.49											
Intersection LOS	B											
Intersection V/C	0.672											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	19.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.754

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Base Volume Input [veh/h]	25	970	3	1	805	120	191	6	51	4	4	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	4.70	0.00	0.00	3.90	3.30	1.00	0.00	0.00	0.00	0.00	20.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	970	3	1	805	120	191	6	51	4	4	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	243	1	0	201	30	48	2	13	1	1	1
Total Analysis Volume [veh/h]	25	970	3	1	805	120	191	6	51	4	4	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			64			10			11		
Bicycle Volume [bicycles/h]	24			12			10			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	30.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	10	10	10	10	10	4	4	4	0	4	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	93	93	93	93	93	93	57	57	57	0	57	0
Vehicle Extension [s]	6.0	6.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	11	11	11	13	13	13	15	15	15	0	15	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	0.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	112	112	112	112	30	30
g / C, Green / Cycle	0.75	0.75	0.75	0.75	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.04	0.54	0.00	0.52	0.18	0.01
s, saturation flow rate [veh/h]	588	1813	587	1779	1357	1728
c, Capacity [veh/h]	318	1355	306	1329	311	373
d1, Uniform Delay [s]	22.93	10.33	23.55	9.97	58.98	48.61
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.48	3.29	0.02	3.03	4.67	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

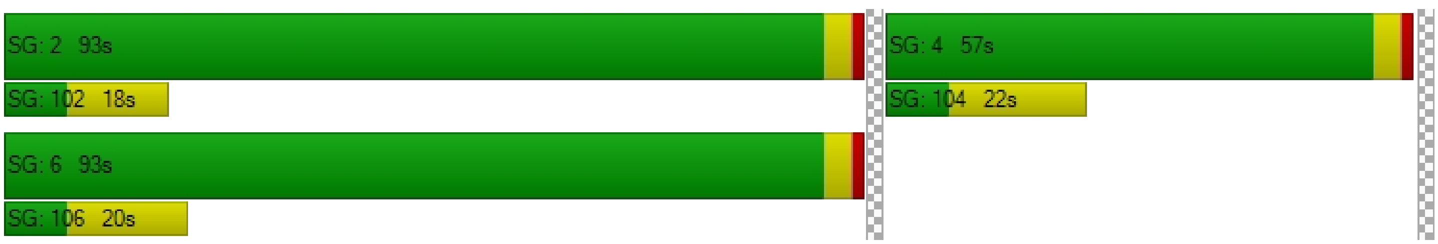
X, volume / capacity	0.08	0.72	0.00	0.70	0.80	0.03
d, Delay for Lane Group [s/veh]	23.41	13.62	23.57	13.00	63.65	48.65
Lane Group LOS	C	B	C	B	E	D
Critical Lane Group	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.56	17.72	0.02	15.81	9.67	0.41
50th-Percentile Queue Length [ft]	14.03	442.93	0.55	395.18	241.81	10.18
95th-Percentile Queue Length [veh]	1.01	24.62	0.04	22.33	14.77	0.73
95th-Percentile Queue Length [ft]	25.26	615.50	0.99	558.19	369.32	18.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	23.41	13.62	13.62	23.57	13.00	13.00	63.65	63.65	63.65	48.65	48.65	48.65
Movement LOS	C	B	B	C	B	B	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	13.87			13.01			63.65			48.65		
Approach LOS	B			B			E			D		
d_I, Intersection Delay [s/veh]	19.36											
Intersection LOS	B											
Intersection V/C	0.754											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	21.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.628

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	3	745	40	27	826	4	37	70	17	89	128	114
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.20	10.00	7.40	3.60	0.00	2.70	0.00	0.00	2.60	0.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	745	40	27	826	4	37	70	17	89	128	114
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	186	10	7	207	1	9	18	4	22	32	29
Total Analysis Volume [veh/h]	3	745	40	27	826	4	37	70	17	89	128	114
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			20			4			5		
Bicycle Volume [bicycles/h]	23			28			16			15		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	68.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	12	12	12	12	12	12	5	5	5	0	5	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	107	107	107	107	107	107	43	43	43	0	43	0
Vehicle Extension [s]	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	14	14	14	14	14	14	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	112	112	112	112	30	30	30	30
g / C, Green / Cycle	0.74	0.74	0.74	0.74	0.20	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.00	0.44	0.04	0.45	0.03	0.05	0.07	0.15
s, saturation flow rate [veh/h]	671	1786	652	1832	1126	1813	1291	1665
c, Capacity [veh/h]	394	1329	391	1363	109	365	241	335
d1, Uniform Delay [s]	17.71	8.76	17.54	8.98	69.40	50.26	58.32	55.99
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.13
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	1.93	0.34	2.03	1.83	0.33	0.95	3.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.59	0.07	0.61	0.34	0.24	0.37	0.72
d, Delay for Lane Group [s/veh]	17.75	10.70	17.88	11.01	71.24	50.60	59.27	59.60
Lane Group LOS	B	B	B	B	E	D	E	E
Critical Lane Group	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.06	11.90	0.52	12.89	1.46	2.83	3.20	9.01
50th-Percentile Queue Length [ft]	1.42	297.51	12.93	322.26	36.56	70.85	79.99	225.30
95th-Percentile Queue Length [veh]	0.10	17.56	0.93	18.78	2.63	5.10	5.76	13.94
95th-Percentile Queue Length [ft]	2.55	438.95	23.28	469.47	65.81	127.53	143.99	348.39

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	17.75	10.70	10.70	17.88	11.01	11.01	71.24	50.60	50.60	59.27	59.60	59.60
Movement LOS	B	B	B	B	B	B	E	D	D	E	E	E
d_A, Approach Delay [s/veh]	10.72			11.23			56.75			59.51		
Approach LOS	B			B			E			E		
d_I, Intersection Delay [s/veh]	21.34											
Intersection LOS	C											
Intersection V/C	0.628											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	58.9
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.563

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	29	212	146	458	75	391	80	368	256	320	356	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	3.60	2.60	2.70	3.80	2.50	0.50	5.50	5.30	3.70	13.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	119	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	29	212	27	458	75	0	80	368	256	320	356	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	53	7	115	19	0	20	92	64	80	89	4
Total Analysis Volume [veh/h]	29	212	27	458	75	0	80	368	256	320	356	15
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			11			3		
Bicycle Volume [bicycles/h]	33			43			24			24		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	8	1	8	4	4	4	6	3	6	2	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	Lag	-	-
Minimum Green [s]	0	3	0	3	3	3	0	3	0	3	3	3
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.3	0.0	3.7	3.7	3.7	0.0	3.7	0.0	3.7	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	0	41	0	35	35	35	0	43	0	31	31	31
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	8	0	8	8	8	0	8	0	8	8	8
Pedestrian Clearance [s]	0	20	0	22	22	22	0	17	0	18	18	18
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.3	0.0	2.7	2.7	2.7	0.0	2.7	0.0	2.7	2.7	2.7
Minimum Recall		No			No			No			Yes	
Maximum Recall		No			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.30	4.30	4.30	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.30	2.30	2.30	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	20	20	20	65	65	65	23	23	23	23	24	24	24
g / C, Green / Cycle	0.13	0.13	0.13	0.43	0.43	0.43	0.15	0.15	0.15	0.15	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.02	0.12	0.02	0.15	0.15	0.00	0.05	0.12	0.12	0.13	0.13	0.13	0.13
s, saturation flow rate [veh/h]	1810	1810	1419	1764	1786	1556	1765	1891	1731	1411	1718	1799	1635
c, Capacity [veh/h]	240	240	188	767	776	677	269	288	263	215	271	284	258
d1, Uniform Delay [s]	57.34	63.91	57.52	28.18	28.18	0.00	56.46	61.20	61.50	62.02	61.42	61.40	61.46
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.22	10.32	0.35	1.23	1.22	0.00	0.61	4.67	5.95	9.66	7.31	6.92	7.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.12	0.88	0.14	0.35	0.35	0.00	0.30	0.78	0.81	0.86	0.85	0.85	0.85
d, Delay for Lane Group [s/veh]	57.57	74.23	57.87	29.42	29.40	0.00	57.07	65.87	67.45	71.68	68.74	68.32	69.30
Lane Group LOS	E	E	E	C	C	A	E	E	E	E	E	E	E
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	0.99	8.67	0.93	6.78	6.86	0.00	2.76	8.68	8.35	7.47	9.12	9.49	8.75
50th-Percentile Queue Length [ft]	24.87	216.77	23.33	169.44	171.46	0.00	69.09	216.9	208.7	186.7	227.90	237.13	218.86
95th-Percentile Queue Length [veh]	1.79	13.50	1.68	11.05	11.15	0.00	4.97	13.51	13.09	11.95	14.07	14.54	13.61
95th-Percentile Queue Length [ft]	44.76	337.50	41.99	276.18	278.83	0.00	124.3	337.6	327.2	298.7	351.70	363.40	340.17

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.57	74.23	57.87	29.41	29.40	0.00	57.07	66.48	70.79	68.62	68.88	69.30
Movement LOS	E	E	E	C	C	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	70.78			29.41			66.87			68.77		
Approach LOS	E			C			E			E		
d_I, Intersection Delay [s/veh]	58.85											
Intersection LOS	E											
Intersection V/C	0.563											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	24.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	15	618	67	21	483	11	172	141	16	136	188	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.30	3.00	0.00	4.90	0.00	6.50	0.90	7.70	11.00	2.10	3.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	618	67	21	483	11	172	141	16	136	188	65
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	155	17	5	121	3	43	35	4	34	47	16
Total Analysis Volume [veh/h]	15	618	67	21	483	11	172	141	16	136	188	65
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	36			37			51			41		
Bicycle Volume [bicycles/h]	52			17			11			37		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	2	2	6	2	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	4	4	0	4	0	0	5	0	4	4	4
Maximum Green [s]	56	56	56	0	56	0	0	31	0	31	31	31
Amber [s]	3.1	3.1	3.1	0.0	3.1	0.0	0.0	3.1	0.0	3.1	3.1	3.1
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	0	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	2.0	2.0	2.0
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	14	0	14	14	14
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	0.0	2.1	0.0	0.0	2.1	0.0	2.1	2.1	2.1
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	35	35	35	35	10	10	19
g / C, Green / Cycle	0.46	0.46	0.46	0.46	0.13	0.13	0.24
(v / s)_i Volume / Saturation Flow Rate	0.02	0.38	0.03	0.27	0.10	0.09	0.22
s, saturation flow rate [veh/h]	914	1818	769	1800	1699	1802	1777
c, Capacity [veh/h]	308	842	180	834	224	238	435
d1, Uniform Delay [s]	22.84	17.74	31.08	15.23	32.18	31.68	28.03
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.05
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	1.97	0.28	0.67	5.46	3.13	3.10
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

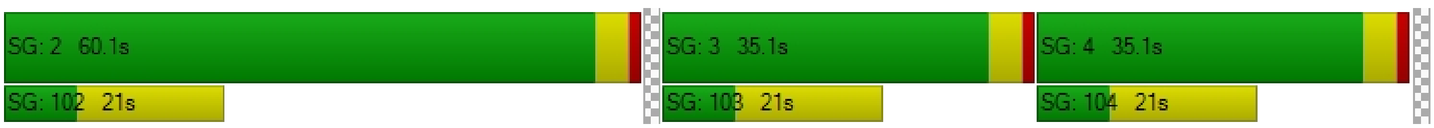
X, volume / capacity	0.05	0.81	0.12	0.59	0.77	0.66	0.89
d, Delay for Lane Group [s/veh]	22.91	19.71	31.36	15.91	37.64	34.81	31.13
Lane Group LOS	C	B	C	B	D	C	C
Critical Lane Group	No	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.21	9.84	0.36	5.97	3.32	2.89	7.05
50th-Percentile Queue Length [ft]	5.25	246.07	9.00	149.18	83.06	72.17	176.33
95th-Percentile Queue Length [veh]	0.38	14.99	0.65	9.97	5.98	5.20	11.41
95th-Percentile Queue Length [ft]	9.45	374.70	16.20	249.33	149.51	129.91	285.22

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	22.91	19.71	19.71	31.36	15.91	15.91	37.64	34.81	34.81	31.13	31.13	31.13
Movement LOS	C	B	B	C	B	B	D	C	C	C	C	C
d_A, Approach Delay [s/veh]	19.78			16.54			36.29			31.13		
Approach LOS	B			B			D			C		
d_I, Intersection Delay [s/veh]	24.01											
Intersection LOS	C											
Intersection V/C	0.735											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	8.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.512

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	12	272	90	30	345	61	30	107	16	72	200	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	3.10	16.50	0.00	1.40	0.00	0.00	2.00	3.80	6.70	3.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	272	90	30	345	61	30	107	16	72	200	52
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	68	23	8	86	15	8	27	4	18	50	13
Total Analysis Volume [veh/h]	12	272	90	30	345	61	30	107	16	72	200	52
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			51			27			65		
Bicycle Volume [bicycles/h]	28			39			21			32		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	4	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	8	8	8	0	8	0	0	4	0	4	4	4
Maximum Green [s]	30	30	30	0	30	0	0	30	0	30	30	30
Amber [s]	3.2	3.2	3.2	0.0	3.2	0.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	30	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	12	0	12	12	12
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	2.2	2.2	0.0	2.2	0.0	0.0	2.2	0.0	2.2	2.2	2.2
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	13	13	10	10
g / C, Green / Cycle	0.42	0.42	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.22	0.25	0.09	0.20
s, saturation flow rate [veh/h]	1714	1743	1743	1636
c, Capacity [veh/h]	831	847	695	664
d1, Uniform Delay [s]	6.99	7.25	8.12	9.13
k, delay calibration	0.11	0.11	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.38	0.49	0.12	0.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.45	0.51	0.22	0.49
d, Delay for Lane Group [s/veh]	7.38	7.74	8.24	9.54
Lane Group LOS	A	A	A	A
Critical Lane Group	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	1.31	1.59	0.59	1.34
50th-Percentile Queue Length [ft]	32.67	39.68	14.85	33.62
95th-Percentile Queue Length [veh]	2.35	2.86	1.07	2.42
95th-Percentile Queue Length [ft]	58.81	71.42	26.72	60.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.38	7.38	7.38	7.74	7.74	7.74	8.24	8.24	8.24	9.54	9.54	9.54
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
d_A, Approach Delay [s/veh]	7.38			7.74			8.24			9.54		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	8.15											
Intersection LOS	A											
Intersection V/C	0.512											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	33.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.976

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	14	100	16	222	20	212	40	2098	282	181	1968	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	3.20	0.00	2.70	0.00	3.60	0.90	0.60	3.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	124	0	0	0
Total Hourly Volume [veh/h]	14	100	16	222	20	212	40	2098	158	181	1968	76
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	25	4	56	5	53	10	525	40	45	492	19
Total Analysis Volume [veh/h]	14	100	16	222	20	212	40	2098	158	181	1968	76
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			2			0			11		
Bicycle Volume [bicycles/h]	0			4			2			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	84.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	0	10	10	0	10	10	0
Maximum Green [s]	0	30	0	0	30	0	25	35	0	25	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	0	39	0	0	39	0	43	85	0	26	68	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
g_i, Effective Green Time [s]	36	36	36	36	8	87	87	17	96	96
g / C, Green / Cycle	0.24	0.24	0.24	0.24	0.05	0.58	0.58	0.11	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.01	0.06	0.25	0.14	0.02	0.60	0.10	0.10	0.38	0.39
s, saturation flow rate [veh/h]	1414	1855	972	1527	1810	3492	1564	1799	3502	1799
c, Capacity [veh/h]	49	445	279	366	98	2026	907	203	2238	1150
d1, Uniform Delay [s]	74.90	46.16	62.25	50.25	67.16	16.95	7.56	62.70	5.30	5.32
k, delay calibration	0.11	0.11	0.50	0.16	0.11	0.50	0.50	0.21	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.20	0.31	28.35	2.09	2.68	29.81	0.42	20.99	1.21	2.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

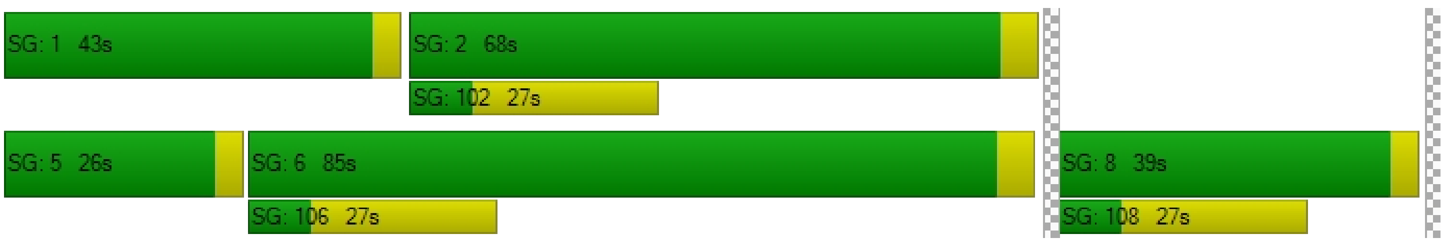
X, volume / capacity	0.29	0.26	0.87	0.58	0.41	1.04	0.17	0.89	0.60	0.61
d, Delay for Lane Group [s/veh]	78.10	46.47	90.60	52.34	69.84	46.76	7.98	83.69	6.51	7.71
Lane Group LOS	E	D	F	D	E	F	A	F	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.60	3.68	11.50	7.29	1.54	33.41	1.42	7.77	4.35	4.89
50th-Percentile Queue Length [ft]	14.88	92.02	287.59	182.35	38.42	835.22	35.54	194.30	108.77	122.15
95th-Percentile Queue Length [veh]	1.07	6.63	17.07	11.72	2.77	44.18	2.56	12.34	7.77	8.51
95th-Percentile Queue Length [ft]	26.79	165.64	426.65	293.09	69.16	1104.42	63.98	308.60	194.29	212.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	78.10	46.47	46.47	90.60	90.60	52.34	69.84	46.76	7.98	83.69	6.89	7.71
Movement LOS	E	D	D	F	F	D	E	F	A	F	A	A
d_A, Approach Delay [s/veh]	49.87			72.74			44.49			13.16		
Approach LOS	D			E			D			B		
d_I, Intersection Delay [s/veh]	33.49											
Intersection LOS	C											
Intersection V/C	0.976											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	64.9
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.983

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	281	139	137	160	337	30	128	889	44	79	1976	802
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	2.40	1.60	0.00	2.80	0.00	0.00	3.90	0.00	1.90	3.90	3.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	74	0	0	0	0	0	29	0	0	285
Total Hourly Volume [veh/h]	281	139	63	160	337	30	128	889	15	79	1976	517
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	35	16	40	84	8	32	222	4	20	494	129
Total Analysis Volume [veh/h]	281	139	63	160	337	30	128	889	15	79	1976	517
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			12			10			5		
Bicycle Volume [bicycles/h]	18			15			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	3	0	0	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	8	10	0	8	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	21	0	0	33	0	13	34	0	62	83	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	2.0	2.2	0.0	2.0	2.2	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		Yes	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	4.00	4.20	4.20	4.00	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	2.00	2.20	2.20	2.00	2.20	2.20
g_i, Effective Green Time [s]	18	18	18	29	29	9	79	79	9	79	79
g / C, Green / Cycle	0.12	0.12	0.12	0.20	0.20	0.06	0.53	0.53	0.06	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.04	0.09	0.20	0.07	0.26	0.01	0.04	0.57	0.34
s, saturation flow rate [veh/h]	1767	1824	1517	1810	1817	1810	3482	1578	1776	3482	1522
c, Capacity [veh/h]	209	215	179	356	357	109	1836	832	101	1825	798
d1, Uniform Delay [s]	66.06	66.06	60.86	53.12	60.26	69.00	13.09	10.59	68.41	22.59	14.97
k, delay calibration	0.44	0.44	0.11	0.11	0.48	0.47	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	55.87	54.96	1.17	0.89	54.20	139.92	0.92	0.04	12.34	47.42	4.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.99	0.99	0.35	0.45	1.03	1.18	0.48	0.02	0.78	1.08	0.65
d, Delay for Lane Group [s/veh]	121.93	121.02	62.03	54.01	114.46	208.91	14.01	10.63	80.74	70.01	19.03
Lane Group LOS	F	F	E	D	F	F	B	B	F	F	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	11.17	11.47	2.29	5.50	19.06	8.29	5.76	0.17	3.29	38.30	9.10
50th-Percentile Queue Length [ft]	279.27	286.86	57.14	137.43	476.59	207.24	143.97	4.15	82.33	957.48	227.39
95th-Percentile Queue Length [veh]	16.65	17.03	4.11	9.34	26.64	13.68	9.69	0.30	5.93	51.64	14.04
95th-Percentile Queue Length [ft]	416.30	425.74	102.86	233.56	665.92	341.94	242.35	7.47	148.19	1291.06	351.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	121.69	121.02	62.03	54.01	114.46	114.46	208.91	14.01	10.63	80.74	70.01	19.03
Movement LOS	F	F	E	D	F	F	F	B	B	F	F	B
d_A, Approach Delay [s/veh]	113.71			96.11			38.13			60.09		
Approach LOS	F			F			D			E		
d_I, Intersection Delay [s/veh]	64.91											
Intersection LOS	E											
Intersection V/C	0.983											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	35.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.876

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	57	196	53	117	254	63	112	917	92	196	2139	133
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	8.80	1.00	1.90	0.90	2.80	3.20	4.50	5.20	4.10	1.60	4.30	9.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	58	0	0	50	0	0	69	0	0	69
Total Hourly Volume [veh/h]	57	196	0	117	254	13	112	917	23	196	2139	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	49	0	29	64	3	28	229	6	49	535	16
Total Analysis Volume [veh/h]	57	196	0	117	254	13	112	917	23	196	2139	64
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			4			25			11		
Bicycle Volume [bicycles/h]	19			38			0			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	136.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	7	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	0	4	4	0	4	10	0	4	10	0
Maximum Green [s]	16	25	0	16	25	0	18	20	0	18	20	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	10	33	0	13	36	0	12	82	0	22	92	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	1.5	0.0	1.0	1.5	0.0	1.5	2.2	0.0	1.5	2.2	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	3.50	3.50	3.00	3.50	3.50	3.50	4.20	4.20	3.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.50	1.50	1.00	1.50	1.50	1.50	2.20	2.20	1.50	2.20	2.20
g_i, Effective Green Time [s]	6	21	21	10	25	25	9	86	86	18	96	96
g / C, Green / Cycle	0.04	0.14	0.14	0.07	0.17	0.17	0.06	0.58	0.58	0.12	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.03	0.10	0.00	0.07	0.14	0.01	0.06	0.27	0.01	0.11	0.62	0.04
s, saturation flow rate [veh/h]	1663	1881	1585	1793	1848	1439	1732	3439	1546	1781	3468	1436
c, Capacity [veh/h]	71	267	225	120	307	239	99	1980	890	215	2218	918
d1, Uniform Delay [s]	71.06	61.58	0.00	69.76	60.41	52.58	67.77	1.35	1.29	62.02	9.61	4.05
k, delay calibration	0.22	0.11	0.11	0.41	0.18	0.11	0.48	0.50	0.50	0.36	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	32.76	4.03	0.00	68.36	9.24	0.09	129.20	0.78	0.05	33.58	12.37	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.74	0.00	0.98	0.83	0.05	1.13	0.46	0.03	0.91	0.96	0.07
d, Delay for Lane Group [s/veh]	103.82	65.61	0.00	138.12	69.65	52.67	196.97	2.13	1.34	95.60	21.98	4.20
Lane Group LOS	F	E	A	F	E	D	F	A	A	F	C	A
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	2.84	7.53	0.00	6.81	10.23	0.43	7.19	0.89	0.05	9.14	17.52	0.36
50th-Percentile Queue Length [ft]	71.07	188.34	0.00	170.21	255.75	10.67	179.71	22.20	1.15	228.59	437.92	9.00
95th-Percentile Queue Length [veh]	5.12	12.03	0.00	11.09	15.48	0.77	12.03	1.60	0.08	14.10	24.38	0.65
95th-Percentile Queue Length [ft]	127.92	300.87	0.00	277.20	386.89	19.21	300.78	39.96	2.08	352.56	609.51	16.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	103.82	65.61	0.00	138.12	69.65	52.67	196.97	2.13	1.34	95.60	21.98	4.20
Movement LOS	F	E	A	F	E	D	F	A	A	F	C	A
d_A, Approach Delay [s/veh]	74.22			89.93			22.86			27.52		
Approach LOS	E			F			C			C		
d_I, Intersection Delay [s/veh]	35.07											
Intersection LOS	D											
Intersection V/C	0.876											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	12.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.828

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	99	69	97	85	91	62	0	1877	89	0	1476	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.80	18.50	7.90	2.40	20.50	3.30	0.00	3.80	5.10	0.00	3.50	8.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	53	0	0	84
Total Hourly Volume [veh/h]	99	69	97	85	91	62	0	1877	36	0	1476	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	17	24	21	23	16	0	469	9	0	369	0
Total Analysis Volume [veh/h]	99	69	97	85	91	62	0	1877	36	0	1476	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	19			15			43			20		
Bicycle Volume [bicycles/h]	14			36			2			4		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	137.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	3	0	0	4	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	10	0	0	10	0
Maximum Green [s]	0	24	0	0	24	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.7	0.0	0.0	3.7	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	87	0	0	31	0	0	32	0	0	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.2	0.0	0.0	2.2	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	15	15	15	21	21	102	102	102	102
g / C, Green / Cycle	0.10	0.10	0.10	0.14	0.14	0.68	0.68	0.68	0.68
(v / s)_i Volume / Saturation Flow Rate	0.06	0.05	0.09	0.05	0.12	0.60	0.03	0.47	0.00
s, saturation flow rate [veh/h]	1569	1443	1133	1590	1256	3137	1339	3146	1346
c, Capacity [veh/h]	161	148	116	218	172	2128	909	2135	913
d1, Uniform Delay [s]	64.35	63.31	65.93	58.89	63.47	0.00	0.00	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.76	2.26	14.07	1.13	13.97	5.70	0.08	1.86	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

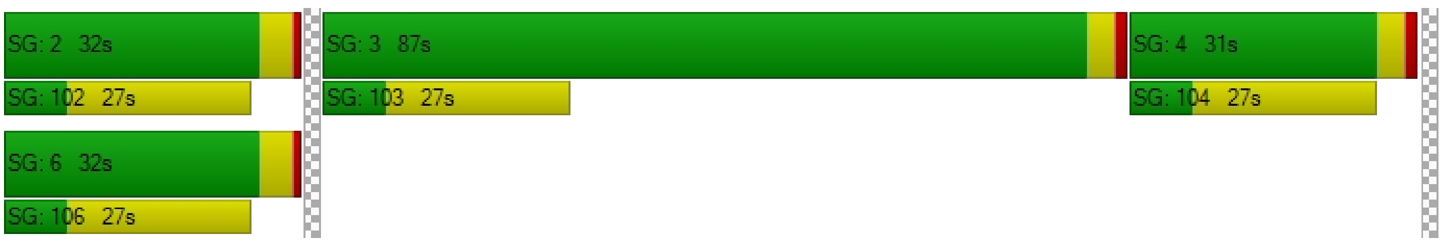
X, volume / capacity	0.61	0.47	0.83	0.39	0.89	0.88	0.04	0.69	0.00
d, Delay for Lane Group [s/veh]	68.11	65.58	80.01	60.02	77.44	5.70	0.08	1.86	0.00
Lane Group LOS	E	E	F	E	E	A	A	A	A
Critical Lane Group	No	No	Yes	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh]	3.81	2.59	4.11	3.05	6.46	1.69	0.02	0.55	0.00
50th-Percentile Queue Length [ft]	95.25	64.77	102.78	76.36	161.54	42.13	0.52	13.82	0.00
95th-Percentile Queue Length [veh]	6.86	4.66	7.40	5.50	10.63	3.03	0.04	1.00	0.00
95th-Percentile Queue Length [ft]	171.45	116.58	185.00	137.45	265.76	75.84	0.93	24.88	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	68.11	65.58	80.01	60.02	77.44	77.44	0.00	5.70	0.08	0.00	1.86	0.00
Movement LOS	E	E	F	E	E	E		A	A		A	A
d_A, Approach Delay [s/veh]	71.80			71.22			5.60			1.86		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	12.70											
Intersection LOS	B											
Intersection V/C	0.828											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	73.0
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.005

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	24	345	60	417	214	44	110	978	497	262	2314	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	1.20	1.70	2.20	1.40	6.80	10.20	3.10	2.50	3.10	3.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	58	0	0	377	0	0	14
Total Hourly Volume [veh/h]	24	345	60	417	214	0	110	978	120	262	2314	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	86	15	104	54	0	28	245	30	66	579	3
Total Analysis Volume [veh/h]	24	345	60	417	214	0	110	978	120	262	2314	12
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23			0			0			20		
Bicycle Volume [bicycles/h]	41			11			1			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	3	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	4	4	4	8	10	10	8	10	10
Maximum Green [s]	0	30	0	16	16	16	4	16	16	4	16	16
Amber [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.2	3.7	3.7	3.2	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	21	0	31	31	31	13	51	51	47	85	85
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	0	0	7	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	0	0	20	20	20	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.2	2.7	2.7	2.2	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.70	4.70	4.20	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.70	2.70	2.20	2.70	2.70
g_i, Effective Green Time [s]	17	17	21	21	21	9	71	71	24	86	86
g / C, Green / Cycle	0.11	0.11	0.14	0.14	0.14	0.06	0.47	0.47	0.16	0.57	0.57
(v / s)_i Volume / Saturation Flow Rate	0.12	0.13	0.12	0.11	0.00	0.07	0.28	0.08	0.15	0.66	0.01
s, saturation flow rate [veh/h]	1868	1570	3438	1874	1512	1642	3509	1556	1755	3495	1547
c, Capacity [veh/h]	212	178	485	264	213	96	1652	733	284	2007	888
d1, Uniform Delay [s]	66.49	66.49	62.96	62.46	0.00	69.13	19.38	15.66	53.80	3.22	1.37
k, delay calibration	0.47	0.50	0.11	0.18	0.11	0.43	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	82.03	106.51	4.58	9.36	0.00	128.47	1.57	0.48	11.94	75.01	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

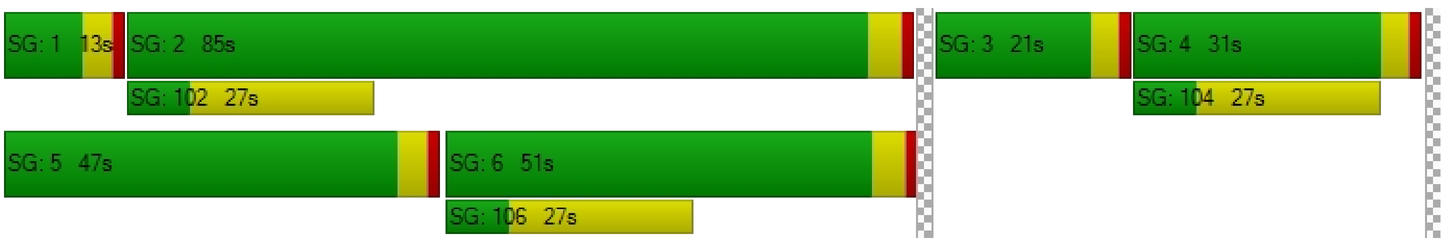
X, volume / capacity	1.08	1.13	0.86	0.81	0.00	1.14	0.59	0.16	0.92	1.15	0.01
d, Delay for Lane Group [s/veh]	148.52	173.00	67.54	71.82	0.00	197.60	20.95	16.15	65.74	78.23	1.40
Lane Group LOS	F	F	E	E	A	F	C	B	E	F	A
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	12.96	12.10	8.12	8.64	0.00	7.05	9.22	1.79	9.73	22.48	0.02
50th-Percentile Queue Length [ft]	323.93	302.50	202.88	215.89	0.00	176.28	230.55	44.78	243.26	562.09	0.61
95th-Percentile Queue Length [veh]	19.47	18.71	12.79	13.46	0.00	11.87	14.20	3.22	14.85	33.59	0.04
95th-Percentile Queue Length [ft]	486.74	467.84	319.68	336.38	0.00	296.70	355.06	80.61	371.15	839.83	1.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	148.52	158.53	173.00	67.54	71.82	0.00	197.60	20.95	16.15	65.74	78.23	1.40
Movement LOS	F	F	F	E	E	A	F	C	B	E	F	A
d_A, Approach Delay [s/veh]		159.99			68.99			36.56			76.61	
Approach LOS		F			E			D			E	
d_I, Intersection Delay [s/veh]	73.02											
Intersection LOS	E											
Intersection V/C	1.005											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	6.3
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.655

Intersection Setup

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	72	9	75	6	3	10	89	2464	51	49	1825	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	10.00	0.00	2.90	0.00	2.30	2.60	2.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	9	0	0	0	0	0	0
Total Hourly Volume [veh/h]	72	9	75	6	3	1	89	2464	51	49	1825	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	2	19	2	1	0	22	616	13	12	456	11
Total Analysis Volume [veh/h]	72	9	75	6	3	1	89	2464	51	49	1825	45
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			0			2		
Bicycle Volume [bicycles/h]	16			0			3			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	19.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	8	8	4	8	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	8	8	0	8	0	4	10	10	4	10	10
Maximum Green [s]	30	30	30	0	30	0	20	40	40	20	40	40
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.7	3.7	3.0	3.7	3.7
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	36	36	36	0	36	0	81	36	36	78	33	33
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	7	7	0	7	0	0	7	7	0	7	7
Pedestrian Clearance [s]	20	20	20	0	20	0	0	20	20	0	20	20
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.7	2.7	2.0	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.70	4.70	4.00	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.70	2.70	2.00	2.70	2.70
g_i, Effective Green Time [s]	19	19	19	9	113	113	5	109	109
g / C, Green / Cycle	0.13	0.13	0.13	0.06	0.75	0.75	0.04	0.73	0.73
(v / s)_i Volume / Saturation Flow Rate	0.11	0.01	0.00	0.05	0.47	0.47	0.03	0.35	0.35
s, saturation flow rate [veh/h]	1414	1128	1461	1810	3516	1824	1769	3526	1825
c, Capacity [veh/h]	216	184	187	111	2642	1371	64	2560	1325
d1, Uniform Delay [s]	64.64	57.31	57.08	67.88	0.00	0.00	70.71	0.71	0.71
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.55	0.11	0.01	12.18	1.13	2.21	17.10	0.65	1.26
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

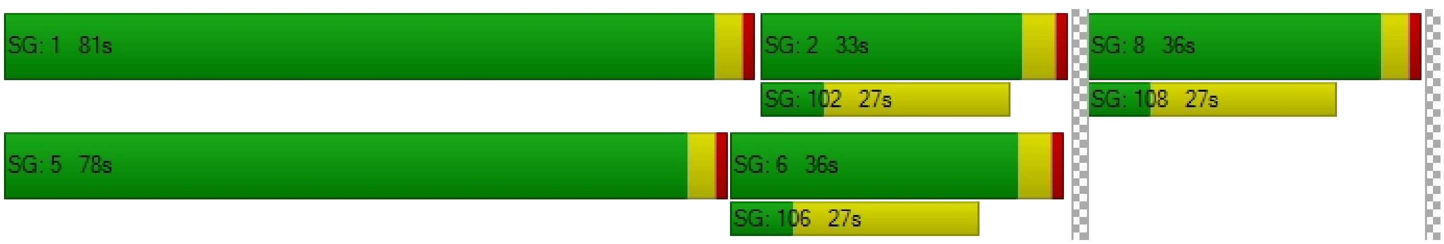
X, volume / capacity	0.72	0.05	0.01	0.80	0.63	0.63	0.77	0.48	0.48
d, Delay for Lane Group [s/veh]	69.19	57.42	57.09	80.06	1.13	2.21	87.81	1.36	1.97
Lane Group LOS	E	E	E	F	A	A	F	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	6.19	0.31	0.03	3.67	0.41	0.84	2.15	0.85	1.11
50th-Percentile Queue Length [ft]	154.76	7.86	0.87	91.68	10.35	21.02	53.66	21.27	27.70
95th-Percentile Queue Length [veh]	10.27	0.57	0.06	6.60	0.75	1.51	3.86	1.53	1.99
95th-Percentile Queue Length [ft]	256.77	14.14	1.56	165.02	18.63	37.84	96.59	38.29	49.86

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.19	69.19	69.19	57.42	57.42	57.09	80.06	1.48	2.21	87.81	1.56	1.97
Movement LOS	E	E	E	E	E	E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	69.19			57.39			4.18			3.77		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	6.29											
Intersection LOS	A											
Intersection V/C	0.655											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	15.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.749

Intersection Setup

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound				Northwestbound			Southeastbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	55.00	100.0	100.0	100.0	100.0	275.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				30.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Crosswalk	Yes			Yes				No			Yes		

volumes

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	186	0	286	0	0	0	0	360	2058	0	0	1823	71
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	0.00	0.70	0.00	0.00	0.00	0.00	2.20	4.80	0.00	0.00	3.60	2.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	183	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	186	0	103	0	0	0	0	360	2058	0	0	1823	71
Peak Hour Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	47	0	26	0	0	0	0	90	515	0	0	456	18
Total Analysis Volume [veh/h]	186	0	103	0	0	0	0	360	2058	0	0	1823	71
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			0				0			8		
Bicycle Volume [bicycles/h]	5			0				3			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	34.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Permi	Permi	Permi	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	4	0	0	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	10	0	0	0	0	10	0	10	10	0	0	10	0
Maximum Green [s]	25	0	0	0	0	25	0	30	45	0	0	45	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	42	0	0	0	0	42	0	86	108	0	0	22	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	25	0	0	0	0	25	0	0	20	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No					No		No	No			No	
Maximum Recall	No					No		No	No			No	
Pedestrian Recall	No					No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	L	C	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	26	26	26	33	117	82	82
g / C, Green / Cycle	0.17	0.17	0.17	0.22	0.78	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.13	0.07	0.00	0.20	0.42	0.36	0.35
s, saturation flow rate [veh/h]	1390	1574	1900	1771	4939	3492	1793
c, Capacity [veh/h]	267	269	348	387	3865	1900	975
d1, Uniform Delay [s]	61.44	55.18	0.00	52.04	0.00	13.33	13.14
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.31	0.90	0.00	10.16	0.53	1.85	3.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

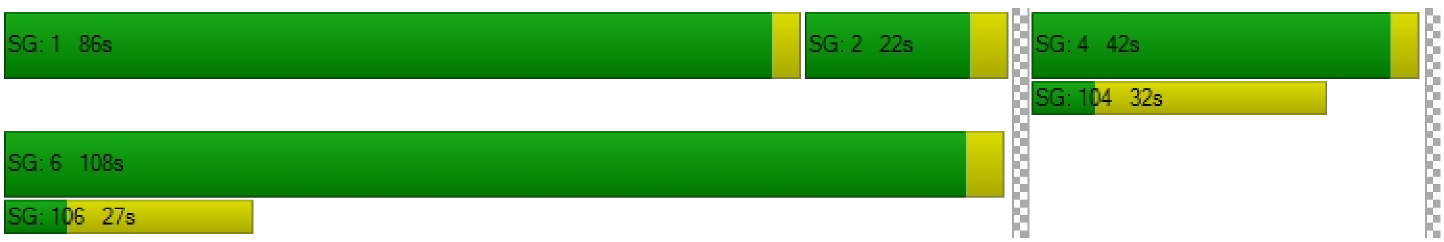
X, volume / capacity	0.70	0.38	0.00	0.93	0.53	0.66	0.65
d, Delay for Lane Group [s/veh]	64.75	56.08	0.00	62.20	0.53	15.19	16.46
Lane Group LOS	E	E	A	E	A	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	7.17	3.56	0.00	13.77	0.19	9.35	9.55
50th-Percentile Queue Length [ft]	179.18	88.98	0.00	344.32	4.73	233.80	238.76
95th-Percentile Queue Length [veh]	11.56	6.41	0.00	19.86	0.34	14.37	14.62
95th-Percentile Queue Length [ft]	288.94	160.16	0.00	496.48	8.52	359.18	365.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	64.75	0.00	56.08	0.00	0.00	0.00	0.00	62.20	0.53	0.00	0.00	15.58	16.46
Movement LOS	E		E	A	A	A	A	E	A			B	B
d_A, Approach Delay [s/veh]	61.66			0.00				9.71			15.61		
Approach LOS	E			A				A			B		
d_I, Intersection Delay [s/veh]	15.40												
Intersection LOS	B												
Intersection V/C	0.749												

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	4.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.635

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	29	0	52	1	0	0	122	1511	1	40	2697	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	0.00	0.00	0.00	0.00	0.00	0.80	3.70	0.00	6.70	2.60	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	54	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	29	0	0	1	0	0	122	1511	1	40	2697	20
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	0	0	0	0	31	378	0	10	674	5
Total Analysis Volume [veh/h]	29	0	0	1	0	0	122	1511	1	40	2697	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			6		
Bicycle Volume [bicycles/h]	0			0			5			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	77.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	11	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Split [s]	0	31	0	0	31	0	93	26	0	93	26	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	15	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	12	123	123	5	115	115
g / C, Green / Cycle	0.07	0.07	0.07	0.08	0.82	0.82	0.03	0.77	0.77
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.00	0.07	0.28	0.28	0.02	0.51	0.51
s, saturation flow rate [veh/h]	1664	1615	859	1795	3489	1831	1696	3526	1844
c, Capacity [veh/h]	161	109	106	148	2866	1505	52	2715	1420
d1, Uniform Delay [s]	66.18	0.00	69.07	65.67	0.00	0.00	71.36	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.53	0.00	0.03	10.91	0.33	0.63	20.70	1.26	2.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

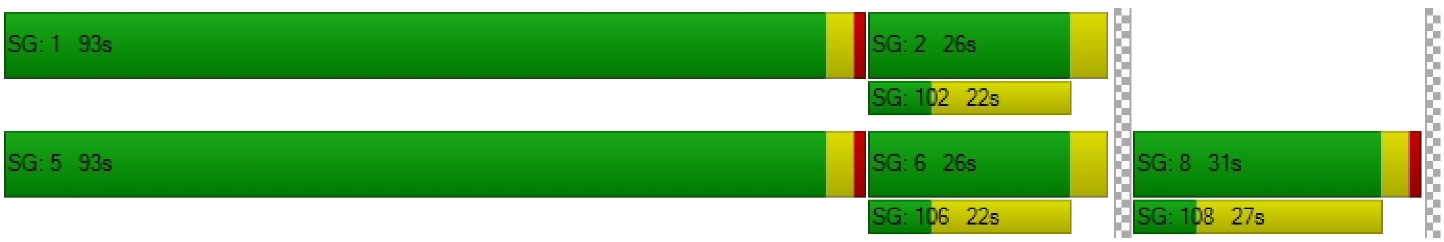
X, volume / capacity	0.18	0.00	0.01	0.83	0.35	0.35	0.77	0.66	0.66
d, Delay for Lane Group [s/veh]	66.71	0.00	69.11	76.58	0.33	0.63	92.06	1.26	2.41
Lane Group LOS	E	A	E	E	A	A	F	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.09	0.00	0.04	4.90	0.13	0.26	1.81	0.47	0.95
50th-Percentile Queue Length [ft]	27.24	0.00	0.97	122.41	3.30	6.60	45.24	11.84	23.76
95th-Percentile Queue Length [veh]	1.96	0.00	0.07	8.53	0.24	0.48	3.26	0.85	1.71
95th-Percentile Queue Length [ft]	49.03	0.00	1.75	213.13	5.94	11.88	81.43	21.32	42.76

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	66.71	66.71	0.00	69.11	69.11	69.11	76.58	0.43	0.63	92.06	1.65	2.41
Movement LOS	E	E	A	E	E	E	E	A	A	F	A	A
d_A, Approach Delay [s/veh]	66.71			69.11			6.12			2.97		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	4.56											
Intersection LOS	A											
Intersection V/C	0.635											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	10.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.562

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	441	428	59	340	315	70
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.93	1.92	2.00	1.94	1.90	1.74
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	441	428	59	340	315	70
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	110	107	15	85	79	18
Total Analysis Volume [veh/h]	441	428	59	340	315	70
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		21		23	
Bicycle Volume [bicycles/h]	11		91		16	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	0
Maximum Green [s]	30	30	15	40	25	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	30	30	0	30	0	0
Vehicle Extension [s]	2.0	2.0	2.0	2.0	2.0	0.0
Walk [s]	7	7	0	0	7	0
Pedestrian Clearance [s]	10	10	0	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	0.0
Minimum Recall	Yes		Yes	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	13	13	2	19	8	8
g / C, Green / Cycle	0.37	0.37	0.05	0.53	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.24	0.29	0.03	0.18	0.18	0.05
s, saturation flow rate [veh/h]	1864	1487	1774	1864	1776	1448
c, Capacity [veh/h]	682	544	90	992	419	342
d1, Uniform Delay [s]	9.32	9.99	16.50	4.73	12.56	10.86
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.39	0.97	3.01	0.08	1.03	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

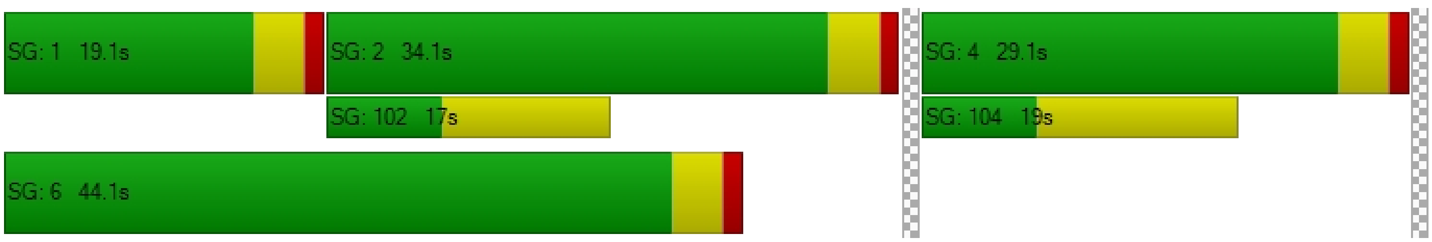
X, volume / capacity	0.65	0.79	0.66	0.34	0.75	0.20
d, Delay for Lane Group [s/veh]	9.71	10.96	19.51	4.81	13.60	10.97
Lane Group LOS	A	B	B	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	2.13	2.28	0.48	0.82	1.97	0.37
50th-Percentile Queue Length [ft]	53.17	57.07	12.00	20.51	49.23	9.14
95th-Percentile Queue Length [veh]	3.83	4.11	0.86	1.48	3.54	0.66
95th-Percentile Queue Length [ft]	95.71	102.73	21.61	36.92	88.62	16.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.71	10.96	19.51	4.81	13.60	10.97
Movement LOS	A	B	B	A	B	B
d_A, Approach Delay [s/veh]	10.33		6.98		13.12	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	10.17					
Intersection LOS	B					
Intersection V/C	0.562					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 39: Santa Cruz Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	46.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.803

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	271	1339	306	331	559	51	110	722	457	223	669	236
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.50	1.40	4.20	1.50	3.40	3.90	8.50	3.90	1.50	0.90	3.40	4.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	144	0	0	38	0	0	288	0	0	281
Total Hourly Volume [veh/h]	271	1339	162	331	559	13	110	722	169	223	669	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	68	335	41	83	140	3	28	181	42	56	167	0
Total Analysis Volume [veh/h]	271	1339	162	331	559	13	110	722	169	223	669	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			5			7		
Bicycle Volume [bicycles/h]	33			33			29			49		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	133
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	8	8	4	8	8	8	8	8	8	8	8
Maximum Green [s]	30	60	60	30	60	60	25	30	30	25	30	30
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.1	3.6	3.6	3.1	3.6	3.6
All red [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Split [s]	29	64	64	18	53	53	13	37	37	14	38	38
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	24	24	0	24	24	0	24	24	0	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	3.6	3.6	2.0	3.6	3.6	2.1	3.6	3.6	2.1	3.6	3.6
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	5.60	5.60	4.00	5.60	5.60	4.10	5.60	5.60	4.10	5.60	5.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.60	3.60	2.00	3.60	3.60	2.10	3.60	3.60	2.10	3.60	3.60
g_i, Effective Green Time [s]	13	60	60	14	61	61	8	30	30	10	32	32
g / C, Green / Cycle	0.10	0.45	0.45	0.11	0.46	0.46	0.06	0.22	0.22	0.07	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.08	0.38	0.11	0.10	0.16	0.01	0.03	0.21	0.11	0.06	0.19	0.00
s, saturation flow rate [veh/h]	3395	3568	1501	3462	3499	1504	3239	3482	1512	3483	3499	1543
c, Capacity [veh/h]	337	1606	676	366	1598	687	193	781	339	261	838	370
d1, Uniform Delay [s]	58.69	32.20	22.55	58.87	23.39	19.82	60.93	50.52	45.08	60.87	47.59	0.00
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.51	5.25	0.84	8.46	0.61	0.05	2.63	5.27	1.13	7.90	1.80	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

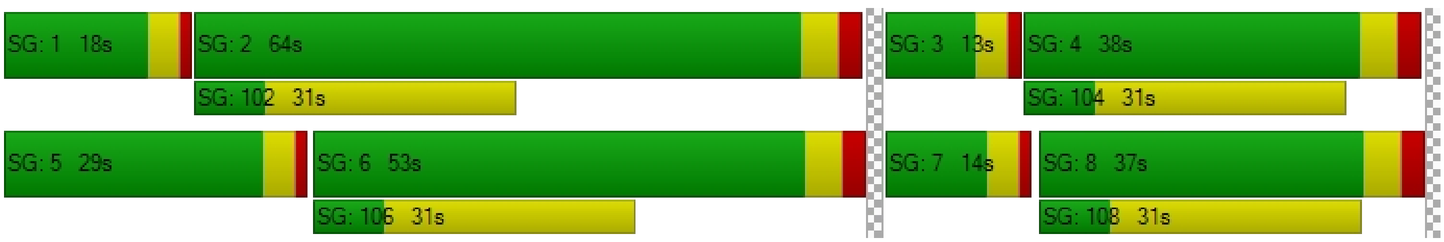
X, volume / capacity	0.80	0.83	0.24	0.91	0.35	0.02	0.57	0.92	0.50	0.86	0.80	0.00
d, Delay for Lane Group [s/veh]	63.19	37.45	23.39	67.33	24.00	19.88	63.57	55.79	46.22	68.77	49.39	0.00
Lane Group LOS	E	D	C	E	C	B	E	E	D	E	D	A
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	4.66	19.63	3.28	5.91	5.78	0.23	1.87	12.20	4.96	3.99	10.54	0.00
50th-Percentile Queue Length [ft]	116.42	490.71	82.12	147.78	144.59	5.81	46.82	305.03	124.12	99.75	263.42	0.00
95th-Percentile Queue Length [veh]	8.20	26.89	5.91	9.90	9.73	0.42	3.37	17.93	8.62	7.18	15.86	0.00
95th-Percentile Queue Length [ft]	204.90	672.35	147.82	247.46	243.20	10.46	84.28	448.24	215.48	179.55	396.51	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.19	37.45	23.39	67.33	24.00	19.88	63.57	55.79	46.22	68.77	49.39	0.00
Movement LOS	E	D	C	E	C	B	E	E	D	E	D	A
d_A, Approach Delay [s/veh]	40.10			39.82			55.03			54.24		
Approach LOS	D			D			E			D		
d_I, Intersection Delay [s/veh]	46.08											
Intersection LOS	D											
Intersection V/C	0.803											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	221.9
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.593

Intersection Setup

Name	University Avenue		University Avenue		Adams Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		Adams Drive	
Base Volume Input [veh/h]	42	1205	1449	140	19	3
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.30	4.70	2.60	4.30	5.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	1205	1449	140	19	3
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	301	362	35	5	1
Total Analysis Volume [veh/h]	42	1205	1449	140	19	3
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.01	0.01	0.00	0.59	0.01
d_M, Delay for Movement [s/veh]	16.47	0.00	0.00	0.00	221.90	15.84
Movement LOS	C	A	A	A	F	C
95th-Percentile Queue Length [veh]	0.40	0.00	0.00	0.00	1.98	0.03
95th-Percentile Queue Length [ft]	9.94	0.00	0.00	0.00	49.42	0.68
d_A, Approach Delay [s/veh]	0.55		0.00		193.80	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	1.73					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 71: Chilco Street/Terminal Avenue

Control Type:	All-way stop	Delay (sec / veh):	9.4
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street		Chilco Street		Terminal Avenue	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Chilco Street		Chilco Street		Terminal Avenue	
Base Volume Input [veh/h]	51	218	101	62	115	45
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	51	218	101	62	115	45
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	55	25	16	29	11
Total Analysis Volume [veh/h]	51	218	101	62	115	45
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.53	0.75	0.83
95th-Percentile Queue Length [ft]	38.13	18.71	20.66
Approach Delay [s/veh]	9.95	8.56	9.26
Approach LOS	A	A	A
Intersection Delay [s/veh]	9.38		
Intersection LOS	A		

Intersection Level Of Service Report
Intersection 74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	7.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.508

Intersection Setup

Name	University Avenue		University Avenue		O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		O'Brien Drive	
Base Volume Input [veh/h]	68	1230	1284	142	17	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	5.10	2.90	3.50	18.80	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	68	1230	1284	142	17	26
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	308	321	36	4	7
Total Analysis Volume [veh/h]	68	1230	1284	142	17	26
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	7		5		1	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	48.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	8	8	0	6	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	14	106	120	0	10	0
Vehicle Extension [s]	2.0	4.0	4.0	0.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	112	118	118	4	4
g / C, Green / Cycle	0.03	0.86	0.91	0.91	0.03	0.03
(v / s)_i Volume / Saturation Flow Rate	0.05	0.40	0.43	0.45	0.01	0.02
s, saturation flow rate [veh/h]	1320	3098	1662	1597	1371	1370
c, Capacity [veh/h]	68	2662	1513	1454	38	38
d1, Uniform Delay [s]	62.05	2.13	0.91	0.94	62.13	62.55
k, delay calibration	0.50	0.50	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	110.19	0.58	1.06	1.18	2.97	7.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.00	0.46	0.47	0.49	0.44	0.68
d, Delay for Lane Group [s/veh]	172.24	2.71	1.97	2.13	65.10	70.13
Lane Group LOS	F	A	A	A	E	E
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	4.37	2.69	1.16	1.22	0.59	0.93
50th-Percentile Queue Length [ft]	109.24	67.14	29.06	30.49	14.65	23.35
95th-Percentile Queue Length [veh]	7.80	4.83	2.09	2.20	1.05	1.68
95th-Percentile Queue Length [ft]	195.09	120.85	52.31	54.89	26.36	42.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	172.24	2.71	2.04	2.13	65.10	70.13
Movement LOS	F	A	A	A	E	E
d_A, Approach Delay [s/veh]	11.59		2.05		68.14	
Approach LOS	B		A		E	
d_I, Intersection Delay [s/veh]	7.55					
Intersection LOS	A					
Intersection V/C	0.508					

Sequence

Ring 1	5	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 77: University Avenue/Donohoe Street

Control Type:	Signalized	Delay (sec / veh):	120.2
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.078

Intersection Setup

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	150.00	100.00	70.00	200.00	100.00	100.00	200.00	100.00	200.00	200.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	194	789	514	23	865	65	8	98	500	605	604	609
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	194	789	514	23	865	65	8	98	500	605	604	609
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	49	197	129	6	216	16	2	25	125	151	151	152
Total Analysis Volume [veh/h]	194	789	514	23	865	65	8	98	500	605	604	609
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			24			0			0		
Bicycle Volume [bicycles/h]	6			12			1			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	11	42	0	8	39	0	0	41	0	0	39	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	20	0	0	0	0	0	19	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	R	L	C	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	7	40	40	2	35	35	37	37	37	35	35	35	35
g / C, Green / Cycle	0.05	0.31	0.31	0.02	0.27	0.27	0.28	0.28	0.28	0.27	0.27	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.06	0.25	0.37	0.01	0.28	0.28	0.01	0.06	0.36	0.29	0.29	0.30	0.34
s, saturation flow rate [veh/h]	3101	3192	1402	1597	1676	1630	1597	1676	1407	1597	1652	1393	1331
c, Capacity [veh/h]	167	973	427	29	451	439	454	477	400	430	445	375	358
d1, Uniform Delay [s]	61.50	41.72	45.18	63.57	47.50	47.50	33.43	35.33	46.50	47.50	47.50	47.50	47.50
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	86.90	7.30	111.67	36.58	53.99	55.71	0.02	0.21	131.20	69.36	59.70	87.06	140.6
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

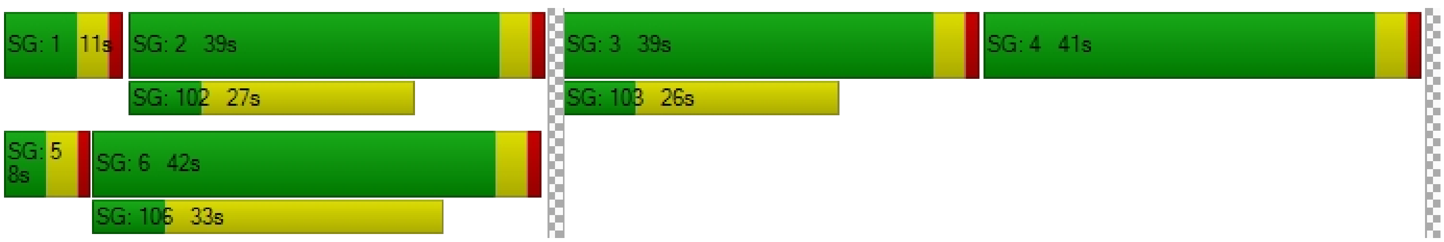
X, volume / capacity	1.16	0.81	1.20	0.79	1.04	1.05	0.02	0.21	1.25	1.09	1.06	1.13	1.27
d, Delay for Lane Group [s/veh]	148.40	49.02	156.85	100.15	101.49	103.21	33.45	35.54	177.70	116.8	107.2	134.5	188.1
Lane Group LOS	F	D	F	F	F	F	C	D	F	F	F	F	F
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	4.78	12.62	26.91	1.06	21.29	20.90	0.19	2.42	27.44	22.11	21.69	21.14	25.51
50th-Percentile Queue Length [ft]	119.38	315.53	672.63	26.39	532.15	522.57	4.66	60.41	685.92	552.6	542.1	528.3	637.8
95th-Percentile Queue Length [veh]	8.60	18.45	39.51	1.90	29.62	29.22	0.34	4.35	40.83	31.39	30.41	30.81	38.43
95th-Percentile Queue Length [ft]	214.88	461.19	987.73	47.50	740.50	730.45	8.39	108.74	1020.67	784.7	760.3	770.2	960.6

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	148.40	49.02	156.85	100.15	102.27	103.21	33.45	35.54	177.70	114.44	119.39	175.21
Movement LOS	F	D	F	F	F	F	C	D	F	F	F	F
d_A, Approach Delay [s/veh]	98.92			102.29			152.81			136.27		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	120.21											
Intersection LOS	F											
Intersection V/C	1.078											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	19.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.640

Intersection Setup

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration	┐╟			┐╟			┼			┐╟		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Base Volume Input [veh/h]	154	435	124	48	627	67	70	106	41	71	51	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.80	2.40	4.20	0.00	0.00	8.70	0.00	0.00	13.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	154	435	124	48	627	67	70	106	41	71	51	62
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	109	31	12	157	17	18	27	10	18	13	16
Total Analysis Volume [veh/h]	154	435	124	48	627	67	70	106	41	71	51	62
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	54			0			12			0		
Bicycle Volume [bicycles/h]	26			2			7			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	25	30	0	25	30	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	14	0	0	0	0	0	0	0	0	13	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	0.00	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	36	29	36	27	17	17	17
g / C, Green / Cycle	0.58	0.48	0.58	0.44	0.27	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.16	0.32	0.05	0.39	0.16	0.06	0.08
s, saturation flow rate [veh/h]	965	1770	954	1788	1320	1260	1411
c, Capacity [veh/h]	468	849	530	780	435	222	382
d1, Uniform Delay [s]	10.66	12.08	7.33	15.86	19.40	27.21	17.64
k, delay calibration	0.23	0.28	0.11	0.35	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.87	2.23	0.07	10.68	0.88	0.82	0.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

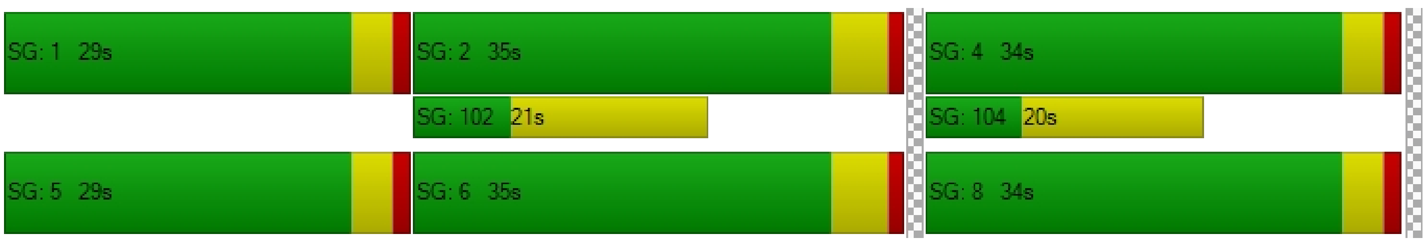
X, volume / capacity	0.33	0.66	0.09	0.89	0.50	0.32	0.30
d, Delay for Lane Group [s/veh]	11.53	14.32	7.40	26.53	20.29	28.03	18.07
Lane Group LOS	B	B	A	C	C	C	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.79	5.21	0.21	9.65	2.68	1.02	1.24
50th-Percentile Queue Length [ft]	19.68	130.31	5.21	241.37	67.00	25.53	30.95
95th-Percentile Queue Length [veh]	1.42	8.96	0.37	14.75	4.82	1.84	2.23
95th-Percentile Queue Length [ft]	35.42	223.92	9.37	368.77	120.60	45.95	55.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.53	14.32	14.32	7.40	26.53	26.53	20.29	20.29	20.29	28.03	18.07	18.07
Movement LOS	B	B	B	A	C	C	C	C	C	C	B	B
d_A, Approach Delay [s/veh]	13.71			25.29			20.29			21.91		
Approach LOS	B			C			C			C		
d_I, Intersection Delay [s/veh]	19.93											
Intersection LOS	B											
Intersection V/C	0.640											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	12.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.698

Intersection Setup

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	23	2	41	2	2	7	103	1888	233	113	852	39
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	2	41	2	2	7	103	1888	233	113	852	39
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	1	10	1	1	2	26	472	58	28	213	10
Total Analysis Volume [veh/h]	23	2	41	2	2	7	103	1888	233	113	852	39
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			1			6		
Bicycle Volume [bicycles/h]	0			0			27			22		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	9.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	41	0	0	10	0	11	38	0	11	38	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	3.0	0.0	3.0	6.0	0.0	2.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	7	7	7	4	4	9	72	72	9	72	72
g / C, Green / Cycle	0.07	0.07	0.07	0.04	0.04	0.09	0.72	0.72	0.09	0.72	0.72
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.03	0.00	0.01	0.06	0.53	0.15	0.06	0.24	0.24
s, saturation flow rate [veh/h]	1774	1788	1543	1774	1638	1774	3547	1525	1774	1863	1828
c, Capacity [veh/h]	127	128	110	66	61	161	2557	1100	161	1343	1318
d1, Uniform Delay [s]	43.53	43.52	44.40	46.54	46.74	44.01	8.34	4.61	44.27	5.14	5.15
k, delay calibration	0.10	0.10	0.10	0.11	0.11	0.37	0.50	0.50	0.42	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.32	0.31	1.98	0.19	1.11	13.54	1.95	0.44	19.37	0.67	0.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

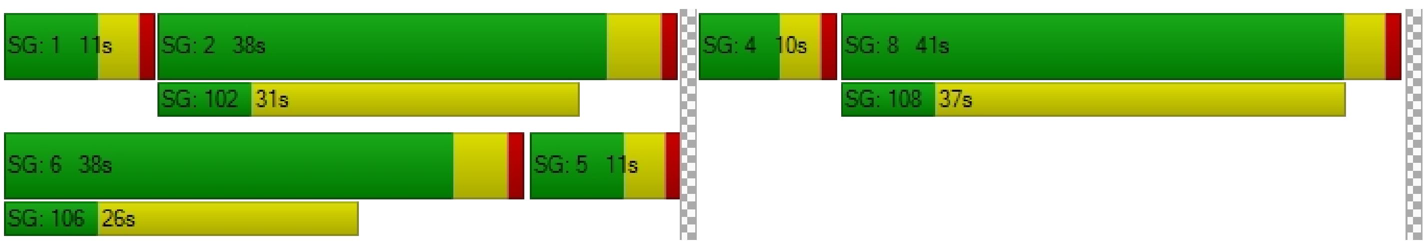
X, volume / capacity	0.10	0.10	0.37	0.03	0.15	0.64	0.74	0.21	0.70	0.33	0.34
d, Delay for Lane Group [s/veh]	43.84	43.84	46.37	46.72	47.85	57.54	10.30	5.05	63.64	5.81	5.83
Lane Group LOS	D	D	D	D	D	E	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.30	0.30	1.04	0.05	0.24	3.01	9.54	1.34	3.52	2.84	2.81
50th-Percentile Queue Length [ft]	7.57	7.58	25.92	1.29	5.93	75.16	238.61	33.50	87.90	71.10	70.21
95th-Percentile Queue Length [veh]	0.55	0.55	1.87	0.09	0.43	5.41	14.61	2.41	6.33	5.12	5.06
95th-Percentile Queue Length [ft]	13.63	13.65	46.66	2.33	10.68	135.29	365.28	60.30	158.23	127.98	126.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.84	43.84	46.37	46.72	47.85	47.85	57.54	10.30	5.05	63.64	5.82	5.83
Movement LOS	D	D	D	D	D	D	E	B	A	E	A	A
d_A, Approach Delay [s/veh]	45.41			47.65			11.94			12.33		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	12.84											
Intersection LOS	B											
Intersection V/C	0.698											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	44.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.811

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	40.00		35.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	663	556	99	263	902	547
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	4.00	3.10	1.70	2.70	0.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	663	556	99	263	902	547
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	166	139	25	66	226	137
Total Analysis Volume [veh/h]	663	556	99	263	902	547
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	43		21		15	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal group	0	4	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	40	30	0	50	0
Amber [s]	0.0	3.6	3.1	0.0	3.9	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	45	54	0	37	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.6	2.1	0.0	2.9	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60	4.10	4.10	4.90	4.90
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60	2.10	2.10	2.90	2.90
g_i, Effective Green Time [s]	36	36	36	26	26	60	60
g / C, Green / Cycle	0.27	0.27	0.27	0.19	0.19	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.23	0.23	0.23	0.06	0.17	0.26	0.35
s, saturation flow rate [veh/h]	1790	1774	1662	1755	1530	3522	1580
c, Capacity [veh/h]	479	475	445	334	291	1556	698
d1, Uniform Delay [s]	47.45	47.44	47.41	47.15	53.72	28.43	32.35
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.08	5.08	5.33	0.49	10.14	1.58	8.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.87	0.87	0.30	0.90	0.58	0.78
d, Delay for Lane Group [s/veh]	52.53	52.51	52.74	47.64	63.86	30.01	40.94
Lane Group LOS	D	D	D	D	E	C	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	13.94	13.80	12.93	2.92	9.53	11.09	16.49
50th-Percentile Queue Length [ft]	348.40	344.88	323.17	73.08	238.26	277.16	412.28
95th-Percentile Queue Length [veh]	20.06	19.89	18.82	5.26	14.59	16.55	23.15
95th-Percentile Queue Length [ft]	501.46	497.16	470.58	131.54	364.83	413.67	578.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.52	52.67	47.64	63.86	30.01	40.94
Movement LOS	D	D	D	E	C	D
d_A, Approach Delay [s/veh]	52.59		59.42		34.14	
Approach LOS	D		E		C	
d_I, Intersection Delay [s/veh]	44.58					
Intersection LOS	D					
Intersection V/C	0.811					

Sequence

Ring 1	-	6	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 110: Marsh Road and US 101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	12.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.717

Intersection Setup

Name	Marsh Road		Marsh Road			
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Marsh Road		Marsh Road			
Base Volume Input [veh/h]	1372	0	0	1404	848	547
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	0.00	0.00	5.20	1.90	4.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1372	0	0	1404	848	547
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	343	0	0	351	212	137
Total Analysis Volume [veh/h]	1372	0	0	1404	848	547
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	40.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	49	0	0	49	31	31
Vehicle Extension [s]	3.0	0.0	0.0	3.0	2.0	2.0
Walk [s]	7	0	0	0	5	0
Pedestrian Clearance [s]	12	0	0	0	15	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	Yes			Yes	No	No
Maximum Recall	No			No	No	No
Pedestrian Recall	No			No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	51	51	25	78
g / C, Green / Cycle	0.64	0.64	0.31	0.97
(v / s)_i Volume / Saturation Flow Rate	0.40	0.41	0.25	0.35
s, saturation flow rate [veh/h]	3462	3439	3449	1548
c, Capacity [veh/h]	2219	2204	1065	1467
d1, Uniform Delay [s]	8.53	8.70	25.29	0.17
k, delay calibration	0.50	0.50	0.04	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.30	1.42	0.53	0.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

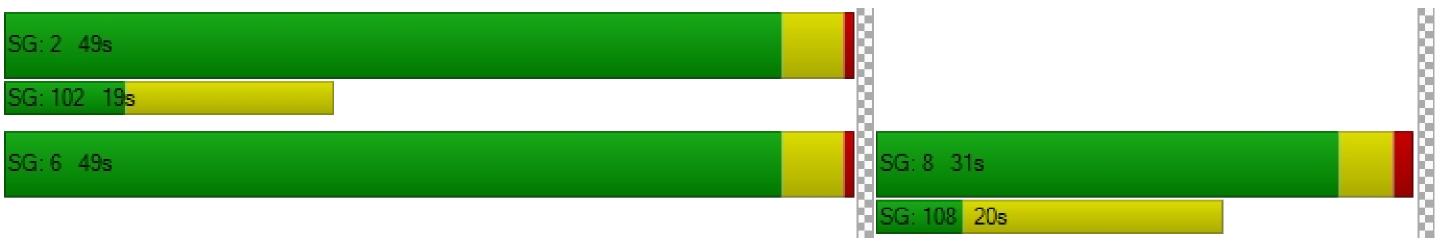
X, volume / capacity	0.62	0.64	0.80	0.37
d, Delay for Lane Group [s/veh]	9.83	10.12	25.81	0.90
Lane Group LOS	A	B	C	A
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	6.20	6.48	7.08	0.30
50th-Percentile Queue Length [ft]	154.88	162.07	176.91	7.41
95th-Percentile Queue Length [veh]	10.28	10.66	11.44	0.53
95th-Percentile Queue Length [ft]	256.92	266.47	285.98	13.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.83	0.00	0.00	10.12	25.81	0.90
Movement LOS	A			B	C	A
d_A, Approach Delay [s/veh]	9.83		10.12		16.04	
Approach LOS	A		B		B	
d_I, Intersection Delay [s/veh]	12.01					
Intersection LOS	B					
Intersection V/C	0.717					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 111: University Avenue / Woodland Avenue

Control Type:	Signalized	Delay (sec / veh):	49.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.759

Intersection Setup

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	1	0	0	0
Pocket Length [ft]	170.00	100.00	100.00	220.00	100.00	100.00	100.00	100.00	40.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Base Volume Input [veh/h]	46	845	25	211	972	533	19	87	311	392	84	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	46	845	25	211	972	533	19	87	311	392	84	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	211	6	53	243	133	5	22	78	98	21	11
Total Analysis Volume [veh/h]	46	845	25	211	972	533	19	87	311	392	84	44
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	51			0			1			13		
Bicycle Volume [bicycles/h]	5			1			4			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	7	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	8	42	0	22	56	0	0	35	0	0	31	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	15	0	0	0	0	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	46	46	18	60	60	30	30	19	19
g / C, Green / Cycle	0.03	0.36	0.36	0.14	0.46	0.46	0.23	0.23	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.03	0.26	0.26	0.13	0.30	0.38	0.06	0.22	0.13	0.09
s, saturation flow rate [veh/h]	1597	1676	1657	1597	3192	1395	1662	1402	3101	1506
c, Capacity [veh/h]	49	597	589	221	1480	647	389	329	460	223
d1, Uniform Delay [s]	62.87	36.48	36.51	55.59	26.89	30.26	40.70	48.96	53.98	51.54
k, delay calibration	0.15	0.50	0.50	0.37	0.50	0.50	0.11	0.40	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	56.19	7.77	7.91	41.66	2.29	11.39	0.37	32.82	4.58	2.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

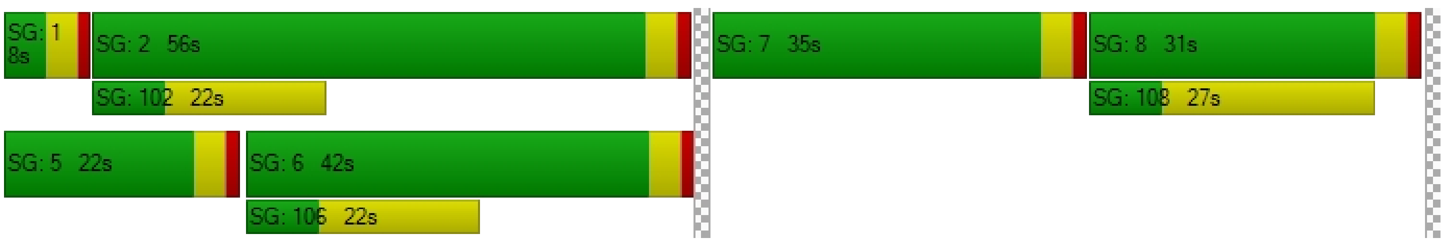
X, volume / capacity	0.94	0.73	0.73	0.95	0.66	0.82	0.27	0.95	0.85	0.57
d, Delay for Lane Group [s/veh]	119.06	44.26	44.42	97.25	29.19	41.65	41.08	81.78	58.56	53.85
Lane Group LOS	F	D	D	F	C	D	D	F	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	2.29	13.33	13.22	9.42	11.98	16.25	2.84	12.89	6.55	4.05
50th-Percentile Queue Length [ft]	57.20	333.20	330.55	235.53	299.49	406.20	71.11	322.32	163.76	101.13
95th-Percentile Queue Length [veh]	4.12	19.32	19.19	14.46	17.66	22.86	5.12	18.78	10.75	7.28
95th-Percentile Queue Length [ft]	102.96	482.88	479.64	361.38	441.40	571.47	128.00	469.53	268.69	182.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	119.06	44.33	44.42	97.25	29.19	41.65	41.08	41.08	81.78	58.56	53.85	53.85
Movement LOS	F	D	D	F	C	D	D	D	F	E	D	D
d_A, Approach Delay [s/veh]	48.09			41.43			71.43			57.40		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	48.97											
Intersection LOS	D											
Intersection V/C	0.759											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 131: Chilco Street/Hamilton Avenue

Control Type:	All-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Streeet			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Streeet			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	23	155	18	50	79	15	37	41	16	22	51	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	155	18	50	79	15	37	41	16	22	51	131
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	39	5	13	20	4	9	10	4	6	13	33
Total Analysis Volume [veh/h]	23	155	18	50	79	15	37	41	16	22	51	131
Pedestrian Volume [ped/h]	3			3			9			5		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.05	0.73	0.45	1.03
95th-Percentile Queue Length [ft]	26.33	18.25	11.28	25.73
Approach Delay [s/veh]	9.54	9.14	8.79	9.13
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	9.21			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	20.4
Analysis Method:	HCM 2000	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.815

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	35.00		35.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	1794	748	38	135	332
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.20	1.90	2.60	0.00	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1794	748	38	135	332
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	449	187	10	34	83
Total Analysis Volume [veh/h]	0	1794	748	38	135	332
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27		0		5	
Bicycle Volume [bicycles/h]	31		28		9	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	89
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal group	0	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	4	0
Maximum Green [s]	0	64	64	0	32	0
Amber [s]	0.0	3.6	3.6	0.0	3.1	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	61	61	0	28	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	2.6	0.0	2.1	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.10	2.10
g_i, Effective Green Time [s]	56	56	24	24
g / C, Green / Cycle	0.63	0.63	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.56	0.25	0.08	0.23
Total Saturation Flow Adjustment	0.85	0.83	0.86	0.76
s, saturation flow rate [veh/h]	3217	3172	1625	1446
c, Capacity [veh/h]	2039	2010	436	388
d1, Uniform Delay [s]	13.50	7.94	25.97	30.90
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.84	0.57	1.84	20.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.39	0.31	0.85
d, Delay for Lane Group [s/veh]	19.34	8.51	27.81	51.62
Lane Group LOS	B	A	C	D
Critical Lane Group	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	25.56	5.72	2.94	10.32
50th-Percentile Queue Length [ft]	638.89	142.97	73.61	258.12
95th-Percentile Queue Length [veh]	41.04	10.97	6.35	17.83
95th-Percentile Queue Length [ft]	1026.08	274.30	158.63	445.73

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	19.34	8.51	8.51	27.81	51.62
Movement LOS		B	A	A	C	D
d_A, Approach Delay [s/veh]	19.34		8.51		44.74	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	20.44					
Intersection LOS	C					
Intersection V/C	0.815					

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	35.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	8.333

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	10	0	33	79	6	51	211	1594	117	73	760	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	33	79	6	51	211	1594	117	73	760	50
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	8	20	2	13	53	399	29	18	190	13
Total Analysis Volume [veh/h]	10	0	33	79	6	51	211	1594	117	73	760	50
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			10			7			0		
Bicycle Volume [bicycles/h]	1			7			23			14		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	62.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	0	12	0	0	12	0	4	10	0	6	10	0
Maximum Green [s]	0	25	0	0	25	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	28	0	0	28	0	25	55	0	17	47	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	34	34	34	34	16	53	53	7	45	45
g / C, Green / Cycle	0.34	0.34	0.34	0.34	0.16	0.53	0.53	0.07	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	7.82	0.02	7.22	0.03	0.12	0.46	0.47	0.04	0.22	0.22
s, saturation flow rate [veh/h]	1	1563	12	1547	1774	1863	1808	1774	1863	1811
c, Capacity [veh/h]	72	526	73	520	277	990	960	128	834	810
d1, Uniform Delay [s]	50.00	22.50	48.71	22.78	40.40	20.32	20.84	44.87	19.56	19.60
k, delay calibration	0.50	0.11	0.50	0.11	0.16	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.94	0.05	153.95	0.08	6.26	10.00	12.19	3.90	2.07	2.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.14	0.06	1.16	0.10	0.76	0.86	0.89	0.57	0.49	0.49
d, Delay for Lane Group [s/veh]	53.94	22.55	202.65	22.86	46.66	30.32	33.03	48.77	21.63	21.75
Lane Group LOS	D	C	F	C	D	C	C	D	C	C
Critical Lane Group	Yes	No	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.33	0.54	4.98	0.84	5.30	18.11	18.99	1.88	7.03	6.90
50th-Percentile Queue Length [ft]	8.26	13.46	124.60	21.07	132.40	452.77	474.69	47.04	175.67	172.62
95th-Percentile Queue Length [veh]	0.59	0.97	8.97	1.52	9.07	25.09	26.13	3.39	11.37	11.21
95th-Percentile Queue Length [ft]	14.87	24.24	224.28	37.93	226.75	627.25	653.34	84.66	284.36	280.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.94	53.94	22.55	202.65	202.65	22.86	46.66	31.57	33.03	48.77	21.68	21.75
Movement LOS	D	D	C	F	F	C	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	29.85			135.23			33.32			23.93		
Approach LOS	C			F			C			C		
d_I, Intersection Delay [s/veh]	35.13											
Intersection LOS	D											
Intersection V/C	8.333											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	6.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.539

Intersection Setup

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	7	3	0	2	9	417	3	4	217	5
Total Analysis Volume [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			6			0			11		
Bicycle Volume [bicycles/h]	2			0			32			53		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	92.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	15	0	0	15	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	39	0	0	39	0	9	53	0	8	52	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	2.9	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	11	11	5	79	79	4	78	78
g / C, Green / Cycle	0.11	0.11	0.05	0.79	0.79	0.04	0.78	0.78
(v / s)_i Volume / Saturation Flow Rate	0.02	0.01	0.02	0.45	0.45	0.01	0.24	0.24
s, saturation flow rate [veh/h]	1539	1525	1774	1863	1857	1774	1863	1842
c, Capacity [veh/h]	215	227	83	1476	1472	63	1456	1440
d1, Uniform Delay [s]	40.39	39.92	46.41	3.92	3.93	46.92	3.13	3.13
k, delay calibration	0.10	0.10	0.04	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.36	0.17	1.42	1.59	1.61	0.83	0.54	0.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

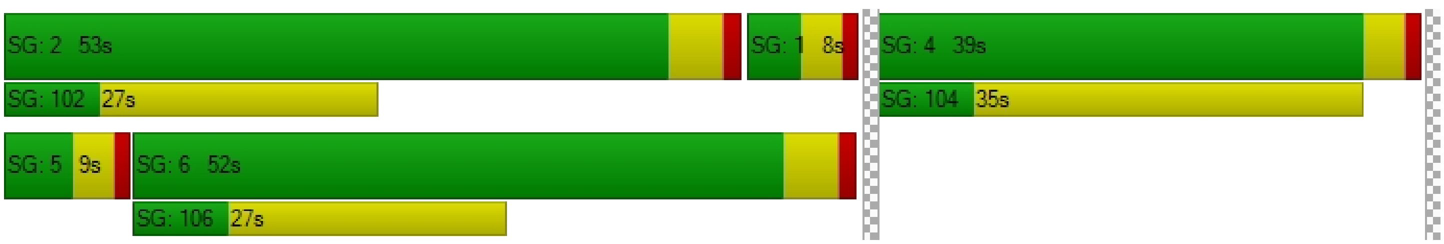
X, volume / capacity	0.17	0.09	0.45	0.57	0.57	0.27	0.31	0.31
d, Delay for Lane Group [s/veh]	40.75	40.09	47.83	5.51	5.53	47.76	3.68	3.69
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.86	0.48	0.91	4.34	4.35	0.42	1.81	1.80
50th-Percentile Queue Length [ft]	21.39	11.96	22.68	108.55	108.69	10.43	45.27	45.00
95th-Percentile Queue Length [veh]	1.54	0.86	1.63	7.76	7.77	0.75	3.26	3.24
95th-Percentile Queue Length [ft]	38.50	21.53	40.83	193.99	194.18	18.77	81.48	80.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.75	40.75	40.75	40.09	40.09	40.09	47.83	5.52	5.53	47.76	3.68	3.69
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.75			40.09			6.44			4.51		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	6.52											
Intersection LOS	A											
Intersection V/C	0.539											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	40.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.163

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Base Volume Input [veh/h]	145	1496	17	29	776	144	2	0	9	215	3	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	145	1496	17	29	776	144	2	0	9	215	3	174
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	374	4	7	194	36	1	0	2	54	1	44
Total Analysis Volume [veh/h]	145	1496	17	29	776	144	2	0	9	215	3	174
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			0			4			3		
Bicycle Volume [bicycles/h]	0			32			20			61		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	99.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	6	10	0	0	6	0	0	6	0
Maximum Green [s]	30	60	0	30	60	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	18	44	0	10	36	0	0	46	0	0	46	0
Vehicle Extension [s]	3.0	7.0	0.0	3.0	7.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	12	45	45	5	38	38	44	44	44
g / C, Green / Cycle	0.12	0.45	0.45	0.05	0.38	0.38	0.44	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.08	0.41	0.41	0.02	0.25	0.26	0.03	0.62	0.12
s, saturation flow rate [veh/h]	1774	1863	1855	1774	1863	1727	325	350	1500
c, Capacity [veh/h]	209	835	831	94	715	662	185	225	658
d1, Uniform Delay [s]	42.38	25.65	25.69	45.57	25.46	25.64	21.98	34.61	17.83
k, delay calibration	0.17	0.50	0.50	0.11	0.50	0.50	0.11	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.48	15.38	15.64	1.82	4.77	5.45	0.13	52.55	0.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

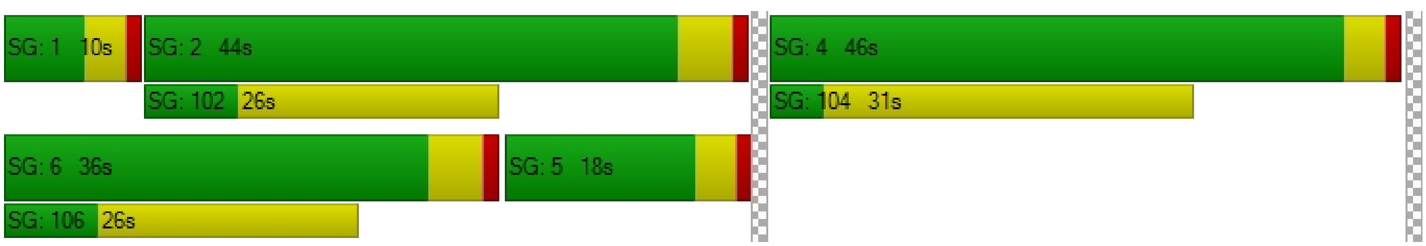
X, volume / capacity	0.69	0.91	0.91	0.31	0.66	0.68	0.06	0.97	0.26
d, Delay for Lane Group [s/veh]	48.86	41.04	41.33	47.38	30.23	31.08	22.11	87.16	18.04
Lane Group LOS	D	D	D	D	C	C	C	F	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	3.72	18.89	18.93	0.73	9.83	9.47	0.15	8.76	2.58
50th-Percentile Queue Length [ft]	92.98	472.28	473.18	18.28	245.87	236.80	3.75	218.99	64.53
95th-Percentile Queue Length [veh]	6.69	26.02	26.06	1.32	14.98	14.52	0.27	13.61	4.65
95th-Percentile Queue Length [ft]	167.36	650.48	651.55	32.91	374.45	362.98	6.75	340.33	116.15

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	48.86	41.18	41.33	47.38	30.56	31.08	22.11	22.11	22.11	87.16	87.16	18.04
Movement LOS	D	D	D	D	C	C	C	C	C	F	F	B
d_A, Approach Delay [s/veh]	41.85			31.16			22.11			56.48		
Approach LOS	D			C			C			E		
d_I, Intersection Delay [s/veh]	40.31											
Intersection LOS	D											
Intersection V/C	1.163											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	42.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.933

Intersection Setup

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Base Volume Input [veh/h]	173	42	1482	6	35	8	8	106	334	2677	407	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.00	0.00	4.60	0.00	0.00	16.70	0.00	18.20	9.10	4.70	4.90	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	173	42	1482	6	35	8	8	106	334	2677	407	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	11	371	2	9	2	2	27	84	669	102	3
Total Analysis Volume [veh/h]	173	42	1482	6	35	8	8	106	334	2677	407	12
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			9			0			0		
Bicycle Volume [bicycles/h]	1			0			14			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	125.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	3	3	6	4	6	4	1	4	8	2	8
Auxiliary Signal Groups		3	2,3									
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	6	6	0	4	0	4	12	4	0	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	4.7	3.6	3.6	0.0	3.6	0.0	3.6	3.6	3.6	0.0	4.7	0.0
All red [s]	1.0	1.0	1.0	0.0	0.5	0.0	0.5	0.0	0.5	0.0	1.0	0.0
Split [s]	82	11	11	0	32	0	32	35	32	0	82	0
Vehicle Extension [s]	4.5	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	4.5	0.0
Walk [s]	5	0	0	0	5	0	5	5	5	0	5	0
Pedestrian Clearance [s]	16	0	0	0	22	0	22	26	22	0	16	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No		No			No			Yes	
Maximum Recall		No	No		No			No			No	
Pedestrian Recall		No	No		Yes			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	36	122	6	6	26	26	26	85	85
g / C, Green / Cycle	0.22	0.77	0.04	0.04	0.16	0.16	0.16	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.12	0.37	0.01	0.01	0.07	0.14	0.12	0.53	0.23
s, saturation flow rate [veh/h]	1827	4015	1878	1630	1602	1202	1431	5035	1802
c, Capacity [veh/h]	409	2980	69	60	257	193	230	2663	953
d1, Uniform Delay [s]	54.60	8.42	75.24	75.29	60.70	65.48	63.83	37.68	23.13
k, delay calibration	0.04	0.50	0.04	0.04	0.04	0.23	0.13	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.39	0.60	1.24	1.53	0.45	20.76	5.10	18.74	1.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.53	0.50	0.37	0.39	0.44	0.87	0.73	1.01	0.44
d, Delay for Lane Group [s/veh]	54.99	9.02	76.48	76.81	61.15	86.23	68.93	56.42	24.61
Lane Group LOS	D	A	E	E	E	F	E	F	C
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	7.75	6.88	1.06	0.97	4.26	7.79	6.83	38.60	10.24
50th-Percentile Queue Length [ft]	193.77	171.99	26.61	24.21	106.42	194.70	170.83	964.96	255.93
95th-Percentile Queue Length [veh]	12.32	11.18	1.92	1.74	7.64	12.36	11.12	49.01	15.48
95th-Percentile Queue Length [ft]	307.91	279.53	47.90	43.58	191.01	309.11	278.01	1225.32	387.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.99	54.99	9.02	76.48	76.63	76.81	61.15	61.15	77.58	56.42	24.61	24.61
Movement LOS	D	D	A	E	E	E	E	E	E	F	C	C
d_A, Approach Delay [s/veh]	14.84			76.64			73.40			52.11		
Approach LOS	B			E			E			D		
d_I, Intersection Delay [s/veh]	42.19											
Intersection LOS	D											
Intersection V/C	0.933											

Sequence

Ring 1	-	2	1	4	3	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	9.0
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Base Volume Input [veh/h]	69	689	413	115	101	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	3.20	5.40	1.00	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	69	689	413	115	101	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	172	103	29	25	19
Total Analysis Volume [veh/h]	69	689	413	115	101	75
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		20		20	
Bicycle Volume [bicycles/h]	24		13		11	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	4	10	10	0	4	0
Maximum Green [s]	20	60	40	0	20	0
Amber [s]	3.1	3.5	3.5	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	4.0	4.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	13	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.5	2.5	0.0	2.1	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.50	4.50	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.50	2.50	2.10	2.10
g_i, Effective Green Time [s]	2	21	15	4	4
g / C, Green / Cycle	0.06	0.63	0.45	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.04	0.41	0.34	0.06	0.06
s, saturation flow rate [veh/h]	1629	1678	1574	1612	1351
c, Capacity [veh/h]	94	1060	709	175	146
d1, Uniform Delay [s]	15.34	3.81	7.52	14.03	13.93
k, delay calibration	0.11	0.15	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.63	0.96	2.24	3.01	2.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

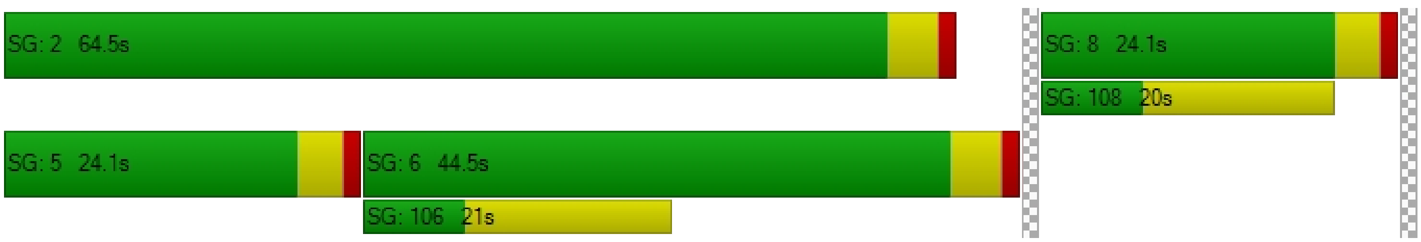
X, volume / capacity	0.74	0.65	0.74	0.58	0.51
d, Delay for Lane Group [s/veh]	25.98	4.77	9.76	17.04	16.69
Lane Group LOS	C	A	A	B	B
Critical Lane Group	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	0.71	1.12	2.15	0.72	0.53
50th-Percentile Queue Length [ft]	17.69	28.12	53.87	17.90	13.31
95th-Percentile Queue Length [veh]	1.27	2.02	3.88	1.29	0.96
95th-Percentile Queue Length [ft]	31.84	50.62	96.97	32.22	23.96

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.98	4.77	9.76	9.76	17.04	16.69
Movement LOS	C	A	A	A	B	B
d_A, Approach Delay [s/veh]	6.70		9.76		16.89	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	9.03					
Intersection LOS	A					
Intersection V/C	0.625					

Sequence

Ring 1	-	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	20.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.840

Intersection Setup

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	300.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	205	26	443	2726	1166	535
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	23.10	6.30	3.80	5.10	5.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	205	26	443	2726	1166	535
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	7	111	682	292	134
Total Analysis Volume [veh/h]	205	26	443	2726	1166	535
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	2		2		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	4	4	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	Lead	-	-	-
Minimum Green [s]	10	10	4	10	10	0
Maximum Green [s]	36	36	20	50	50	0
Amber [s]	3.0	3.0	3.0	5.0	5.0	0.0
All red [s]	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	2.0	2.0	2.0	3.0	3.0	0.0
Walk [s]	5	5	0	5	5	0
Pedestrian Clearance [s]	38	38	0	38	38	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	1.5	1.5	1.0	3.5	3.5	0.0
Minimum Recall	No		Yes	No	Yes	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.00	5.50	5.50	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.00	3.50	3.50	3.50
g_i, Effective Green Time [s]	10	10	20	59	36	36
g / C, Green / Cycle	0.13	0.13	0.26	0.76	0.46	0.46
(v / s)_i Volume / Saturation Flow Rate	0.07	0.02	0.29	0.61	0.26	0.39
s, saturation flow rate [veh/h]	3059	1162	1532	4488	4432	1380
c, Capacity [veh/h]	389	148	391	3401	2057	641
d1, Uniform Delay [s]	31.96	30.50	29.15	5.85	15.26	18.36
k, delay calibration	0.04	0.04	0.50	0.11	0.11	0.16
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.41	0.21	86.48	0.46	0.25	4.33
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

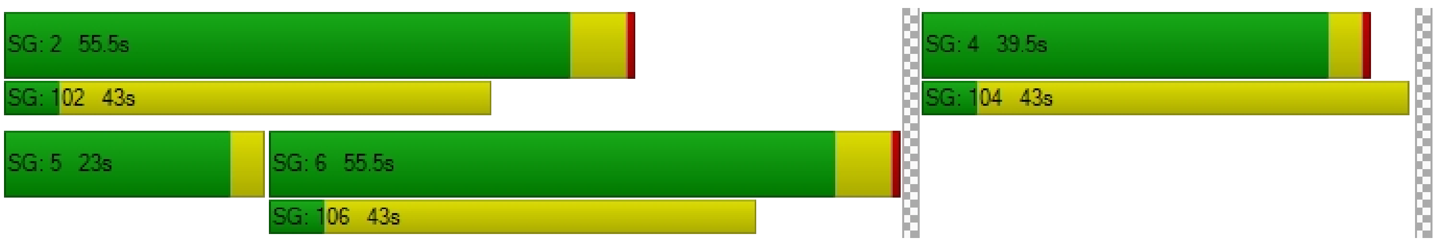
X, volume / capacity	0.53	0.18	1.13	0.80	0.57	0.84
d, Delay for Lane Group [s/veh]	32.37	30.71	115.63	6.31	15.51	22.69
Lane Group LOS	C	C	F	A	B	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	1.79	0.44	16.03	4.08	4.19	7.64
50th-Percentile Queue Length [ft]	44.72	10.90	400.66	101.91	104.81	190.90
95th-Percentile Queue Length [veh]	3.22	0.79	24.19	7.34	7.55	12.17
95th-Percentile Queue Length [ft]	80.49	19.63	604.84	183.43	188.66	304.19

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	32.37	30.71	115.63	6.31	15.51	22.69
Movement LOS	C	C	F	A	B	C
d_A, Approach Delay [s/veh]	32.19		21.59		17.77	
Approach LOS	C		C		B	
d_I, Intersection Delay [s/veh]	20.80					
Intersection LOS	C					
Intersection V/C	0.840					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	9.0
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.813

Intersection Setup

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	1	1	0
Pocket Length [ft]	100.00	300.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	298	27	1691	26	100	2914
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.30	8.30	5.30	7.10	0.00	3.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	298	27	1691	26	100	2914
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	75	7	423	7	25	729
Total Analysis Volume [veh/h]	298	27	1691	26	100	2914
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4		0		18	
Bicycle Volume [bicycles/h]	1		1		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Protected	Permissive	Permissive	Protected	Permissive
Signal group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	0	10	0	7	10
Maximum Green [s]	31	0	40	0	21	40
Amber [s]	3.0	0.0	5.0	0.0	3.0	5.0
All red [s]	0.5	0.0	0.5	0.0	0.0	0.5
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	2.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	35	0	35	0	0	35
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	1.5	0.0	3.5	0.0	1.0	3.5
Minimum Recall	No		Yes		No	Yes
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	20.0	0.0	0.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	3.00	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	1.00	3.50
g_i, Effective Green Time [s]	8	29	29	5	38
g / C, Green / Cycle	0.14	0.54	0.54	0.10	0.69
(v / s)_i Volume / Saturation Flow Rate	0.10	0.34	0.02	0.06	0.58
s, saturation flow rate [veh/h]	3129	4915	1471	1810	4991
c, Capacity [veh/h]	446	2644	791	182	3461
d1, Uniform Delay [s]	22.27	8.92	5.95	23.46	6.19
k, delay calibration	0.11	0.11	0.11	0.04	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.74	0.26	0.02	0.96	0.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

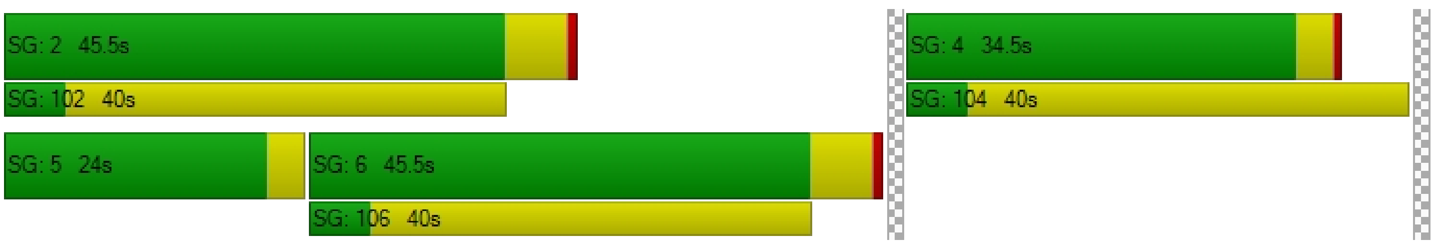
X, volume / capacity	0.67	0.64	0.03	0.55	0.84
d, Delay for Lane Group [s/veh]	24.02	9.18	5.97	24.42	6.78
Lane Group LOS	C	A	A	C	A
Critical Lane Group	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.82	3.03	0.09	1.12	2.74
50th-Percentile Queue Length [ft]	45.38	75.71	2.37	27.92	68.39
95th-Percentile Queue Length [veh]	3.27	5.45	0.17	2.01	4.92
95th-Percentile Queue Length [ft]	81.68	136.28	4.27	50.25	123.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.02	0.00	9.18	5.97	24.42	6.78
Movement LOS	C		A	A	C	A
d_A, Approach Delay [s/veh]	24.02		9.13		7.37	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	8.96					
Intersection LOS	A					
Intersection V/C	0.813					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 204: Chilco Street/Newbridge Street

Control Type:	All-way stop	Delay (sec / veh):	8.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	╋			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	3	23	1	2	1	30	1	3	32	21
Total Analysis Volume [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.12	0.51	0.55	1.06
95th-Percentile Queue Length [ft]	2.90	12.63	13.73	26.40
Approach Delay [s/veh]	7.81	8.70	8.35	8.70
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.56			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 206: Chilco Street/Ivy Drive

Control Type:	All-way stop	Delay (sec / veh):	8.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Streeet			Ivy Drive			Ivy Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	╋			╋			╋			╋		
Turning Movement	Left	Thru	Right2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Streeet			Ivy Drive			Ivy Drive		
Base Volume Input [veh/h]	74	77	21	41	54	20	17	56	25	9	64	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	74	77	21	41	54	20	17	56	25	9	64	63
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	19	5	10	14	5	4	14	6	2	16	16
Total Analysis Volume [veh/h]	74	77	21	41	54	20	17	56	25	9	64	63
Pedestrian Volume [ped/h]	29			100			28			66		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.85	0.52	0.44	0.61
95th-Percentile Queue Length [ft]	21.18	13.08	10.89	15.21
Approach Delay [s/veh]	8.97	8.49	8.36	8.40
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.60			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	155.8
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Base Volume Input [veh/h]	134	174	196	766	204	8	5	10	17	42	24	84
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	10.10	6.80	2.30	3.40	0.00	40.00	40.00	29.40	14.30	37.50	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	134	174	196	766	204	8	5	10	17	42	24	84
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	44	49	192	51	2	1	3	4	11	6	21
Total Analysis Volume [veh/h]	134	174	196	766	204	8	5	10	17	42	24	84
Pedestrian Volume [ped/h]	0			1			0			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	7.10	48.49	0.04	0.19	1.18
95th-Percentile Queue Length [ft]	177.54	1212.31	0.95	4.74	29.48
Approach Delay [s/veh]	23.84	250.49	11.27		12.65
Approach LOS	C	F	B		B
Intersection Delay [s/veh]	155.80				
Intersection LOS	F				

Intersection Level Of Service Report
Intersection 209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	9.5
Analysis Method:	HCM 2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	1	0	0	1	53	0	2	17	1	1	0	11
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.90	0.00	0.00	5.90	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	0	1	53	0	2	17	1	1	0	11
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	0	13	0	1	4	0	0	0	3
Total Analysis Volume [veh/h]	1	0	0	1	53	0	2	17	1	1	0	11
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
d_M, Delay for Movement [s/veh]	9.01	9.42	8.38	7.23	0.00	0.00	7.30	0.00	0.00	8.97	9.46	8.57
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.10	0.10	0.10	0.04	0.04	0.04	0.04	0.04	0.04
95th-Percentile Queue Length [ft]	0.08	0.08	0.08	2.60	2.60	2.60	0.97	0.97	0.97	0.90	0.90	0.90
d_A, Approach Delay [s/veh]	9.01			0.13			0.73			8.61		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	1.54											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Base Volume Input [veh/h]	8	67	5	1	47	70	29	11	91	45	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	9.10	20.00	100.00	33.30	0.00	10.30	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	67	5	1	47	70	29	11	91	45	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	17	1	0	12	18	7	3	23	11	0	0
Total Analysis Volume [veh/h]	8	67	5	1	47	70	29	11	91	45	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.09	0.07	0.00	0.00
d_M, Delay for Movement [s/veh]	7.44	0.00	0.00	8.33	0.00	0.00	10.34	10.88	9.27	10.85	10.40	9.06
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh]	0.17	0.17	0.17	0.37	0.37	0.37	0.50	0.50	0.50	0.22	0.22	0.22
95th-Percentile Queue Length [ft]	4.27	4.27	4.27	9.16	9.16	9.16	12.62	12.62	12.62	5.55	5.55	5.55
d_A, Approach Delay [s/veh]	0.74			0.07			9.65			10.81		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	4.88											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	14.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Approach	Southbound			Northeastbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Base Volume Input [veh/h]	153	150	0	0	102	14	7	0	46	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	10.30	2.00	2.00	26.10	7.10	0.00	0.00	18.20	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	153	150	0	0	102	14	7	0	46	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	38	0	0	26	4	2	0	12	0	0	0
Total Analysis Volume [veh/h]	153	150	0	0	102	14	7	0	46	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.05	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.74	0.00	0.00	0.00	0.00	0.00	14.34	14.64	9.33	0.00	0.00	0.00
Movement LOS	A	A			A	A	B	B	A			
95th-Percentile Queue Length [veh]	0.78	0.78	0.00	0.00	0.00	0.00	0.22	0.22	0.22	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	19.40	19.40	0.00	0.00	0.00	0.00	5.50	5.50	5.50	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	3.91			0.00			9.99			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	3.63											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 215: Chrysler Dr/Constitution Dr

Control Type:	Signalized	Delay (sec / veh):	26.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.392

Intersection Setup

Name	Chrysler Drive						Constitution Drive					
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive						Constitution Drive					
Base Volume Input [veh/h]	23	74	89	65	127	190	19	5	102	1	116	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	13.00	8.50	8.30	21.10	0.80	3.10	5.30	40.00	9.80	0.00	17.90	100.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	74	89	65	127	190	19	5	102	1	116	28
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	19	22	16	32	48	5	1	26	0	29	7
Total Analysis Volume [veh/h]	23	74	89	65	127	190	19	5	102	1	116	28
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			5			5			5		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split
Signal group	0	6	0	0	8	0	0	4	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	26	0	0	26	0	0	26	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	31	0	0	47	0	0	47	0	0	22	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	15	65	65	65	8	8
g / C, Green / Cycle	0.15	0.65	0.65	0.65	0.08	0.08
(v / s)_i Volume / Saturation Flow Rate	0.13	0.07	0.21	0.13	0.05	0.06
s, saturation flow rate [veh/h]	1445	971	1530	969	1449	1213
c, Capacity [veh/h]	216	529	1000	674	112	93
d1, Uniform Delay [s]	41.48	15.02	7.58	6.83	44.98	45.14
k, delay calibration	0.11	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.54	0.48	0.83	0.61	7.27	10.49
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

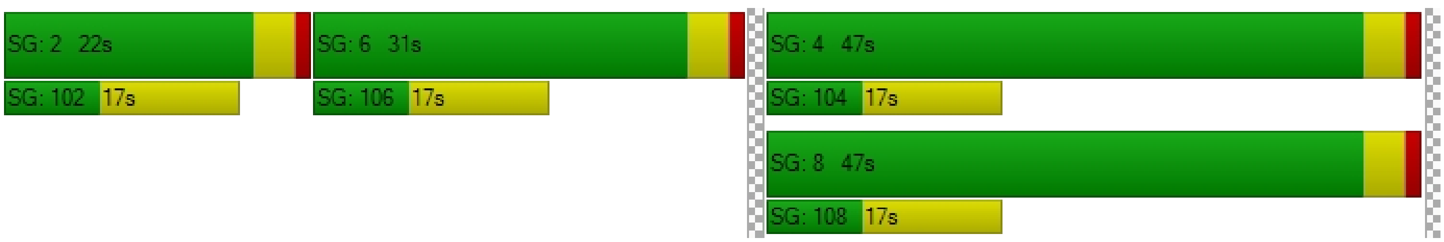
X, volume / capacity	0.86	0.12	0.32	0.19	0.69	0.73
d, Delay for Lane Group [s/veh]	51.02	15.49	8.42	7.44	52.24	55.64
Lane Group LOS	D	B	A	A	D	E
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	5.00	0.89	2.92	1.08	2.07	1.92
50th-Percentile Queue Length [ft]	125.04	22.29	72.97	26.88	51.68	48.05
95th-Percentile Queue Length [veh]	8.67	1.60	5.25	1.94	3.72	3.46
95th-Percentile Queue Length [ft]	216.74	40.11	131.34	48.38	93.03	86.50

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.02	51.02	51.02	15.49	8.42	8.42	7.44	7.44	7.44	52.24	53.42	55.64
Movement LOS	D	D	D	B	A	A	A	A	A	D	D	E
d_A, Approach Delay [s/veh]	51.02			9.62			7.44			53.84		
Approach LOS	D			A			A			D		
d_I, Intersection Delay [s/veh]	26.11											
Intersection LOS	C											
Intersection V/C	0.392											

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 233: Sand Hill Road and Sand Hill Circle

Control Type:	Signalized	Delay (sec / veh):	14.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.576

Intersection Setup

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			Yes		

volumes

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Base Volume Input [veh/h]	4	293	0	0	51	40	0	0	0	0	795	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	26.60	2.00	2.00	5.90	7.50	2.00	2.00	2.00	3.00	3.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	293	0	0	51	40	0	0	0	0	795	32
Peak Hour Factor	0.8700	0.8700	1.0000	1.0000	0.8700	0.8700	1.0000	1.0000	1.0000	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	84	0	0	15	11	0	0	0	0	228	9
Total Analysis Volume [veh/h]	5	337	0	0	59	46	0	0	0	0	914	37
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Split	Split	Split
Signal group	0	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	55	0	0	55	0	0	0	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	55	0	0	55	0	0	0	0	0	30	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	14	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Minimum Recall		No			No						No	
Maximum Recall		No			No						No	
Pedestrian Recall		No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R		C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		1.00	1.00
g_i, Effective Green Time [s]	23	23	23		57	57
g / C, Green / Cycle	0.27	0.27	0.27		0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.23	0.03	0.03		0.27	0.27
s, saturation flow rate [veh/h]	1491	1794	1483		1845	1651
c, Capacity [veh/h]	448	487	402		1236	1106
d1, Uniform Delay [s]	29.24	23.34	23.29		6.36	6.37
k, delay calibration	0.08	0.08	0.08		0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	2.05	0.08	0.09		0.99	1.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00

Lane Group Results

X, volume / capacity	0.76	0.12	0.11		0.41	0.41
d, Delay for Lane Group [s/veh]	31.29	23.42	23.39		7.36	7.48
Lane Group LOS	C	C	C		A	A
Critical Lane Group	Yes	No	No		No	Yes
50th-Percentile Queue Length [veh]	6.61	0.89	0.69		3.71	3.37
50th-Percentile Queue Length [ft]	165.17	22.15	17.28		92.74	84.14
95th-Percentile Queue Length [veh]	10.82	1.59	1.24		6.68	6.06
95th-Percentile Queue Length [ft]	270.56	39.87	31.10		166.93	151.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.29	31.29	0.00	0.00	23.42	23.39	0.00	0.00	0.00	7.36	7.41	7.48
Movement LOS	C	C			C	C				A	A	A
d_A, Approach Delay [s/veh]	31.29			23.41			0.00			7.41		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	14.46											
Intersection LOS	B											
Intersection V/C	0.576											

Sequence

Ring 1	-	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	85.6
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.807

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	0	161	689	48	0	0	156	1696	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.70	3.60	4.20	2.00	2.00	2.60	1.50	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	161	689	48	0	0	156	1696	0	0	0	0
Peak Hour Factor	1.0000	0.9500	0.9500	0.9500	1.0000	1.0000	0.9500	0.9500	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	42	181	13	0	0	41	446	0	0	0	0
Total Analysis Volume [veh/h]	0	169	725	51	0	0	164	1785	0	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			40			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Protecte	Permiss	Overlap	Permiss	Permiss	Protecte	Protecte	Permiss
Signal group	0	8	5	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups			5,8				1,5,6					
Lead / Lag	-	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	0	6	5	6	0	0	4	8	0	0	0	0
Maximum Green [s]	0	14	30	25	0	0	16	30	0	0	0	0
Amber [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0
All red [s]	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Split [s]	0	14	30	25	0	0	16	30	0	0	0	0
Vehicle Extension [s]	0.0	2.5	3.0	2.0	0.0	0.0	2.0	4.0	0.0	0.0	0.0	0.0
Walk [s]	0	10	0	0	0	0	0	10	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	0	0	0	10	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Minimum Recall		No	No	No			No	Yes				
Maximum Recall		No	No	No			No	No				
Pedestrian Recall		No	No	No			No	No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	L	C	
L, Total Lost Time per Cycle [s]	2.00	2.25	2.00	2.25	2.50	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.50	
g_i, Effective Green Time [s]	16	23	6	23	32	
g / C, Green / Cycle	0.24	0.34	0.09	0.34	0.48	
(v / s)_i Volume / Saturation Flow Rate	0.09	0.47	0.03	0.11	0.50	
s, saturation flow rate [veh/h]	1850	1559	1737	1470	3564	
c, Capacity [veh/h]	444	512	151	403	1710	
d1, Uniform Delay [s]	21.20	22.39	28.65	22.93	17.34	
k, delay calibration	0.04	0.50	0.04	0.12	0.19	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.20	198.64	0.49	0.75	26.58	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

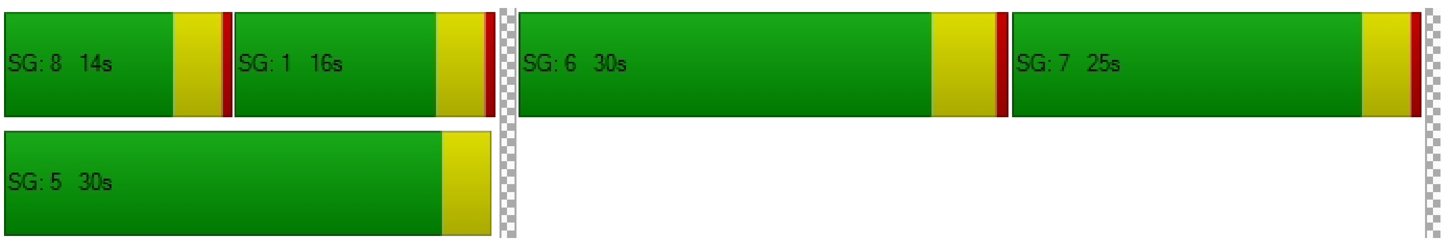
X, volume / capacity	0.38	1.42	0.34	0.41	1.04	
d, Delay for Lane Group [s/veh]	21.40	221.04	29.14	23.68	43.92	
Lane Group LOS	C	F	C	C	F	
Critical Lane Group	No	Yes	Yes	Yes	Yes	
50th-Percentile Queue Length [veh]	2.02	35.17	0.73	1.73	16.62	
50th-Percentile Queue Length [ft]	50.42	879.24	18.33	43.18	415.50	
95th-Percentile Queue Length [veh]	3.63	54.33	1.32	3.11	24.04	
95th-Percentile Queue Length [ft]	90.76	1358.28	33.00	77.72	601.07	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	21.40	221.04	29.14	0.00	0.00	23.68	43.92	0.00	0.00	0.00	0.00
Movement LOS		C	F	C			C	F				
d_A, Approach Delay [s/veh]	183.30			29.14			42.22			0.00		
Approach LOS	F			C			D			A		
d_I, Intersection Delay [s/veh]	85.57											
Intersection LOS	F											
Intersection V/C	0.807											

Sequence

Ring 1	8	1	6	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 243: University Avenue/US 101 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	39.8
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.863

Intersection Setup

Name	University Avenue		University Avenue		US 101 SB Ramps	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	0	1
Pocket Length [ft]	100.00	160.00	230.00	100.00	100.00	220.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		US 101 SB Ramps	
Base Volume Input [veh/h]	1000	486	841	1474	571	435
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1000	486	841	1474	571	435
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	263	128	221	388	150	114
Total Analysis Volume [veh/h]	1053	512	885	1552	601	458
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	7		5		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	4.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Protected	Permissive	Protected	Permissive
Signal group	6	7	5	2	7	0
Auxiliary Signal Groups		6,7				
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	10	6	4	10	6	0
Maximum Green [s]	30	30	30	30	30	0
Amber [s]	4.0	3.0	3.0	4.0	3.0	0.0
All red [s]	0.5	0.5	0.5	0.5	0.5	0.0
Split [s]	50	37	43	93	37	0
Vehicle Extension [s]	3.0	2.0	2.0	3.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.5	1.5	1.5	2.5	1.5	0.0
Minimum Recall	Yes	No	No	Yes	No	
Maximum Recall	No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R
L, Total Lost Time per Cycle [s]	4.50	3.50	3.50	4.50	3.50	3.50	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.50	0.00	1.50	2.50	1.50	1.50	1.50
g_i, Effective Green Time [s]	46	84	39	89	34	34	34
g / C, Green / Cycle	0.36	0.65	0.30	0.68	0.26	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.33	0.21	0.29	0.49	0.22	0.23	0.25
s, saturation flow rate [veh/h]	3192	2462	3101	3192	1597	1541	1425
c, Capacity [veh/h]	1134	1594	926	2173	411	397	367
d1, Uniform Delay [s]	40.32	10.19	44.76	12.89	45.98	46.46	47.61
k, delay calibration	0.50	0.04	0.04	0.50	0.34	0.36	0.43
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.28	0.04	2.95	2.04	14.46	19.02	34.70
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.93	0.32	0.96	0.71	0.86	0.89	0.96
d, Delay for Lane Group [s/veh]	54.59	10.23	47.71	14.93	60.44	65.47	82.31
Lane Group LOS	D	B	D	B	E	E	F
Critical Lane Group	Yes	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	18.26	3.19	14.29	13.67	12.49	13.05	14.76
50th-Percentile Queue Length [ft]	456.53	79.63	357.23	341.75	312.35	326.27	369.12
95th-Percentile Queue Length [veh]	25.27	5.73	20.49	19.73	18.29	18.98	21.07
95th-Percentile Queue Length [ft]	631.74	143.33	512.22	493.34	457.27	474.39	526.66

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.59	10.23	47.71	14.93	62.52	78.45
Movement LOS	D	B	D	B	E	E
d_A, Approach Delay [s/veh]	40.08		26.83		69.41	
Approach LOS	D		C		E	
d_I, Intersection Delay [s/veh]	39.84					
Intersection LOS	D					
Intersection V/C	0.863					

Sequence

Ring 1	2	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 245: University Avenue/Runnymede Street

Control Type:	Signalized	Delay (sec / veh):	11.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.624

Intersection Setup

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	120.00	100.00	100.00	130.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Base Volume Input [veh/h]	11	1270	58	167	848	89	19	85	1	34	214	27
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	1270	58	167	848	89	19	85	1	34	214	27
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	318	15	42	212	22	5	21	0	9	54	7
Total Analysis Volume [veh/h]	11	1270	58	167	848	89	19	85	1	34	214	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			5			6			8		
Bicycle Volume [bicycles/h]	1			7			0			1		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	54.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	45	0	0	45	0	0	20	0	0	20	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	44	44	44	44	44	44	13	13
g / C, Green / Cycle	0.67	0.67	0.67	0.67	0.67	0.67	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.02	0.40	0.40	0.45	0.28	0.29	0.07	0.17
s, saturation flow rate [veh/h]	536	1676	1646	370	1676	1611	1506	1593
c, Capacity [veh/h]	380	1128	1108	264	1128	1084	372	387
d1, Uniform Delay [s]	8.18	5.78	5.80	20.21	4.85	4.87	21.98	24.80
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.20
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	2.29	2.36	11.06	1.16	1.22	0.41	4.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.03	0.59	0.60	0.63	0.42	0.43	0.28	0.71
d, Delay for Lane Group [s/veh]	8.32	8.07	8.16	31.27	6.01	6.09	22.38	29.31
Lane Group LOS	A	A	A	C	A	A	C	C
Critical Lane Group	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.08	4.06	4.04	3.15	2.36	2.31	1.33	4.30
50th-Percentile Queue Length [ft]	2.08	101.52	100.90	78.83	59.10	57.72	33.27	107.46
95th-Percentile Queue Length [veh]	0.15	7.31	7.26	5.68	4.26	4.16	2.40	7.70
95th-Percentile Queue Length [ft]	3.74	182.73	181.62	141.90	106.38	103.90	59.89	192.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	8.32	8.11	8.16	31.27	6.05	6.09	22.38	22.38	22.38	29.31	29.31	29.31
Movement LOS	A	A	A	C	A	A	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	8.12			9.87			22.38			29.31		
Approach LOS	A			A			C			C		
d_I, Intersection Delay [s/veh]	11.39											
Intersection LOS	B											
Intersection V/C	0.624											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 246: University Avenue/Bell Street

Control Type:	Signalized	Delay (sec / veh):	18.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	60.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Base Volume Input [veh/h]	38	1311	57	16	888	16	14	88	41	185	237	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	38	1311	57	16	888	16	14	88	41	185	237	25
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	328	14	4	222	4	4	22	10	46	59	6
Total Analysis Volume [veh/h]	38	1311	57	16	888	16	14	88	41	185	237	25
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			5			7			1		
Bicycle Volume [bicycles/h]	4			11			2			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	78.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	38	0	0	38	0	0	27	0	0	27	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	34	34	34	34	34	34	23	23
g / C, Green / Cycle	0.53	0.53	0.53	0.53	0.53	0.53	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.07	0.41	0.41	0.04	0.27	0.27	0.09	0.33
s, saturation flow rate [veh/h]	552	1676	1648	356	1676	1664	1545	1351
c, Capacity [veh/h]	288	882	867	169	882	875	603	553
d1, Uniform Delay [s]	16.11	12.39	12.44	23.73	10.01	10.02	15.05	20.57
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.39
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.95	6.79	7.05	1.10	2.14	2.16	0.20	9.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

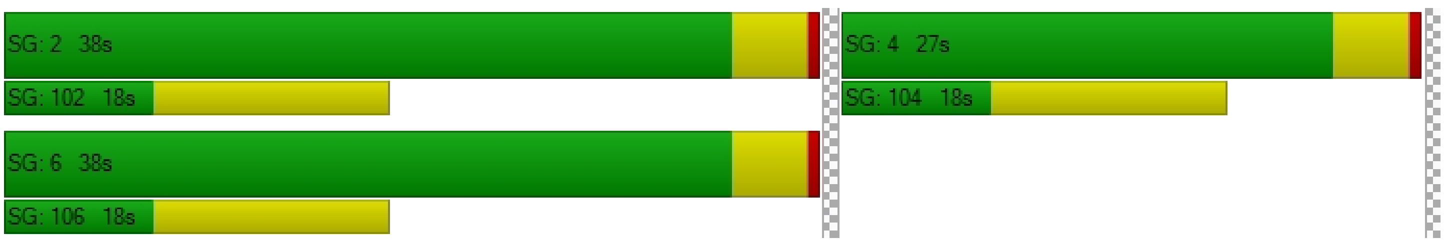
X, volume / capacity	0.13	0.78	0.78	0.09	0.51	0.52	0.24	0.81
d, Delay for Lane Group [s/veh]	17.06	19.18	19.48	24.83	12.15	12.18	15.25	30.24
Lane Group LOS	B	B	B	C	B	B	B	C
Critical Lane Group	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.46	8.31	8.29	0.26	4.06	4.04	1.42	7.40
50th-Percentile Queue Length [ft]	11.48	207.63	207.14	6.41	101.55	101.08	35.49	185.04
95th-Percentile Queue Length [veh]	0.83	13.03	13.01	0.46	7.31	7.28	2.56	11.86
95th-Percentile Queue Length [ft]	20.67	325.78	325.16	11.54	182.78	181.95	63.88	296.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	17.06	19.32	19.48	24.83	12.17	12.18	15.25	15.25	15.25	30.24	30.24	30.24
Movement LOS	B	B	B	C	B	B	B	B	B	C	C	C
d_A, Approach Delay [s/veh]	19.27			12.39			15.25			30.24		
Approach LOS	B			B			B			C		
d_I, Intersection Delay [s/veh]	18.58											
Intersection LOS	B											
Intersection V/C	0.743											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 247: University Avenue/Bay Road

Control Type:	Signalized	Delay (sec / veh):	37.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name	University Avenue			University Avenue						BayRoad		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	170.00	100.00	170.00	170.00	100.00	170.00
Speed [mph]	35.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue						BayRoad		
Base Volume Input [veh/h]	118	1104	94	99	970	34	136	275	138	56	175	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	118	1104	94	99	970	34	136	275	138	56	175	76
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	276	24	25	243	9	34	69	35	14	44	19
Total Analysis Volume [veh/h]	118	1104	94	99	970	34	136	275	138	56	175	76
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	78			19			8			26		
Bicycle Volume [bicycles/h]	9			8			3			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	1	6	0	5	2	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	0	4	4	0	5	4	0	4	5	0
Maximum Green [s]	0	0	0	0	0	0	30	0	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	15	49	0	12	46	0	35	35	0	34	34	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	4	5	0
Pedestrian Clearance [s]	0	23	0	0	17	0	0	27	0	26	10	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	Yes		No	Yes		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	74	74	8	71	71	13	26	26	6	18	18
g / C, Green / Cycle	0.08	0.57	0.57	0.06	0.55	0.55	0.10	0.20	0.20	0.04	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.07	0.36	0.36	0.06	0.30	0.30	0.09	0.16	0.10	0.04	0.10	0.06
s, saturation flow rate [veh/h]	1597	1676	1625	1597	1676	1650	1597	1676	1363	1597	1676	1190
c, Capacity [veh/h]	135	960	930	98	921	906	161	332	270	72	238	169
d1, Uniform Delay [s]	58.81	18.62	18.69	61.00	18.89	18.93	57.44	50.04	46.54	61.41	53.41	51.10
k, delay calibration	0.30	0.50	0.50	0.35	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	34.01	3.16	3.32	77.76	2.35	2.41	11.30	5.33	1.50	16.04	4.35	1.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.63	0.64	1.01	0.55	0.55	0.84	0.83	0.51	0.78	0.73	0.45
d, Delay for Lane Group [s/veh]	92.82	21.78	22.01	138.76	21.24	21.33	68.74	55.37	48.05	77.45	57.76	52.96
Lane Group LOS	F	C	C	F	C	C	E	E	D	E	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	5.09	12.53	12.31	5.34	10.10	10.01	4.91	9.07	4.12	2.16	5.78	2.37
50th-Percentile Queue Length [ft]	127.30	313.26	307.78	133.62	252.38	250.18	122.63	226.82	102.95	53.92	144.50	59.23
95th-Percentile Queue Length [veh]	8.79	18.34	18.07	9.16	15.31	15.20	8.54	14.01	7.41	3.88	9.72	4.26
95th-Percentile Queue Length [ft]	219.81	458.39	451.64	228.94	382.65	379.88	213.43	350.32	185.32	97.05	243.07	106.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	92.82	21.88	22.01	138.76	21.29	21.33	68.74	55.37	48.05	77.45	57.76	52.96
Movement LOS	F	C	C	F	C	C	E	E	D	E	E	D
d_A, Approach Delay [s/veh]	28.25			31.83			56.84			60.16		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	37.24											
Intersection LOS	D											
Intersection V/C	0.625											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 249: Donohoe Street/US 101 NB Off-ramp/Capitol Avenue

Control Type:	Signalized	Delay (sec / veh):	44.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.468

Intersection Setup

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	776	0	313	0	0	0	0	444	0	0	1042	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	776	0	313	0	0	0	0	444	0	0	1042	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9330	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	194	0	78	0	0	0	0	111	0	0	261	0
Total Analysis Volume [veh/h]	776	0	313	0	0	0	0	444	0	0	1042	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			25			0			1		
Bicycle Volume [bicycles/h]	1			0			2			4		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Protecte	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	0	5	0	0	6	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	4	0	4	0	0	4	0	5	0	0	5	0
Maximum Green [s]	30	0	30	0	0	30	0	30	0	0	30	0
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	65	0	65	0	0	8	0	57	0	0	57	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	26	0	0	26	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No		No			No		No			No	
Maximum Recall	No		No			Yes		No			No	
Pedestrian Recall	No		No			No		No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	R	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	41	41	41	41
g / C, Green / Cycle	0.28	0.28	0.31	0.31	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.25	0.22	0.00	0.14	0.22	0.21
s, saturation flow rate [veh/h]	3101	1407	1425	3192	3192	1676
c, Capacity [veh/h]	876	397	443	1003	1003	527
d1, Uniform Delay [s]	44.65	43.05	0.00	35.52	39.08	38.57
k, delay calibration	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.25	3.51	0.00	1.42	3.94	6.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.89	0.79	0.00	0.44	0.69	0.66
d, Delay for Lane Group [s/veh]	47.90	46.56	0.00	36.94	43.02	44.93
Lane Group LOS	D	D	A	D	D	D
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	12.31	9.66	0.00	5.85	10.27	10.53
50th-Percentile Queue Length [ft]	307.87	241.47	0.00	146.18	256.87	263.21
95th-Percentile Queue Length [veh]	18.07	14.76	0.00	9.81	15.53	15.85
95th-Percentile Queue Length [ft]	451.75	368.89	0.00	245.32	388.29	396.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	47.90	0.00	46.56	0.00	0.00	0.00	0.00	36.94	0.00	0.00	43.66	44.93
Movement LOS	D		D			A		D			D	D
d_A, Approach Delay [s/veh]	47.51			0.00			36.94			43.66		
Approach LOS	D			A			D			D		
d_I, Intersection Delay [s/veh]	44.13											
Intersection LOS	D											
Intersection V/C	0.468											

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

General Plan & Facebook Expansion

Vistro File: J:\...\2040(b)_AM.vistro

Scenario 1: Existing GP plus Facebook Conditions AM

Report File: J:\...\Cumulative 2040 Existing General Plan Plus Facebook Project Conditions Conditions AM.pdf

5/19/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	888	1749	1091	320	4048

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	28	1189	14	439	1422	296	15	4	71	250	13	5	3746

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	99	767	90	27	1068	435	454	48	201	30	18	28	3265

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	1	803	82	268	867	31	236	161	14	58	24	221	2766

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
5	Middlefield Rd/Marsh Rd	505	307	374	391	225	455	2257

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	93	573	446	364	420	75	1971

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringswood Ave	5	3	12	136	44	251	55	559	84	225	679	64	2117

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
13	Middlefield Rd/Lytton Ave	125	41	75	4	111	6	129	273	7	5	464	337	1577

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14	Middlefield Rd/University Ave	26	246	26	126	555	160	34	240	65	111	356	68	2013

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	873	85	1341	4069	888	359	7615

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	444	625	361	16	59	142	243	747	197	732	3641	24	7231

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	163	1329	94	88	795	57	78	22	50	26	24	23	2749

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	141	1569	842	9	17	147	2725

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1617	307	54	969	313	93	3353

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	151	1826	166	51	1143	10	37	169	281	394	173	61	4462

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	67	1278	1161	445	363	60	3374

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	26	1040	16	36	925	89	40	3	10	58	14	84	2341

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	25	970	3	1	805	120	191	6	51	4	4	5	2185

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	3	745	40	27	826	4	37	70	17	89	128	114	2100

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	29	212	146	458	75	391	80	368	256	320	356	15	2706

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	15	618	67	21	483	11	172	141	16	136	188	65	1933

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	12	272	90	30	345	61	30	107	16	72	200	52	1287

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	14	100	16	222	20	212	40	2098	282	181	1968	76	5229

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	281	139	137	160	337	30	128	889	44	79	1976	802	5002

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	57	196	53	117	254	63	112	917	92	196	2139	133	4329

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	99	69	97	85	91	62	1877	89	1476	17	3962

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	24	345	60	417	214	44	110	978	497	262	2314	26	5291

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	72	9	75	6	3	10	89	2464	51	49	1825	45	4698

ID	Intersection Name	Northeastbound		Southwestbound				Northwestbound		Southeastbound		Total Volume
		Left	Right	U-T	Left	Thru	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	186	286	0	0	0	0	360	2058	1823	71	4784

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	29	0	52	1	0	0	122	1511	1	40	2697	20	4473

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	441	428	59	340	315	70	1653

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Santa Cruz Ave/Sand Hill Rd	271	1339	306	331	559	51	110	722	457	223	669	236	5274

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
58	University Avenue and Adams Drive	42	1205	1449	140	19	3	2858

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
71	Chilco Street/Terminal Avenue	51	218	101	62	115	45	592

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	68	1230	1284	142	17	26	2767

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
77	University Avenue/Donohoe Street	194	789	514	23	865	65	8	98	500	605	604	609	4874

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	154	435	124	48	627	67	70	106	41	71	51	62	1856

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	23	2	41	2	2	7	103	1888	233	113	852	39	3305

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	663	556	99	263	902	547	3030

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road and US 101 NB Ramps	1372	1404	848	547	4171

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
111	University Avenue / Woodland Avenue	46	845	25	211	972	533	19	87	311	392	84	44	3569

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
131	Chilco Street/Hamilton Avenue	23	155	18	50	79	15	37	41	16	22	51	131	638

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	1794	748	38	135	332	3047

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	10	0	33	79	6	51	211	1594	117	73	760	50	2984

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	7	1	29	12	1	8	37	1666	12	17	867	21	2678

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	145	1496	17	29	776	144	2	0	9	215	3	174	3010

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	173	42	1482	6	35	8	8	106	334	2677	407	12	5290

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	69	689	413	115	101	75	1462

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	205	26	443	2726	1166	535	5101

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	298	27	1691	26	100	2914	5056

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
199	Bayfront Expwy/Bldg 21	56	120	1134	90	809	2758	4967

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
201	Bayfront Expwy/Bldg 20	44	76	1503	79	704	3523	5929

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
204	Chilco Street/Newbridge Street	2	15	12	93	5	9	4	118	2	13	127	85	485

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
206	Chilco Street/Ivy Drive	74	77	21	41	54	20	17	56	25	9	64	63	521

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	134	174	196	766	204	8	5	10	17	42	24	84	1664

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	1	0	0	1	53	0	2	17	1	1	0	11	87

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	8	67	5	1	47	70	29	11	91	45	0	1	375

ID	Intersection Name	Southbound		Northeastbound		Northwestbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
214	Chrysler Dr/Jefferson Dr	153	150	102	14	7	0	46	472

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	23	74	89	65	127	190	19	5	102	1	116	28	839

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Road and Sand Hill Circle	4	293	51	40	0	795	32	1215

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	161	689	48	156	1696	2750

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
243	University Avenue/US 101 SB Ramps	1000	486	841	1474	571	435	4807

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
245	University Avenue/Runnymede Street	11	1270	58	167	848	89	19	85	1	34	214	27	2823

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
246	University Avenue/Bell Street	38	1311	57	16	888	16	14	88	41	185	237	25	2916

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
247	University Avenue/Bay Road	118	1104	94	99	970	34	136	275	138	56	175	76	3275

ID	Intersection Name	Northbound		Southbound	Eastbound	Westbound		Total Volume
		Left	Right	Right	Thru	Thru	Right	
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	776	313	0	444	1042	0	2575

2040 No Project – PM Peak Hour

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General Plan & Facebook Expansion

Vistro File: J:\...\2040(b)_PM.vistro

Scenario 1: Existing GP plus Facebook Conditions PM

Report File: J:\...\Cumulative 2040 Existing General Plan Plus Facebook Project Conditions Conditions PM.pdf

5/19/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM 2010	SWB Thru	0.810	18.6	B
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM 2010	NEB Left	0.628	22.6	C
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM 2010	SB Left	0.673	35.4	D
4	Marsh Rd/Bay Rd	Signalized	HCM 2010	SB Left	0.531	22.9	C
5	Middlefield Rd/Marsh Rd	Signalized	HCM 2010	EB Left	0.767	36.5	D
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM 2010	NWB Left	1.290	42.7	D
10	Middlefield Rd/Ringwood Ave	Signalized	HCM 2010	SEB Left	0.651	34.3	C
13	Middlefield Rd/Lytton Ave	Signalized	HCM 2010	SWB Thru	0.740	41.2	D
14	Middlefield Rd/University Ave	Signalized	HCM 2010	SEB Left	0.546	35.0	D
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM 2010	NWB Right	1.194	147.8	F
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM 2010	SB Left	1.115	123.9	F
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM 2010	EB Left	0.802	98.5	F
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM 2010	NB Left	0.906	30.8	C
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM 2010	SB Left	0.780	10.9	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM 2010	NB Left	0.963	50.2	D
21	Willow Rd/Bay Rd	Signalized	HCM 2010	NEB Left	0.811	13.7	B
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM 2010	NB Left	0.636	13.8	B
23	Willow Rd/Coleman Ave	Signalized	HCM 2010	EB Left	0.581	8.1	A
24	Willow Rd/Gilbert Ave	Signalized	HCM 2010	WB Left	0.499	12.3	B
25	Middlefield Rd-Willow Rd	Signalized	HCM 2010	NEB Right	0.587	69.5	E
26	Ravenswood Ave/Laurel St	Signalized	HCM 2010	SEB Thru	0.769	28.8	C
28	Oak Grove Ave/Laurel St	Signalized	HCM 2010	NWB Thru	0.578	7.8	A

29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM 2010	SWB Left	11.963	38.7	D
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM 2010	SEB Left	0.855	49.0	D
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM 2010	SEB Left	0.746	27.2	C
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM 2010	SWB Thru	0.795	14.0	B
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM 2010	NWB Left	0.844	48.1	D
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM 2010	SEB Left	0.593	9.2	A
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM 2010	NEB Left	0.745	16.4	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM 2010	SEB Left	0.699	8.5	A
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM 2010	SWB Left	0.586	11.3	B
39	Sand Hill Rd/Santa Cruz Ave	Signalized	HCM 2010	NWB Left	0.712	44.5	D
58	University Avenue and Adams Drive	Two-way stop	HCM 2010	EB Thru	0.000	812.3	F
71	Chilco Street/Terminal Avenue	All-way stop	HCM 2010	SEB Thru		16.5	C
74	University Ave/O'Brien Dr	Signalized	HCM 2010	EB Left	0.685	8.6	A
77	University Avenue/Donohoe Street	Signalized	HCM 2010	EB Right	1.188	177.0	F
88	Valparaiso Ave/ University Dr	Signalized	HCM 2010	SEB Left	0.731	24.3	C
103	Addison Wesley/Sand Hill Rd	Signalized	HCM 2010	EB Left	0.674	15.6	B
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM 2010	NEB Thru	0.726	47.5	D
110	Marsh Road/101 NB Ramps	Signalized	HCM 2010	NWB Left	0.896	13.0	B
111	University Avenue/Woodland Avenue	Signalized	HCM 2010	SWB Left	0.820	58.1	E
131	Chilco Street/Hamilton Avenue	All-way stop	HCM 2010	SB Thru		41.6	E
132	Oak Ave/Sand Hill Rd	Signalized	HCM 2000	SEB Right	0.618	8.9	A
156	Saga Ln/Sand Hill Rd	Signalized	HCM 2010	NB Left	51.460	42.3	D
157	Branner Dr/Sand Hill Rd	Signalized	HCM 2010	WB Left	0.467	5.5	A

162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM 2010	NWB Right	1.418	49.1	D
163	Bayfront Expy/Marsh Rd	Signalized	HCM 2010	NB Left	0.848	29.0	C
181	Santa Cruz Ave/Elder Ave	Signalized	HCM 2010	NEB Left	0.619	7.7	A
195	Bayfront Expy/Chilco St	Signalized	HCM 2010	NB Right	0.993	43.5	D
196	Bayfront Expy/Chrysler Drive	Signalized	HCM 2010	WB Left	0.860	18.1	B
199	Bafront Expwy/Bldg 21	Signalized	HCM 2010	EB Thru	1.079	171.5	F
201	Bayfront Expwy/Bldg 20	Signalized	HCM 2010	EB Thru	1.244	265.2	F
204	Chilco Street/Newbridge Street	All-way stop	HCM 2010	SB Left		9.2	A
206	Chilco Street/Ivy Drive	All-way stop	HCM 2010	SB Thru		13.0	B
207	Chilco St/Constitution Dr	All-way stop	HCM 2010	NWB Right		206.8	F
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM 2010	SB Left	0.053	23.1	C
213	Chrysler Dr/Independence Dr	Two-way stop	HCM 2010	SEB Thru	0.004	13.3	B
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM 2010	NWB Left	0.004	14.9	B
215	Chrysler Dr/Constitution Dr	Signalized	HCM 2010	EB Left	0.771	51.6	D
233	Sand Hill Circle/Sand Hill Road	Signalized	HCM 2010	WB Right	1.165	74.0	E
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM 2010	SB Left	0.428	10.5	B
243	University Avenue/US 101 SB Ramps	Signalized	HCM 2010	WB Right	0.995	69.7	E
245	University Avenue/Runnymede Street	Signalized	HCM 2010	WB Right	0.566	15.6	B
246	University Avenue/Bell Street	Signalized	HCM 2010	WB Thru	0.600	16.8	B
247	University Avenue/Bay Road	Signalized	HCM 2010	SWB Left	0.985	107.5	F
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	Signalized	HCM 2010	NB Right	0.734	31.4	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	18.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	984	974	279	1570	404
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.70	2.15	3.60	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	984	974	279	1570	404
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	246	244	70	393	101
Total Analysis Volume [veh/h]	0	984	974	279	1570	404
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	0	6	2	0	4	5
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	32	32	0	60	10
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	28	28	0	52	25
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	7	0	0	5	0
Pedestrian Clearance [s]	0	16	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	2.1	0.0	0.0	1.1
Minimum Recall		Yes	Yes		No	No
Maximum Recall		No	No		No	No
Pedestrian Recall		No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	4.10	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.10	0.00	0.00
g_i, Effective Green Time [s]	34	32	42	42
g / C, Green / Cycle	0.43	0.40	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.25	0.28	0.46	0.25
s, saturation flow rate [veh/h]	4000	3522	3392	1607
c, Capacity [veh/h]	1718	1421	1766	837
d1, Uniform Delay [s]	17.30	19.72	17.15	12.31
k, delay calibration	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.39	2.71	0.65	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

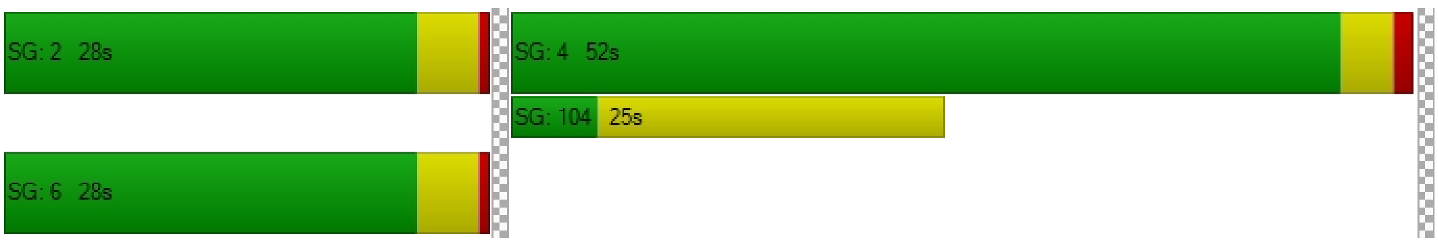
X, volume / capacity	0.57	0.69	0.89	0.48
d, Delay for Lane Group [s/veh]	18.69	22.43	17.80	12.47
Lane Group LOS	B	C	B	B
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	6.58	7.37	11.54	4.24
50th-Percentile Queue Length [ft]	164.43	184.23	288.60	106.04
95th-Percentile Queue Length [veh]	10.78	11.82	17.12	7.62
95th-Percentile Queue Length [ft]	269.58	295.53	427.91	190.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	18.69	22.43	0.00	17.80	12.47
Movement LOS		B	C		B	B
d_A, Approach Delay [s/veh]	18.69		22.43		16.71	
Approach LOS	B		C		B	
d_I, Intersection Delay [s/veh]	18.62					
Intersection LOS	B					
Intersection V/C	0.810					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	22.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.628

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Base Volume Input [veh/h]	29	1083	4	69	1058	212	27	9	471	257	15	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	2.40	0.00	4.50	1.50	2.50	3.70	0.00	1.70	1.30	7.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	326	0	0	0
Total Hourly Volume [veh/h]	29	1083	4	69	1058	212	27	9	145	257	15	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	271	1	17	265	53	7	2	36	64	4	0
Total Analysis Volume [veh/h]	29	1083	4	69	1058	212	27	9	145	257	15	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	77.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	0	1	6	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	4	10	0	0	6	0	0	4	0
Maximum Green [s]	15	40	0	15	40	0	0	20	0	0	20	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.2	0.0	0.0	3.2	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	9	46	0	8	45	0	0	41	0	0	45	0
Vehicle Extension [s]	2.5	3.5	0.0	2.0	3.5	0.0	0.0	2.5	0.0	0.0	2.5	0.0
Walk [s]	0	7	0	0	7	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	21	0	0	21	0	0	28	0	0	24	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	5	90	90	6	91	91	12	12	24	24
g / C, Green / Cycle	0.04	0.64	0.64	0.04	0.65	0.65	0.08	0.08	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.20	0.20	0.02	0.35	0.35	0.02	0.05	0.14	0.01
s, saturation flow rate [veh/h]	1750	3533	1852	3363	1872	1751	1831	2811	1786	1744
c, Capacity [veh/h]	62	2276	1193	146	1221	1143	152	233	307	300
d1, Uniform Delay [s]	66.12	11.08	11.08	65.28	12.95	13.06	59.97	61.99	55.96	48.35
k, delay calibration	0.08	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.02	0.36	0.69	0.88	1.67	1.85	0.59	2.02	4.51	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

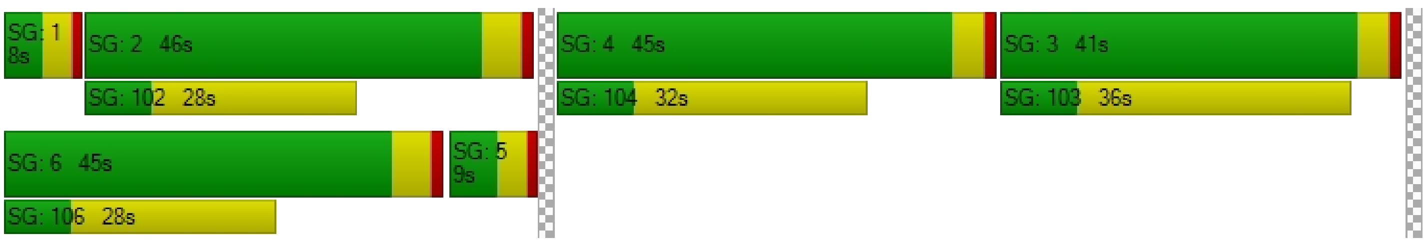
X, volume / capacity	0.47	0.31	0.31	0.47	0.53	0.54	0.24	0.62	0.84	0.05
d, Delay for Lane Group [s/veh]	70.14	11.44	11.77	66.15	14.62	14.91	60.56	64.01	60.47	48.40
Lane Group LOS	E	B	B	E	B	B	E	E	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.08	4.90	5.24	1.22	10.95	10.54	1.24	2.59	9.24	0.48
50th-Percentile Queue Length [ft]	27.08	122.46	131.11	30.45	273.64	263.48	30.90	64.67	231.00	12.02
95th-Percentile Queue Length [veh]	1.95	8.53	9.00	2.19	16.37	15.86	2.23	4.66	14.23	0.87
95th-Percentile Queue Length [ft]	48.74	213.20	225.00	54.80	409.29	396.58	55.63	116.41	355.63	21.64

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.14	11.55	11.77	66.15	14.73	14.91	60.56	60.56	64.01	60.47	48.40	48.40
Movement LOS	E	B	B	E	B	B	E	E	E	E	D	D
d_A, Approach Delay [s/veh]	13.07			17.41			63.33			59.76		
Approach LOS	B			B			E			E		
d_I, Intersection Delay [s/veh]	22.58											
Intersection LOS	C											
Intersection V/C	0.628											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	35.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.673

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Base Volume Input [veh/h]	185	720	84	30	697	377	499	16	136	133	56	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	3.20	6.00	6.70	2.20	4.00	2.50	0.00	0.80	4.10	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	174	0	0	0
Total Hourly Volume [veh/h]	185	720	84	30	697	377	499	16	0	133	56	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	180	21	8	174	94	125	4	0	33	14	25
Total Analysis Volume [veh/h]	185	720	84	30	697	377	499	16	0	133	56	98
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	16			1			7			3		
Bicycle Volume [bicycles/h]	3			1			1			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	31.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	35	58	58	9	32	32	37	36	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	12	12	0	16	16	25	25	25	0	25	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	18	85	85	5	72	72	25	25	25	17	17
g / C, Green / Cycle	0.13	0.61	0.61	0.04	0.51	0.51	0.18	0.18	0.18	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.10	0.22	0.22	0.02	0.31	0.31	0.14	0.14	0.00	0.08	0.09
s, saturation flow rate [veh/h]	1762	1841	1764	1696	1859	1607	1765	1815	1602	1738	1683
c, Capacity [veh/h]	231	1123	1076	61	957	827	309	317	280	212	205
d1, Uniform Delay [s]	58.97	13.68	13.70	66.18	23.75	24.01	55.63	55.63	0.00	58.38	59.34
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.43	0.92	0.97	2.28	2.73	3.34	4.13	4.03	0.00	2.26	4.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.36	0.37	0.49	0.60	0.61	0.82	0.82	0.00	0.63	0.75
d, Delay for Lane Group [s/veh]	61.40	14.59	14.66	68.45	26.48	27.34	59.76	59.66	0.00	60.63	63.40
Lane Group LOS	E	B	B	E	C	C	E	E	A	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	6.49	6.64	6.42	1.09	13.69	12.37	9.08	9.32	0.00	4.66	5.56
50th-Percentile Queue Length [ft]	162.28	165.99	160.57	27.20	342.19	309.15	226.93	233.05	0.00	116.60	139.12
95th-Percentile Queue Length [veh]	10.67	10.87	10.58	1.96	19.76	18.13	14.02	14.33	0.00	8.21	9.43
95th-Percentile Queue Length [ft]	266.73	271.64	264.48	48.96	493.88	453.32	350.46	358.23	0.00	205.15	235.84

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.40	14.62	14.66	68.45	26.63	27.34	59.71	59.66	0.00	60.63	63.40	63.40
Movement LOS	E	B	B	E	C	C	E	E	A	E	E	E
d_A, Approach Delay [s/veh]	23.38			28.01			59.71			62.12		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	35.45											
Intersection LOS	D											
Intersection V/C	0.673											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	22.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.531

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			No		

volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	2	681	108	194	841	54	101	65	14	88	19	149
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.30	0.90	1.00	1.00	0.00	2.20	6.90	0.00	1.20	0.00	2.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	681	108	194	841	54	101	65	14	88	19	149
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	170	27	49	210	14	25	16	4	22	5	37
Total Analysis Volume [veh/h]	2	681	108	194	841	54	101	65	14	88	19	149
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			7			7			0		
Bicycle Volume [bicycles/h]	1			7			7			11		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	33.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	40	60	40	25	40	60	31	31	31	0	31	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	85	50	85	35	85	50	55	55	55	0	55	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	84	84	19	105	105	31	31
g / C, Green / Cycle	0.60	0.60	0.14	0.75	0.75	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.23	0.23	0.11	0.24	0.24	0.18	0.17
s, saturation flow rate [veh/h]	1853	1596	1792	1881	1834	1014	1515
c, Capacity [veh/h]	1134	954	243	1407	1372	267	373
d1, Uniform Delay [s]	14.64	14.69	58.63	5.85	5.86	51.82	50.58
k, delay calibration	0.50	0.50	0.04	0.50	0.50	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.94	1.18	2.29	0.60	0.62	2.21	1.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

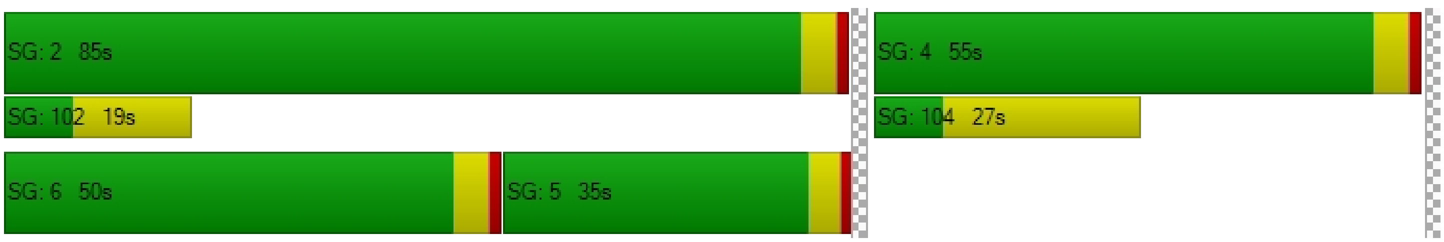
X, volume / capacity	0.37	0.39	0.80	0.32	0.32	0.67	0.69
d, Delay for Lane Group [s/veh]	15.59	15.87	60.93	6.46	6.48	54.03	52.26
Lane Group LOS	B	B	E	A	A	D	D
Critical Lane Group	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	7.17	6.30	6.79	4.23	4.15	6.32	8.57
50th-Percentile Queue Length [ft]	179.27	157.61	169.75	105.76	103.85	158.03	214.23
95th-Percentile Queue Length [veh]	11.56	10.42	11.06	7.60	7.48	10.44	13.37
95th-Percentile Queue Length [ft]	289.07	260.55	276.58	190.08	186.94	261.11	334.24

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.59	15.70	15.87	60.93	6.47	6.48	54.03	54.03	54.03	52.26	52.26	52.26
Movement LOS	B	B	B	E	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	15.72			16.17			54.03			52.26		
Approach LOS	B			B			D			D		
d_I, Intersection Delay [s/veh]	22.95											
Intersection LOS	C											
Intersection V/C	0.531											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Middlefield Rd/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	36.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.767

Intersection Setup

Name	Marsh Road		Middlefield Road		Middlefield Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	225.00	150.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	426	399	324	288	502	393
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	426	399	324	288	502	393
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	107	100	81	72	126	98
Total Analysis Volume [veh/h]	426	399	324	288	502	393
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	6		10		28	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	40.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Overlap	Protected	Permissive	Permissive	Permissive
Signal group	3	1	1	2	2	4
Auxiliary Signal Groups		1,3				4,6
Lead / Lag	Lead	-	Lag	-	-	-
Minimum Green [s]	6	5	5	24	24	0
Maximum Green [s]	30	30	30	50	50	0
Amber [s]	3.0	3.0	3.0	3.2	3.2	0.0
All red [s]	2.0	1.0	1.0	1.0	1.0	0.0
Split [s]	45	56	56	29	29	0
Vehicle Extension [s]	2.5	2.0	2.0	2.0	2.0	0.0
Walk [s]	0	0	0	8	8	0
Pedestrian Clearance [s]	0	0	0	12	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	3.0	2.0	2.0	2.2	2.2	0.0
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	6.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	5.00	5.00	4.00	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	0.00	2.00	2.20	2.20	2.20
g_i, Effective Green Time [s]	34	64	26	56	56	56
g / C, Green / Cycle	0.26	0.50	0.20	0.43	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.24	0.26	0.18	0.15	0.27	0.25
s, saturation flow rate [veh/h]	1774	1545	1774	1863	1863	1542
c, Capacity [veh/h]	464	765	360	808	808	669
d1, Uniform Delay [s]	46.58	22.31	50.52	24.62	28.49	27.93
k, delay calibration	0.08	0.15	0.04	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.94	0.78	3.41	1.23	3.57	3.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

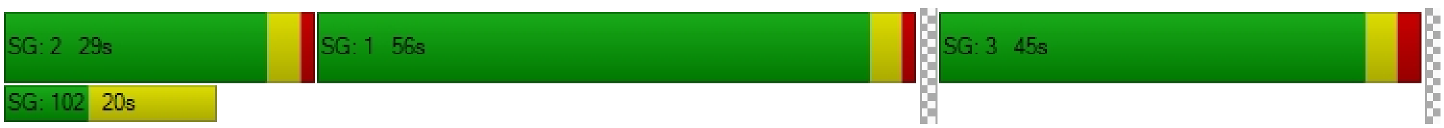
X, volume / capacity	0.92	0.52	0.90	0.36	0.62	0.59
d, Delay for Lane Group [s/veh]	52.52	23.09	53.92	25.84	32.06	31.69
Lane Group LOS	D	C	D	C	C	C
Critical Lane Group	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	14.08	8.41	10.60	6.26	12.87	9.96
50th-Percentile Queue Length [ft]	352.06	210.14	265.06	156.49	321.84	249.08
95th-Percentile Queue Length [veh]	20.24	13.16	15.94	10.36	18.76	15.14
95th-Percentile Queue Length [ft]	505.92	329.01	398.56	259.07	468.94	378.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.52	23.09	53.92	25.84	32.06	31.69
Movement LOS	D	C	D	C	C	C
d_A, Approach Delay [s/veh]	38.29		40.71		31.90	
Approach LOS	D		D		C	
d_I, Intersection Delay [s/veh]	36.47					
Intersection LOS	D					
Intersection V/C	0.767					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	42.7
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.290

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	208	636	481	708	435	73
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.10	1.30	0.60	1.40	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	208	0	481	708	435	73
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	0	120	177	109	18
Total Analysis Volume [veh/h]	208	0	481	708	435	73
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6		13		0	
Bicycle Volume [bicycles/h]	9		26		13	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	58.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	5	10	0
Maximum Green [s]	50	35	35	70	35	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	50	35	35	70	35	0
Vehicle Extension [s]	2.5	3.6	3.0	3.0	3.6	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	10	12	0	12	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	2.6	0.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	4.60	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	2.60	0.00
g_i, Effective Green Time [s]	18	18	35	72	38
g / C, Green / Cycle	0.15	0.15	0.30	0.60	0.31
(v / s)_i Volume / Saturation Flow Rate	0.12	0.00	0.27	0.37	0.28
s, saturation flow rate [veh/h]	1774	1582	1786	1889	1813
c, Capacity [veh/h]	270	240	528	1140	568
d1, Uniform Delay [s]	48.88	0.00	40.72	15.07	39.33
k, delay calibration	0.08	0.08	0.44	0.20	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.50	0.00	20.28	1.04	19.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

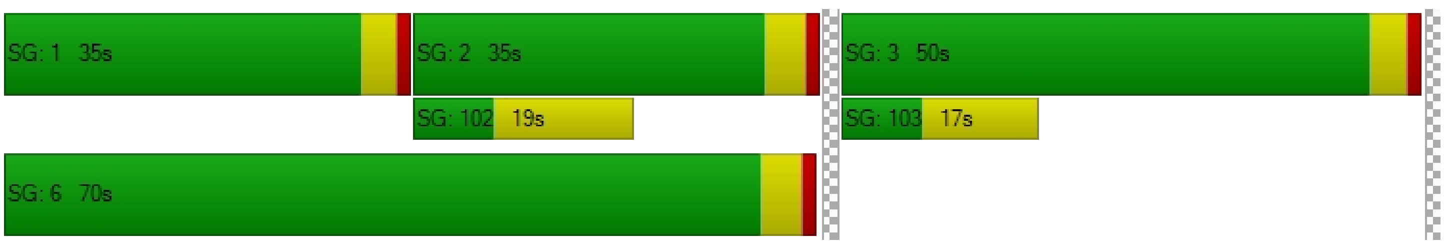
X, volume / capacity	0.77	0.00	0.91	0.62	0.89
d, Delay for Lane Group [s/veh]	52.38	0.00	61.00	16.10	58.53
Lane Group LOS	D	A	E	B	E
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	6.25	0.00	16.38	11.76	16.99
50th-Percentile Queue Length [ft]	156.15	0.00	409.50	293.94	424.70
95th-Percentile Queue Length [veh]	10.34	0.00	23.02	17.38	23.75
95th-Percentile Queue Length [ft]	258.62	0.00	575.44	434.52	593.69

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.38	0.00	61.00	16.10	58.53	58.53
Movement LOS	D	A	E	B	E	E
d_A, Approach Delay [s/veh]	52.38		34.27		58.53	
Approach LOS	D		C		E	
d_I, Intersection Delay [s/veh]	42.72					
Intersection LOS	D					
Intersection V/C	1.290					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Middlefield Rd/Ringwood Ave

Control Type:	Signalized	Delay (sec / veh):	34.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	87	105	57	64	1	275	10	775	97	423	634	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	0.00	0.00	0.00	0.00	2.20	0.00	1.70	0.00	2.10	1.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	8	0	0	57	0	0	0
Total Hourly Volume [veh/h]	87	105	57	64	1	267	10	775	40	423	634	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	26	14	16	0	67	3	194	10	106	159	2
Total Analysis Volume [veh/h]	87	105	57	64	1	267	10	775	40	423	634	6
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			14			5			0		
Bicycle Volume [bicycles/h]	14			14			17			16		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	58.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	2	8	2	6	8	6	1	6	8	5	2	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	35	35	35	50	35	50	50	50	35	35	35	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.0	3.6	3.2	3.5	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	35	35	35	50	35	50	50	50	35	35	35	0
Vehicle Extension [s]	3.0	2.9	3.0	3.6	2.9	3.6	3.0	3.6	2.9	3.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	12	12	12	12	12	0	12	12	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.6	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.6	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.50	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.60	2.60
g_i, Effective Green Time [s]	33	33	33	33	3	49	49	30	76	76
g / C, Green / Cycle	0.27	0.27	0.27	0.27	0.03	0.40	0.40	0.25	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.06	0.09	0.08	0.17	0.01	0.22	0.03	0.24	0.17	0.17
s, saturation flow rate [veh/h]	1415	1769	805	1543	1810	3557	1531	1772	1866	1859
c, Capacity [veh/h]	206	482	279	421	48	1440	620	446	1175	1170
d1, Uniform Delay [s]	51.42	34.96	42.92	38.40	57.18	27.17	21.82	44.12	9.95	9.95
k, delay calibration	0.10	0.10	0.10	0.18	0.11	0.50	0.50	0.40	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.31	0.39	0.40	2.59	2.13	1.45	0.20	27.06	0.57	0.58
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

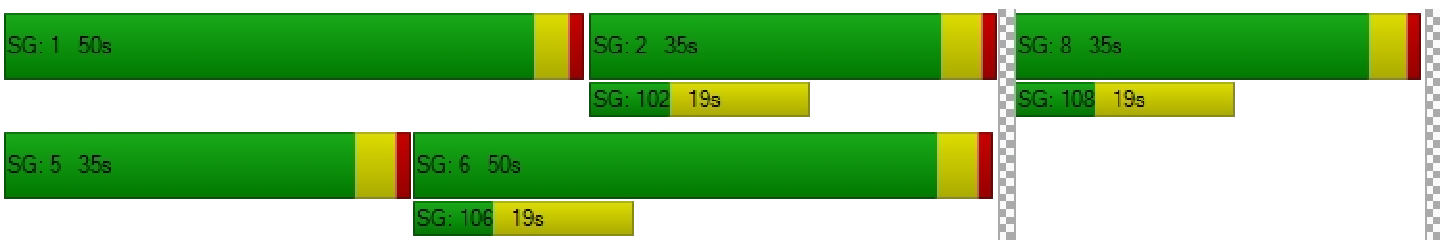
X, volume / capacity	0.42	0.34	0.23	0.63	0.21	0.54	0.06	0.95	0.27	0.27
d, Delay for Lane Group [s/veh]	52.73	35.34	43.32	40.99	59.31	28.61	22.02	71.18	10.53	10.53
Lane Group LOS	D	D	D	D	E	C	C	E	B	B
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	2.62	3.94	1.72	7.20	0.32	8.58	0.72	15.48	3.76	3.75
50th-Percentile Queue Length [ft]	65.52	98.57	42.94	180.03	8.09	214.39	18.04	387.08	94.05	93.78
95th-Percentile Queue Length [veh]	4.72	7.10	3.09	11.60	0.58	13.38	1.30	21.94	6.77	6.75
95th-Percentile Queue Length [ft]	117.93	177.43	77.29	290.06	14.55	334.45	32.46	548.41	169.30	168.80

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.73	35.34	35.34	43.32	43.32	40.99	59.31	28.61	22.02	71.18	10.53	10.53
Movement LOS	D	D	D	D	D	D	E	C	C	E	B	B
d_A, Approach Delay [s/veh]	41.42			41.45			28.67			34.67		
Approach LOS	D			D			C			C		
d_I, Intersection Delay [s/veh]	34.25											
Intersection LOS	C											
Intersection V/C	0.651											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Middlefield Rd/Lytton Ave

Control Type:	Signalized	Delay (sec / veh):	41.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.740

Intersection Setup

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	238	179	68	2	66	8	84	445	16	16	512	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.50	5.60	0.00	0.60	0.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	238	179	68	2	66	8	84	445	16	16	512	179
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	45	17	1	17	2	21	111	4	4	128	45
Total Analysis Volume [veh/h]	238	179	68	2	66	8	84	445	16	16	512	179
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			10			11		
Bicycle Volume [bicycles/h]	19			2			5			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	65.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	4	0	0	1	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	4	0	0	12	0	0	12	0
Maximum Green [s]	0	26	0	0	17	0	0	31	0	0	22	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	25	0	0	18	0	0	20	0	0	37	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	6	0	0	5	0	0	6	0	0	6	0
Pedestrian Clearance [s]	0	10	0	0	9	0	0	10	0	0	8	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	27	27	6	26	26	26	26
g / C, Green / Cycle	0.27	0.27	0.06	0.26	0.26	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.14	0.24	0.04	0.16	0.14	0.21	0.18
s, saturation flow rate [veh/h]	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	469	469	101	463	463	464	464
d1, Uniform Delay [s]	31.07	35.48	46.50	32.86	32.33	35.12	33.62
k, delay calibration	0.08	0.20	0.08	0.50	0.50	0.29	0.24
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.63	11.67	8.14	6.03	4.88	9.82	4.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

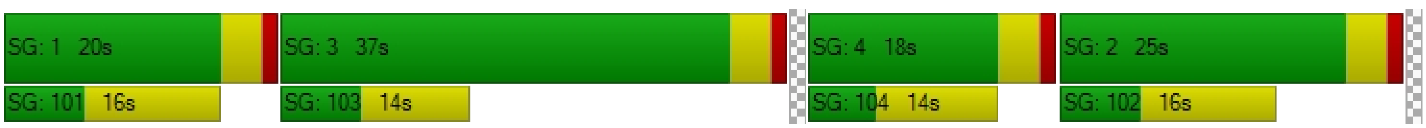
X, volume / capacity	0.51	0.91	0.75	0.62	0.56	0.83	0.69
d, Delay for Lane Group [s/veh]	31.70	47.14	54.64	38.88	37.20	44.94	37.68
Lane Group LOS	C	D	D	D	D	D	D
Critical Lane Group	No	Yes	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	4.96	11.49	2.10	6.86	6.09	10.08	7.58
50th-Percentile Queue Length [ft]	123.96	287.18	52.51	171.41	152.21	251.96	189.38
95th-Percentile Queue Length [veh]	8.61	17.05	3.78	11.15	10.14	15.28	12.09
95th-Percentile Queue Length [ft]	215.26	426.14	94.52	278.77	253.38	382.12	302.22

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.70	47.14	47.14	54.64	54.64	54.64	38.88	37.96	37.20	44.94	42.92	37.68
Movement LOS	C	D	D	D	D	D	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	41.61			54.64			38.08			41.64		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	41.15											
Intersection LOS	D											
Intersection V/C	0.740											

Sequence

Ring 1	1	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Middlefield Rd/University Ave

Control Type:	Signalized	Delay (sec / veh):	35.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.546

Intersection Setup

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	66	340	35	81	374	86	27	319	87	101	370	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	340	35	81	374	86	27	319	87	101	370	55
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	85	9	20	94	22	7	80	22	25	93	14
Total Analysis Volume [veh/h]	66	340	35	81	374	86	27	319	87	101	370	55
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			4			23			17		
Bicycle Volume [bicycles/h]	13			11			2			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	54.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	2	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	8	0	0	8	0	0	8	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	43	0	0	43	0	0	26	0	0	31	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	12	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	24	24	24	24	24	44	44	20	20
g / C, Green / Cycle	0.24	0.24	0.24	0.24	0.24	0.44	0.44	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.04	0.21	0.05	0.13	0.13	0.13	0.11	0.15	0.14
s, saturation flow rate [veh/h]	1750	1750	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	266	423	113	423	423	792	792	357	357
d1, Uniform Delay [s]	29.89	36.61	30.16	33.25	32.99	18.01	17.66	38.02	37.31
k, delay calibration	0.08	0.10	0.08	0.08	0.08	0.50	0.50	0.25	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.36	5.92	6.15	0.86	0.76	0.94	0.77	8.10	5.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.25	0.89	0.72	0.56	0.53	0.29	0.25	0.78	0.70
d, Delay for Lane Group [s/veh]	30.25	42.53	36.32	34.11	33.75	18.94	18.43	46.12	42.46
Lane Group LOS	C	D	D	C	C	B	B	D	D
Critical Lane Group	No	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.29	9.49	1.74	5.07	4.76	3.63	3.08	7.25	6.17
50th-Percentile Queue Length [ft]	32.24	237.16	43.46	126.64	119.02	90.77	77.12	181.20	154.35
95th-Percentile Queue Length [veh]	2.32	14.54	3.13	8.76	8.34	6.54	5.55	11.66	10.25
95th-Percentile Queue Length [ft]	58.03	363.44	78.22	218.92	208.48	163.38	138.81	291.58	256.23

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.25	42.53	42.53	36.32	33.98	33.75	18.94	18.76	18.43	46.12	44.20	42.46
Movement LOS	C	D	D	D	C	C	B	B	B	D	D	D
d_A, Approach Delay [s/veh]	40.70			34.29			18.71			44.39		
Approach LOS	D			C			B			D		
d_I, Intersection Delay [s/veh]	35.01											
Intersection LOS	D											
Intersection V/C	0.546											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	147.8
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.194

Intersection Setup

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	4315	62	304	813	78	1577
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	16.10	4.90	3.80	9.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4315	62	304	813	78	1577
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1079	16	76	203	20	394
Total Analysis Volume [veh/h]	4315	62	304	813	78	1577
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal group	6	2	5	2	4	4
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	4	5	5	5	8	8
Maximum Green [s]	150	35	50	35	15	15
Amber [s]	5.0	5.4	3.0	5.4	3.0	3.0
All red [s]	1.0	0.5	0.5	0.5	1.0	1.0
Split [s]	94	107	13	107	43	43
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	5	0	0	0	5	5
Pedestrian Clearance [s]	35	0	0	0	29	29
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	4.0	5.8	1.5	5.8	2.0	2.0
Minimum Recall	No		No	No	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	0.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	6.00	6.00	3.50	7.80	4.00	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	1.50	5.80	2.00	0.00
g_i, Effective Green Time [s]	150	150	36	188	15	55
g / C, Green / Cycle	0.70	0.70	0.17	0.88	0.07	0.26
(v / s)_i Volume / Saturation Flow Rate	0.85	0.05	0.09	0.16	0.02	0.37
s, saturation flow rate [veh/h]	5054	1374	3350	4986	3224	4224
c, Capacity [veh/h]	3531	960	565	4363	225	1086
d1, Uniform Delay [s]	32.34	10.21	81.57	2.00	95.13	79.71
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.12
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	100.56	0.03	0.80	0.02	0.91	204.51
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.22	0.06	0.54	0.19	0.35	1.45
d, Delay for Lane Group [s/veh]	132.90	10.24	82.36	2.02	96.04	284.21
Lane Group LOS	F	B	F	A	F	F
Critical Lane Group	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	87.35	0.91	7.68	1.12	2.12	40.65
50th-Percentile Queue Length [ft]	2183.82	22.84	191.93	27.92	53.02	1016.22
95th-Percentile Queue Length [veh]	121.49	1.64	12.22	2.01	3.82	61.54
95th-Percentile Queue Length [ft]	3037.17	41.11	305.54	50.26	95.44	1538.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	132.90	10.24	82.36	2.02	96.04	284.21
Movement LOS	F	B	F	A	F	F
d_A, Approach Delay [s/veh]	131.17		23.89		275.34	
Approach LOS	F		C		F	
d_I, Intersection Delay [s/veh]	147.78					
Intersection LOS	F					
Intersection V/C	1.194					

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	123.9
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.115

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Base Volume Input [veh/h]	28	54	1648	316	591	165	43	2872	935	359	880	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	10.90	3.30	4.30	1.00	1.70	37.10	2.50	12.00	6.40	5.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	70	0	0	45	0	0	1
Total Hourly Volume [veh/h]	28	54	1648	316	591	95	43	2872	890	359	880	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	14	412	79	148	24	11	718	223	90	220	2
Total Analysis Volume [veh/h]	28	54	1648	316	591	95	43	2872	890	359	880	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			7			0		
Bicycle Volume [bicycles/h]	0			7			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	68
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	7	7	4	8	4	1	6	2	5	2	6
Auxiliary Signal Groups			5,7									
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	6	8	8	0	6	0	6	10	10	6	10	10
Maximum Green [s]	18	15	15	0	18	0	16	65	20	65	20	65
Amber [s]	3.0	3.9	3.9	0.0	3.0	0.0	3.5	5.0	5.0	3.6	5.0	5.0
All red [s]	1.5	0.5	0.5	0.0	1.5	0.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	30	0	0	0	30	0	30	30	0	0	0	30
Vehicle Extension [s]	2.0	2.2	2.2	0.0	2.0	0.0	2.0	3.0	3.0	2.0	3.0	3.0
Walk [s]	5	0	0	0	5	0	0	5	0	0	0	5
Pedestrian Clearance [s]	29	0	0	0	29	0	0	35	0	0	0	35
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.4	2.4	0.0	2.5	0.0	1.5	4.0	4.0	2.6	4.0	4.0
Minimum Recall		No	No		No		No	Yes		No	Yes	
Maximum Recall		No	No		No		No	No		No	No	
Pedestrian Recall		No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	20.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.40	4.40	4.40	4.40	4.50	4.50	4.50	3.50	6.00	6.00	4.60	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.40	2.40	2.40	0.00	2.50	2.50	2.50	1.50	4.00	4.00	2.60	4.00	4.00
g_i, Effective Green Time [s]	15	15	15	48	18	18	18	5	65	65	28	89	89
g / C, Green / Cycle	0.10	0.10	0.10	0.33	0.12	0.12	0.12	0.03	0.45	0.45	0.19	0.61	0.61
(v / s)_i Volume / Saturation Flow Rate	0.02	0.02	0.02	0.40	0.18	0.17	0.06	0.02	0.49	0.62	0.11	0.15	0.01
s, saturation flow rate [veh/h]	1737	1713	1559	4151	1735	3582	1523	2563	5846	1442	3303	5846	1615
c, Capacity [veh/h]	179	177	161	1358	215	443	188	87	2611	644	636	3582	990
d1, Uniform Delay [s]	59.49	59.53	59.50	48.95	63.75	63.75	59.58	69.04	40.25	40.25	53.22	12.85	10.97
k, delay calibration	0.06	0.06	0.06	0.50	0.50	0.12	0.04	0.04	0.11	0.50	0.04	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.22	0.23	0.24	103.0	236.12	154.00	0.78	1.59	46.48	181.35	0.29	0.04	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

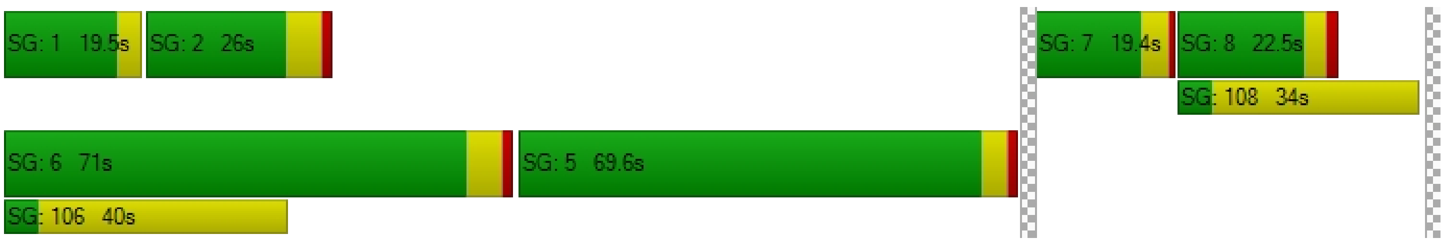
X, volume / capacity	0.16	0.16	0.16	1.21	1.47	1.33	0.50	0.49	1.10	1.38	0.56	0.25	0.01
d, Delay for Lane Group [s/veh]	59.71	59.76	59.74	152.0	299.87	217.75	60.36	70.63	86.74	221.60	53.52	12.88	10.98
Lane Group LOS	E	E	E	F	F	F	E	E	F	F	D	B	B
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.95	0.97	0.86	29.01	22.16	17.82	3.38	0.81	41.89	55.13	6.02	4.42	0.12
50th-Percentile Queue Length [ft]	23.69	24.33	21.40	725.3	553.88	445.41	84.57	20.25	1047.22	1378.17	150.45	110.52	2.91
95th-Percentile Queue Length [veh]	1.71	1.75	1.54	42.56	34.47	27.68	6.09	1.46	56.43	82.55	10.04	7.87	0.21
95th-Percentile Queue Length [ft]	42.64	43.80	38.52	1063.	861.64	692.02	152.23	36.45	1410.68	2063.65	251.03	196.72	5.24

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	59.71	59.75	152.02	299.87	217.75	60.36	70.63	86.74	221.60	53.52	12.88	10.98
Movement LOS	E	E	F	F	F	E	E	F	F	D	B	B
d_A, Approach Delay [s/veh]		147.65			228.73			118.10			24.56	
Approach LOS		F			F			F			C	
d_I, Intersection Delay [s/veh]	123.91											
Intersection LOS	F											
Intersection V/C	1.115											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	98.5
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.802

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	50	1299	3	13	1842	30	359	33	86	139	17	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	3.50	33.30	7.70	3.50	0.00	0.60	26.70	5.10	0.70	5.90	1.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	1299	3	13	1842	30	359	33	86	139	17	61
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	325	1	3	461	8	90	8	22	35	4	15
Total Analysis Volume [veh/h]	50	1299	3	13	1842	30	359	33	86	139	17	61
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			1			5			3		
Bicycle Volume [bicycles/h]	4			12			3			3		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	20.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	1	6	2	5	2	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	4	4	4	4	4	4
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.2	3.2	3.2
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	11	69	86	28	86	69	48	48	48	48	48	48
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	7	5	7	5	7	5	5	5	5	5	5
Pedestrian Clearance [s]	0	19	10	15	10	19	25	25	25	25	25	25
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.2	1.2	1.2
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	20.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	1.00	2.00	2.00	0.00	1.20
g_i, Effective Green Time [s]	5	110	110	2	106	106	24	23
g / C, Green / Cycle	0.04	0.76	0.76	0.01	0.73	0.73	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.35	0.35	0.01	0.51	0.51	0.44	0.15
s, saturation flow rate [veh/h]	1774	1836	1834	1680	1836	1823	1088	1460
c, Capacity [veh/h]	64	1391	1390	19	1345	1336	200	275
d1, Uniform Delay [s]	69.30	6.59	6.59	71.43	10.56	10.63	58.76	59.86
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.50	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.38	1.13	1.14	15.25	3.00	3.08	638.85	1.91
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

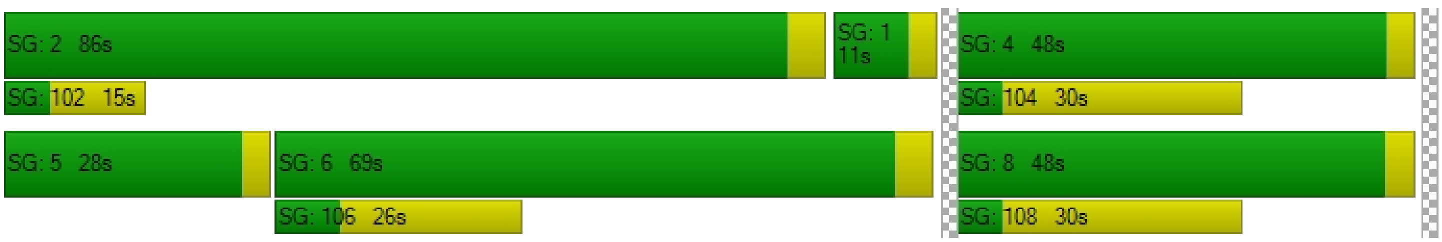
X, volume / capacity	0.78	0.47	0.47	0.69	0.70	0.70	2.39	0.79
d, Delay for Lane Group [s/veh]	76.68	7.73	7.73	86.68	13.56	13.71	697.60	61.78
Lane Group LOS	E	A	A	F	B	B	F	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.96	6.92	6.92	0.56	16.19	16.30	42.81	8.07
50th-Percentile Queue Length [ft]	48.93	173.10	173.01	14.10	404.72	407.42	1070.36	201.66
95th-Percentile Queue Length [veh]	3.52	11.24	11.23	1.02	22.79	22.92	68.43	12.72
95th-Percentile Queue Length [ft]	88.07	280.98	280.87	25.38	569.68	572.93	1710.63	318.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.68	7.73	7.73	86.68	13.63	13.71	697.60	697.60	697.60	61.78	61.78	61.78
Movement LOS	E	A	A	F	B	B	F	F	F	E	E	E
d_A, Approach Delay [s/veh]	10.28			14.14			697.60			61.78		
Approach LOS	B			B			F			E		
d_I, Intersection Delay [s/veh]	98.53											
Intersection LOS	F											
Intersection V/C	0.802											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	30.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.906

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	68	1339	2052	15	73	311
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	3.30	2.80	0.00	0.00	2.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	68	1339	2052	15	73	311
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	335	513	4	18	78
Total Analysis Volume [veh/h]	68	1339	2052	15	73	311
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12		23		13	
Bicycle Volume [bicycles/h]	7		6		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	10.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	15	10	10	11	11
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	4.0	3.0	3.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	9	104	95	95	41	41
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	5	5
Pedestrian Clearance [s]	0	0	22	22	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	2.0	1.0	1.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	2.00	1.00
g_i, Effective Green Time [s]	6	102	93	93	36
g / C, Green / Cycle	0.04	0.70	0.64	0.64	0.25
(v / s)_i Volume / Saturation Flow Rate	0.04	0.38	0.56	0.56	0.24
s, saturation flow rate [veh/h]	1783	3502	1848	1842	1615
c, Capacity [veh/h]	74	2463	1185	1181	401
d1, Uniform Delay [s]	69.27	10.34	21.18	21.27	53.71
k, delay calibration	0.31	0.50	0.50	0.50	0.39
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	63.17	0.87	8.97	9.17	30.46
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.54	0.87	0.87	0.96
d, Delay for Lane Group [s/veh]	132.43	11.21	30.15	30.43	84.18
Lane Group LOS	F	B	C	C	F
Critical Lane Group	Yes	No	No	Yes	Yes
50th-Percentile Queue Length [veh]	3.79	9.65	29.05	29.21	17.18
50th-Percentile Queue Length [ft]	94.70	241.30	726.20	730.22	429.62
95th-Percentile Queue Length [veh]	6.82	14.75	37.89	38.07	23.98
95th-Percentile Queue Length [ft]	170.46	368.68	947.17	951.81	599.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	132.43	11.21	30.29	30.43	84.18	84.18
Movement LOS	F	B	C	C	F	F
d_A, Approach Delay [s/veh]	17.07		30.29		84.18	
Approach LOS	B		C		F	
d_I, Intersection Delay [s/veh]	30.83					
Intersection LOS	C					
Intersection V/C	0.906					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	10.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.780

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1368	217	72	2266	218	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.90	6.50	2.80	2.70	1.80	6.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1368	217	72	2266	218	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	342	54	18	567	55	11
Total Analysis Volume [veh/h]	1368	217	72	2266	218	44
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		3	
Bicycle Volume [bicycles/h]	6		9		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	10.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lag	-	Lead	-
Minimum Green [s]	10	10	5	15	8	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	4.0	4.0	3.0	4.0	3.2	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	47	47	28	75	70	0
Vehicle Extension [s]	4.0	4.0	2.0	4.0	2.0	0.0
Walk [s]	7	7	0	0	0	0
Pedestrian Clearance [s]	17	17	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	1.0	2.0	1.2	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	3.00	4.00	3.20	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	1.00	2.00	1.20	1.20
g_i, Effective Green Time [s]	114	114	7	124	13	13
g / C, Green / Cycle	0.79	0.79	0.05	0.86	0.09	0.09
(v / s)_i Volume / Saturation Flow Rate	0.39	0.15	0.04	0.64	0.08	0.08
s, saturation flow rate [veh/h]	3516	1479	1760	3522	1778	1626
c, Capacity [veh/h]	2769	1165	90	3028	161	147
d1, Uniform Delay [s]	5.35	3.83	67.98	4.00	64.86	64.91
k, delay calibration	0.50	0.50	0.04	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.63	0.35	5.95	1.74	4.60	5.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

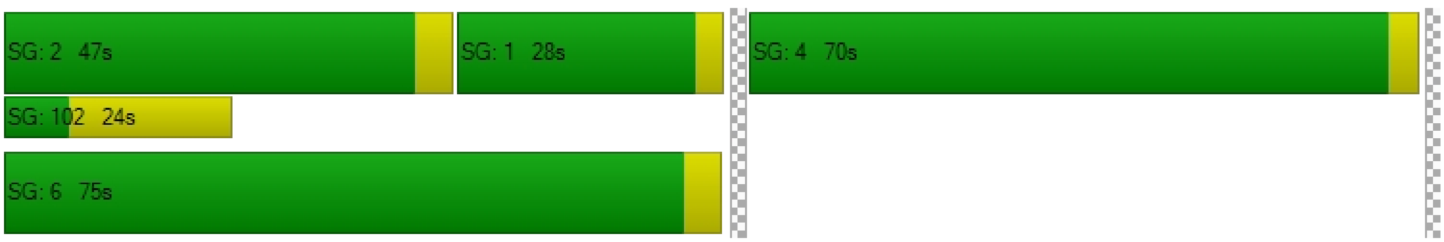
X, volume / capacity	0.49	0.19	0.80	0.75	0.85	0.85
d, Delay for Lane Group [s/veh]	5.98	4.18	73.93	5.74	69.46	70.16
Lane Group LOS	A	A	E	A	E	E
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	6.11	1.45	2.77	8.16	5.18	4.81
50th-Percentile Queue Length [ft]	152.87	36.20	69.13	204.09	129.50	120.14
95th-Percentile Queue Length [veh]	10.17	2.61	4.98	12.85	8.91	8.40
95th-Percentile Queue Length [ft]	254.25	65.16	124.44	321.24	222.82	210.02

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	5.98	4.18	73.93	5.74	69.72	70.16
Movement LOS	A	A	E	A	E	E
d_A, Approach Delay [s/veh]	5.73		7.84		69.79	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	10.92					
Intersection LOS	B					
Intersection V/C	0.780					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	50.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.963

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	301	1484	263	74	2388	22	34	166	254	240	285	87
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.30	4.40	5.30	0.00	3.40	0.00	0.00	4.40	0.50	3.80	4.40	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	175	0	0	45
Total Hourly Volume [veh/h]	301	1484	263	74	2388	22	34	166	79	240	285	42
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	75	371	66	19	597	6	9	42	20	60	71	11
Total Analysis Volume [veh/h]	301	1484	263	74	2388	22	34	166	79	240	285	42
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	28			47			11			1		
Bicycle Volume [bicycles/h]	0			4			1			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	140.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	4	4	8	3	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	4	4	4	0	4	0
Maximum Green [s]	0	0	0	0	16	16	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0
Split [s]	25	79	79	10	64	64	32	32	32	0	24	0
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	0.0	2.0	0.0
Walk [s]	0	5	5	0	7	7	5	5	5	0	0	0
Pedestrian Clearance [s]	0	19	19	0	16	16	23	23	23	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	3.0	3.0	1.0	3.0	3.0	2.0	2.0	2.0	0.0	1.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	5.00	5.00	3.00	5.00	5.00	4.00	4.00	4.00	3.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	3.00	3.00	1.00	3.00	3.00	2.00	2.00	2.00	1.00	1.00	1.00
g_i, Effective Green Time [s]	22	87	87	7	72	72	15	15	15	21	21	21
g / C, Green / Cycle	0.15	0.60	0.60	0.05	0.49	0.49	0.11	0.11	0.11	0.14	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.17	0.34	0.34	0.04	0.45	0.45	0.02	0.09	0.05	0.07	0.16	0.03
s, saturation flow rate [veh/h]	1786	3465	1684	1810	3499	1827	1810	1820	1460	3385	1820	1570
c, Capacity [veh/h]	269	2071	1006	87	1733	905	192	193	155	490	263	227
d1, Uniform Delay [s]	61.58	17.72	17.84	68.46	33.68	33.78	59.07	63.78	61.28	57.07	62.00	54.48
k, delay calibration	0.50	0.50	0.50	0.26	0.50	0.50	0.04	0.04	0.04	0.04	0.50	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	90.82	1.12	2.37	38.38	8.84	15.35	0.16	4.37	0.97	0.28	78.96	0.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

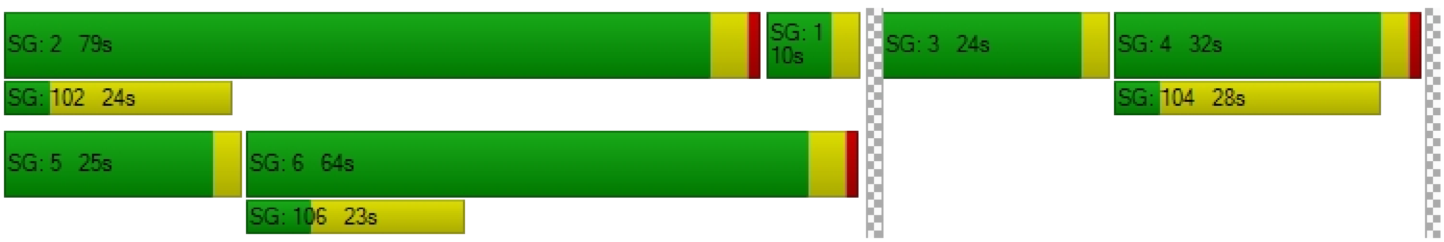
X, volume / capacity	1.12	0.57	0.57	0.85	0.91	0.92	0.18	0.86	0.51	0.49	1.08	0.18
d, Delay for Lane Group [s/veh]	152.40	18.85	20.21	106.84	42.52	49.13	59.23	68.15	62.25	57.35	140.96	54.63
Lane Group LOS	F	B	C	F	D	D	E	E	E	E	F	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	16.55	11.70	11.93	3.68	27.65	30.69	1.16	6.28	2.81	4.10	15.50	1.37
50th-Percentile Queue Length [ft]	413.76	292.59	298.33	92.09	691.36	767.13	28.91	157.12	70.21	102.38	387.48	34.28
95th-Percentile Queue Length [veh]	24.50	17.31	17.60	6.63	36.28	39.77	2.08	10.40	5.06	7.37	22.79	2.47
95th-Percentile Queue Length [ft]	612.38	432.85	439.96	165.76	906.97	994.25	52.04	259.90	126.38	184.29	569.79	61.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	152.40	19.13	20.21	106.84	44.75	49.13	59.23	68.15	62.25	57.35	140.96	54.63
Movement LOS	F	B	C	F	D	D	E	E	E	E	F	D
d_A, Approach Delay [s/veh]		38.86			46.64			65.39			99.18	
Approach LOS		D			D			E			F	
d_I, Intersection Delay [s/veh]						50.19						
Intersection LOS						D						
Intersection V/C						0.963						

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	13.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.811

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	80.00	100.00	100.00	100.00	100.00	175.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	35	1284	925	262	504	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.20	0.00	1.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	223	0	47
Total Hourly Volume [veh/h]	35	1284	925	39	504	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	321	231	10	126	5
Total Analysis Volume [veh/h]	35	1284	925	39	504	21
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		7	
Bicycle Volume [bicycles/h]	8		7		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	10	20	20	4	4
Maximum Green [s]	16	36	36	36	36	36
Amber [s]	3.0	4.5	4.5	4.5	3.2	3.2
All red [s]	0.5	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	0	0
Pedestrian Clearance [s]	0	0	18	18	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.5	3.5	3.5	3.5	2.2	2.2
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	5.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	3.50	2.20	2.20
g_i, Effective Green Time [s]	2	27	22	22	17	17
g / C, Green / Cycle	0.03	0.50	0.41	0.41	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.02	0.36	0.26	0.02	0.28	0.01
s, saturation flow rate [veh/h]	1810	3526	3540	1572	1792	1554
c, Capacity [veh/h]	56	1773	1441	640	569	493
d1, Uniform Delay [s]	25.86	10.50	12.84	9.73	17.49	12.74
k, delay calibration	0.04	0.15	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.31	0.82	0.69	0.06	1.90	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.63	0.72	0.64	0.06	0.89	0.04
d, Delay for Lane Group [s/veh]	30.17	11.31	13.53	9.78	19.39	12.76
Lane Group LOS	C	B	B	A	B	B
Critical Lane Group	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.48	4.79	3.74	0.24	5.44	0.16
50th-Percentile Queue Length [ft]	12.02	119.77	93.42	6.00	135.90	3.94
95th-Percentile Queue Length [veh]	0.87	8.38	6.73	0.43	9.26	0.28
95th-Percentile Queue Length [ft]	21.63	209.52	168.15	10.79	231.50	7.10

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.17	11.31	13.53	9.78	19.39	12.76
Movement LOS	C	B	B	A	B	B
d_A, Approach Delay [s/veh]	11.81		13.37		19.13	
Approach LOS	B		B		B	
d_I, Intersection Delay [s/veh]	13.72					
Intersection LOS	B					
Intersection V/C	0.811					

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	13.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.636

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	8	935	10	54	719	29	117	2	28	21	2	97
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	2.10	0.00	0.00	2.60	27.60	4.30	0.00	17.90	0.00	0.00	6.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	18	0	0	0
Total Hourly Volume [veh/h]	8	935	10	54	719	29	117	2	10	21	2	97
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	234	3	14	180	7	29	1	3	5	1	24
Total Analysis Volume [veh/h]	8	935	10	54	719	29	117	2	10	21	2	97
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			17			10			19		
Bicycle Volume [bicycles/h]	5			3			1			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	30	30	4	30	30	4	4	4	4	4	4
Maximum Green [s]	30	100	100	20	100	100	30	30	30	30	30	30
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	30	30	0	30	30	30	30	30	30	30	30
Vehicle Extension [s]	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	7	7	7	7	7	7
Pedestrian Clearance [s]	0	11	11	0	15	15	15	15	15	15	15	15
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
g_i, Effective Green Time [s]	0	30	30	2	32	13	13	13	13
g / C, Green / Cycle	0.01	0.51	0.51	0.04	0.55	0.22	0.22	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.01	0.25	0.25	0.03	0.41	0.15	0.01	0.01	0.06
s, saturation flow rate [veh/h]	1206	1861	1852	1810	1837	814	1340	1414	1562
c, Capacity [veh/h]	10	957	952	74	1003	296	287	161	335
d1, Uniform Delay [s]	28.95	9.26	9.27	27.75	10.16	24.10	18.19	28.14	19.28
k, delay calibration	0.11	0.23	0.23	0.11	0.23	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	73.54	0.85	0.85	13.07	2.38	0.88	0.05	0.36	0.49
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.77	0.49	0.50	0.73	0.75	0.40	0.03	0.13	0.30
d, Delay for Lane Group [s/veh]	102.48	10.11	10.12	40.82	12.54	24.98	18.24	28.51	19.76
Lane Group LOS	F	B	B	D	B	C	B	C	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.32	3.56	3.55	0.99	6.64	1.65	0.11	0.30	1.11
50th-Percentile Queue Length [ft]	8.01	89.07	88.80	24.70	166.09	41.33	2.81	7.41	27.80
95th-Percentile Queue Length [veh]	0.58	6.41	6.39	1.78	10.87	2.98	0.20	0.53	2.00
95th-Percentile Queue Length [ft]	14.42	160.32	159.84	44.46	271.77	74.40	5.06	13.34	50.04

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	102.48	10.12	10.12	40.82	12.54	12.54	24.98	24.98	18.24	28.51	19.76	19.76
Movement LOS	F	B	B	D	B	B	C	C	B	C	B	B
d_A, Approach Delay [s/veh]	10.89			14.45			24.46			21.29		
Approach LOS	B			B			C			C		
d_I, Intersection Delay [s/veh]	13.81											
Intersection LOS	B											
Intersection V/C	0.636											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	8.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.581

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Coleman Avenue					
Base Volume Input [veh/h]	12	826	3	5	680	84	102	4	31	1	1	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.10	0.00	0.00	3.70	2.40	3.90	0.00	3.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	826	3	5	680	84	102	4	31	1	1	4
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	207	1	1	170	21	26	1	8	0	0	1
Total Analysis Volume [veh/h]	12	826	3	5	680	84	102	4	31	1	1	4
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12			3			1			9		
Bicycle Volume [bicycles/h]	16			10			7			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	80.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	10	10	10	10	10	4	4	4	0	4	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	73	73	73	73	73	73	27	27	27	0	27	0
Vehicle Extension [s]	6.0	6.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	11	11	11	13	13	13	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	0.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	81	81	81	81	11	11
g / C, Green / Cycle	0.81	0.81	0.81	0.81	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.02	0.45	0.01	0.43	0.09	0.00
s, saturation flow rate [veh/h]	714	1841	672	1791	1526	1718
c, Capacity [veh/h]	526	1484	489	1444	234	234
d1, Uniform Delay [s]	6.74	3.42	7.24	3.28	43.01	39.56
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.08	1.52	0.04	1.39	2.33	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.56	0.01	0.53	0.59	0.03
d, Delay for Lane Group [s/veh]	6.82	4.95	7.27	4.67	45.34	39.60
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.10	4.72	0.04	3.87	3.42	0.14
50th-Percentile Queue Length [ft]	2.56	118.04	1.09	96.84	85.57	3.39
95th-Percentile Queue Length [veh]	0.18	8.29	0.08	6.97	6.16	0.24
95th-Percentile Queue Length [ft]	4.61	207.13	1.96	174.32	154.03	6.09

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	6.82	4.95	4.95	7.27	4.67	4.67	45.34	45.34	45.34	39.60	39.60	39.60
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]		4.97			4.69			45.34			39.60	
Approach LOS		A			A			D			D	
d_I, Intersection Delay [s/veh]						8.12						
Intersection LOS						A						
Intersection V/C						0.581						

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	12.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.499

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	32	705	14	26	597	6	61	51	69	56	43	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	0.00	2.70	0.00	3.30	2.00	10.10	0.00	2.30	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	705	14	26	597	6	61	51	69	56	43	28
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	176	4	7	149	2	15	13	17	14	11	7
Total Analysis Volume [veh/h]	32	705	14	26	597	6	61	51	69	56	43	28
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			4			3			3		
Bicycle Volume [bicycles/h]	15			12			5			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	12	12	12	12	12	12	5	5	5	0	5	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	73	73	73	73	73	73	27	27	27	0	27	0
Vehicle Extension [s]	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	14	14	14	14	14	14	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	76	76	76	76	16	16	16	16
g / C, Green / Cycle	0.76	0.76	0.76	0.76	0.16	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.04	0.39	0.03	0.33	0.05	0.07	0.04	0.04
s, saturation flow rate [veh/h]	829	1837	745	1846	1295	1651	1287	1704
c, Capacity [veh/h]	592	1393	511	1400	201	264	163	272
d1, Uniform Delay [s]	7.25	4.80	8.74	4.34	42.51	38.06	45.17	36.83
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.17	1.37	0.19	0.97	0.84	1.22	1.25	0.50
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.05	0.52	0.05	0.43	0.30	0.45	0.34	0.26
d, Delay for Lane Group [s/veh]	7.43	6.17	8.92	5.31	43.34	39.29	46.42	37.33
Lane Group LOS	A	A	A	A	D	D	D	D
Critical Lane Group	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.29	5.33	0.26	4.02	1.48	2.76	1.41	1.57
50th-Percentile Queue Length [ft]	7.14	133.32	6.57	100.44	36.91	69.12	35.30	39.24
95th-Percentile Queue Length [veh]	0.51	9.12	0.47	7.23	2.66	4.98	2.54	2.83
95th-Percentile Queue Length [ft]	12.85	228.00	11.82	180.79	66.44	124.41	63.54	70.63

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.43	6.17	6.17	8.92	5.31	5.31	43.34	39.29	39.29	46.42	37.33	37.33
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]		6.22			5.46			40.65			41.34	
Approach LOS		A			A			D			D	
d_I, Intersection Delay [s/veh]	12.27											
Intersection LOS	B											
Intersection V/C	0.499											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	69.5
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.587

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	47	95	259	441	115	411	92	429	216	309	592	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	1.10	0.00	1.70	0.00	2.40	1.10	0.50	2.30	6.40	0.00	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	120	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	47	95	139	441	115	0	92	429	216	309	592	38
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	24	35	110	29	0	23	107	54	77	148	10
Total Analysis Volume [veh/h]	47	95	139	441	115	0	92	429	216	309	592	38
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			0			0			6		
Bicycle Volume [bicycles/h]	51			1			5			16		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	8	1	8	4	4	4	6	3	6	2	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	Lag	-	-
Minimum Green [s]	0	5	0	5	5	5	0	5	0	5	5	5
Maximum Green [s]	0	33	0	46	46	46	0	32	0	39	39	39
Amber [s]	0.0	3.3	0.0	3.7	3.7	3.7	0.0	3.7	0.0	3.7	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	0	33	0	46	46	46	0	32	0	39	39	39
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	8	0	8	8	8	0	8	0	8	8	8
Pedestrian Clearance [s]	0	20	0	22	22	22	0	17	0	18	18	18
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.3	0.0	2.7	2.7	2.7	0.0	2.7	0.0	2.7	2.7	2.7
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.30	4.30	4.30	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.30	2.30	2.30	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	17	17	17	26	26	26	22	22	22	22	30	30	30
g / C, Green / Cycle	0.11	0.11	0.11	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.03	0.05	0.10	0.15	0.15	0.00	0.05	0.12	0.12	0.13	0.18	0.18	0.18
s, saturation flow rate [veh/h]	1771	1879	1435	1779	1845	1577	1790	1891	1848	1527	1701	1898	1675
c, Capacity [veh/h]	202	214	164	311	322	276	263	278	271	224	346	386	341
d1, Uniform Delay [s]	60.47	61.99	65.17	60.34	60.33	0.00	57.56	62.10	62.14	62.47	57.87	57.87	57.99
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.13	0.13	0.14	0.22	0.22	0.22
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.58	1.43	11.42	7.88	7.60	0.00	0.80	6.94	7.38	11.71	12.68	11.55	13.79
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.23	0.44	0.85	0.88	0.88	0.00	0.35	0.82	0.83	0.86	0.87	0.87	0.88
d, Delay for Lane Group [s/veh]	61.05	63.43	76.59	68.21	67.94	0.00	58.35	69.03	69.52	74.18	70.56	69.42	71.78
Lane Group LOS	E	E	E	E	E	A	E	E	E	E	E	E	E
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	1.68	3.49	5.76	10.92	11.29	0.00	3.23	9.02	8.90	7.92	12.34	13.65	12.39
50th-Percentile Queue Length [ft]	41.90	87.28	143.94	272.88	282.27	0.00	80.67	225.4	222.4	197.9	308.62	341.36	309.79
95th-Percentile Queue Length [veh]	3.02	6.28	9.69	16.33	16.80	0.00	5.81	13.94	13.79	12.53	18.11	19.71	18.16
95th-Percentile Queue Length [ft]	75.42	157.10	242.32	408.34	420.04	0.00	145.2	348.5	344.7	313.3	452.67	492.86	454.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.05	63.43	76.59	68.11	67.94	0.00	58.35	69.26	74.15	70.56	70.47	71.78
Movement LOS	E	E	E	E	E	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	69.54			68.07			69.19			70.54		
Approach LOS	E			E			E			E		
d_I, Intersection Delay [s/veh]	69.49											
Intersection LOS	E											
Intersection V/C	0.587											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	28.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.769

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	62	653	137	35	574	26	296	238	71	53	136	26
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.00	0.00	0.00	2.10	4.20	0.40	0.50	0.00	13.50	0.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	62	653	137	35	574	26	296	238	71	53	136	26
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	16	163	34	9	144	7	74	60	18	13	34	7
Total Analysis Volume [veh/h]	62	653	137	35	574	26	296	238	71	53	136	26
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	35			40			67			58		
Bicycle Volume [bicycles/h]	1			5			20			7		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	2	2	6	2	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	4	4	0	4	0	0	4	0	4	4	4
Maximum Green [s]	56	56	56	0	56	0	0	31	0	31	31	31
Amber [s]	3.1	3.1	3.1	0.0	3.1	0.0	0.0	3.1	0.0	3.1	3.1	3.1
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	0	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	2.0	2.0	2.0
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	14	0	14	14	14
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	0.0	2.1	0.0	0.0	2.1	0.0	2.1	2.1	2.1
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	49	49	49	49	20	20	13
g / C, Green / Cycle	0.52	0.52	0.52	0.52	0.21	0.21	0.14
(v / s)_i Volume / Saturation Flow Rate	0.07	0.44	0.05	0.33	0.16	0.18	0.12
s, saturation flow rate [veh/h]	832	1793	697	1839	1802	1740	1825
c, Capacity [veh/h]	299	933	160	957	379	366	254
d1, Uniform Delay [s]	27.39	19.42	38.41	16.12	35.24	35.81	39.63
k, delay calibration	0.11	0.28	0.11	0.13	0.11	0.11	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.34	5.48	0.67	0.83	3.55	5.63	2.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

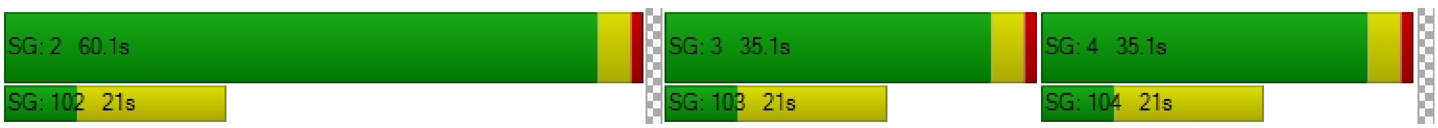
X, volume / capacity	0.21	0.85	0.22	0.63	0.78	0.85	0.85
d, Delay for Lane Group [s/veh]	27.73	24.90	39.08	16.95	38.79	41.44	42.61
Lane Group LOS	C	C	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	No	Yes	Yes
50th-Percentile Queue Length [veh]	1.12	15.08	0.77	8.83	6.67	7.26	5.05
50th-Percentile Queue Length [ft]	28.02	377.03	19.31	220.86	166.87	181.40	126.32
95th-Percentile Queue Length [veh]	2.02	21.45	1.39	13.71	10.91	11.67	8.74
95th-Percentile Queue Length [ft]	50.44	536.26	34.76	342.73	272.79	291.84	218.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	27.73	24.90	24.90	39.08	16.95	16.95	38.79	41.44	41.44	42.61	42.61	42.61
Movement LOS	C	C	C	D	B	B	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	25.10			18.17			40.14			42.61		
Approach LOS	C			B			D			D		
d_I, Intersection Delay [s/veh]	28.77											
Intersection LOS	C											
Intersection V/C	0.769											

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	7.8
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.578

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	15	386	108	35	308	56	80	239	39	29	120	30
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	7.40	0.00	0.80	0.00	0.00	0.40	2.60	0.00	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	15	386	108	35	308	56	80	239	39	29	120	30
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	97	27	9	77	14	20	60	10	7	30	8
Total Analysis Volume [veh/h]	15	386	108	35	308	56	80	239	39	29	120	30
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			1			18			5		
Bicycle Volume [bicycles/h]	16			12			20			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	4	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	8	8	8	0	8	0	0	4	0	4	4	4
Maximum Green [s]	30	30	30	0	30	0	0	30	0	30	30	30
Amber [s]	3.2	3.2	3.2	0.0	3.2	0.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	30	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	12	0	12	12	12
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	2.2	2.2	0.0	2.2	0.0	0.0	2.2	0.0	2.2	2.2	2.2
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	12	12	8	8
g / C, Green / Cycle	0.42	0.42	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.29	0.22	0.20	0.10
s, saturation flow rate [veh/h]	1735	1788	1757	1777
c, Capacity [veh/h]	863	893	654	652
d1, Uniform Delay [s]	6.77	6.14	9.14	8.17
k, delay calibration	0.11	0.11	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.65	0.35	0.53	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.59	0.45	0.55	0.27
d, Delay for Lane Group [s/veh]	7.42	6.49	9.67	8.34
Lane Group LOS	A	A	A	A
Critical Lane Group	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.55	1.08	1.45	0.59
50th-Percentile Queue Length [ft]	38.70	26.94	36.22	14.75
95th-Percentile Queue Length [veh]	2.79	1.94	2.61	1.06
95th-Percentile Queue Length [ft]	69.66	48.49	65.20	26.55

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.42	7.42	7.42	6.49	6.49	6.49	9.67	9.67	9.67	8.34	8.34	8.34
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
d_A, Approach Delay [s/veh]	7.42			6.49			9.67			8.34		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	7.83											
Intersection LOS	A											
Intersection V/C	0.578											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	38.7
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	11.963

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	34	27	55	107	9	238	24	1774	102	80	1498	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	1.30	0.00	1.40	0.00	1.50	1.20	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	101	0	0	0
Total Hourly Volume [veh/h]	34	27	55	107	9	238	24	1774	1	80	1498	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	7	14	27	2	60	6	444	0	20	375	4
Total Analysis Volume [veh/h]	34	27	55	107	9	238	24	1774	1	80	1498	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			12			0			17		
Bicycle Volume [bicycles/h]	3			3			14			3		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	15.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	0	10	10	0	10	10	0
Maximum Green [s]	0	30	0	0	30	0	25	35	0	25	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	0	40	0	0	40	0	25	85	0	25	85	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	37	6	93	93	10	97	97
g / C, Green / Cycle	0.25	0.25	0.25	0.25	0.04	0.62	0.62	0.06	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.73	0.03	11.10	0.15	0.01	0.50	0.00	0.04	0.28	0.28
s, saturation flow rate [veh/h]	83	1591	10	1539	1810	3568	1554	1783	3575	1866
c, Capacity [veh/h]	58	391	49	378	76	2224	969	115	2307	1204
d1, Uniform Delay [s]	62.44	44.19	73.38	50.47	68.70	7.93	4.77	67.15	4.35	4.35
k, delay calibration	0.50	0.11	0.50	0.19	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	134.85	0.16	679.91	3.09	2.32	3.09	0.00	7.43	0.59	1.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.06	0.14	2.38	0.63	0.31	0.80	0.00	0.70	0.43	0.43
d, Delay for Lane Group [s/veh]	197.29	44.36	753.30	53.57	71.02	11.02	4.78	74.57	4.94	5.48
Lane Group LOS	F	D	F	D	E	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	4.44	1.68	11.09	8.36	0.94	9.43	0.01	3.19	2.81	3.12
50th-Percentile Queue Length [ft]	111.10	42.03	277.21	208.89	23.41	235.65	0.16	79.70	70.30	77.96
95th-Percentile Queue Length [veh]	8.00	3.03	19.96	13.10	1.69	14.46	0.01	5.74	5.06	5.61
95th-Percentile Queue Length [ft]	199.98	75.65	498.98	327.40	42.14	361.53	0.28	143.45	126.54	140.33

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	197.29	197.29	44.36	753.30	753.30	53.57	71.02	11.02	4.78	74.57	5.12	5.48
Movement LOS	F	F	D	F	F	D	E	B	A	E	A	A
d_A, Approach Delay [s/veh]	124.78			282.86			11.82			8.61		
Approach LOS	F			F			B			A		
d_I, Intersection Delay [s/veh]	38.72											
Intersection LOS	D											
Intersection V/C	11.963											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	49.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.855

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	436	173	95	98	285	68	99	1539	46	71	1256	385
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.60	0.00	0.00	0.60	0.00	1.00	0.50	0.00	1.80	1.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	59	0	0	0	0	0	45	0	0	274
Total Hourly Volume [veh/h]	436	173	36	98	285	68	99	1539	1	71	1256	111
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	109	43	9	25	71	17	25	385	0	18	314	28
Total Analysis Volume [veh/h]	436	173	36	98	285	68	99	1539	1	71	1256	111
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			9			17			3		
Bicycle Volume [bicycles/h]	6			5			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	26.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	3	0	0	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	8	10	0	8	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	40	0	0	36	0	29	62	0	12	45	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	2.0	2.2	0.0	2.0	2.2	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	4.00	4.20	4.20	4.00	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	2.00	2.20	2.20	2.00	2.20	2.20
g_i, Effective Green Time [s]	29	29	29	31	31	10	67	67	8	65	65
g / C, Green / Cycle	0.19	0.19	0.19	0.21	0.21	0.07	0.45	0.45	0.05	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.17	0.17	0.02	0.05	0.19	0.06	0.43	0.00	0.04	0.35	0.07
s, saturation flow rate [veh/h]	1810	1762	1585	1810	1820	1792	3600	1577	1778	3557	1570
c, Capacity [veh/h]	351	342	307	373	375	122	1612	707	90	1531	676
d1, Uniform Delay [s]	58.77	58.74	49.87	49.95	58.62	67.26	28.77	16.68	69.15	27.27	19.25
k, delay calibration	0.22	0.22	0.11	0.11	0.39	0.11	0.50	0.50	0.19	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.45	13.46	0.17	0.37	28.44	12.12	13.93	0.00	22.60	5.05	0.52
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

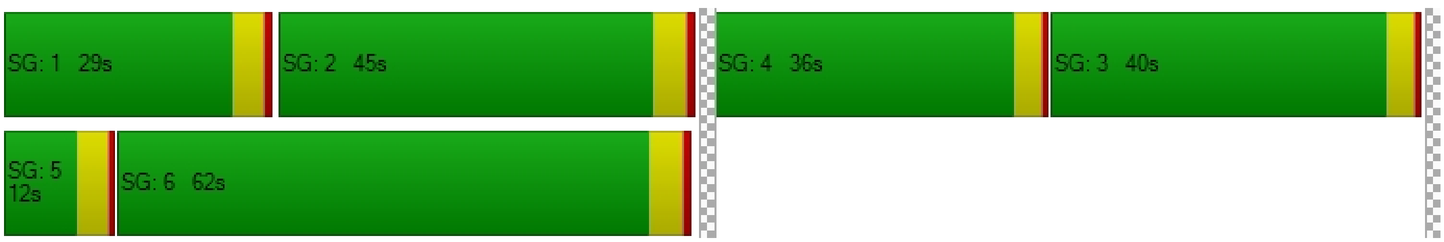
X, volume / capacity	0.88	0.88	0.12	0.26	0.94	0.81	0.95	0.00	0.79	0.82	0.16
d, Delay for Lane Group [s/veh]	72.22	72.19	50.04	50.32	87.06	79.37	42.69	16.68	91.76	32.32	19.78
Lane Group LOS	E	E	D	D	F	E	D	B	F	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	12.75	12.38	1.15	3.19	16.28	4.06	25.75	0.02	3.23	17.59	1.93
50th-Percentile Queue Length [ft]	318.82	309.49	28.64	79.70	406.95	101.42	643.85	0.38	80.66	439.75	48.18
95th-Percentile Queue Length [veh]	18.61	18.15	2.06	5.74	22.89	7.30	34.08	0.03	5.81	24.47	3.47
95th-Percentile Queue Length [ft]	465.24	453.75	51.55	143.45	572.37	182.56	851.92	0.69	145.18	611.70	86.72

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.21	72.19	50.04	50.32	87.06	87.06	79.37	42.69	16.68	91.76	32.32	19.78
Movement LOS	E	E	D	D	F	F	E	D	B	F	C	B
d_A, Approach Delay [s/veh]	70.97			79.07			44.89			34.28		
Approach LOS	E			E			D			C		
d_I, Intersection Delay [s/veh]	48.96											
Intersection LOS	D											
Intersection V/C	0.855											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	27.2
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	152	259	171	151	252	90	90	1478	97	154	1415	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.00	1.60	1.40	1.30	0.00	1.70	0.00	2.60	1.20	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	77	0	0	82	0	0	77	0	0	116
Total Hourly Volume [veh/h]	152	259	94	151	252	8	90	1478	20	154	1415	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	65	24	38	63	2	23	370	5	39	354	4
Total Analysis Volume [veh/h]	152	259	94	151	252	8	90	1478	20	154	1415	15
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			7			37			17		
Bicycle Volume [bicycles/h]	10			10			4			6		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	147.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	7	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	0	4	4	0	4	10	0	4	10	0
Maximum Green [s]	16	25	0	16	25	0	18	20	0	18	20	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	55	58	0	28	31	0	31	40	0	24	33	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	1.5	0.0	1.0	1.5	0.0	1.5	2.2	0.0	1.5	2.2	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	3.50	3.50	3.00	3.50	3.50	3.50	4.20	4.20	3.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.50	1.50	1.00	1.50	1.50	1.50	2.20	2.20	1.50	2.20	2.20
g_i, Effective Green Time [s]	15	25	25	15	25	25	9	81	81	15	87	87
g / C, Green / Cycle	0.10	0.17	0.17	0.10	0.17	0.17	0.06	0.54	0.54	0.10	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.08	0.14	0.06	0.08	0.13	0.01	0.05	0.42	0.01	0.09	0.40	0.01
s, saturation flow rate [veh/h]	1810	1872	1472	1781	1874	1507	1810	3557	1568	1764	3575	1546
c, Capacity [veh/h]	177	314	247	174	314	252	111	1924	848	175	2069	895
d1, Uniform Delay [s]	66.47	60.14	55.36	66.55	59.91	52.13	66.30	4.36	3.39	64.03	10.46	7.23
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.18	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.44	5.50	0.97	12.36	4.82	0.05	13.10	3.01	0.05	20.12	1.86	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

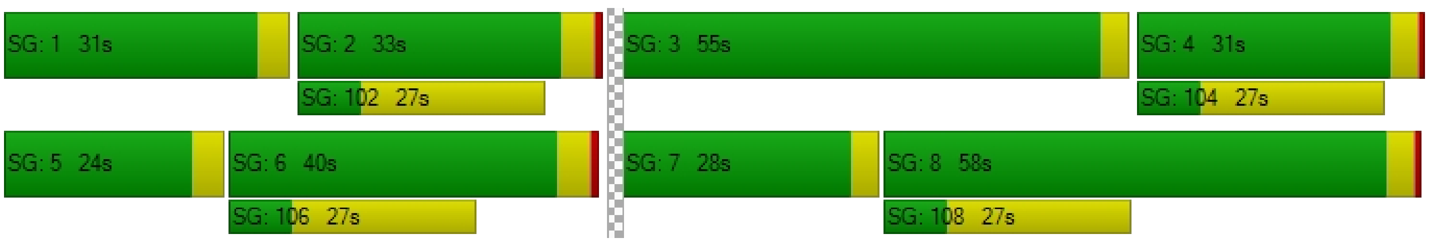
X, volume / capacity	0.86	0.83	0.38	0.87	0.80	0.03	0.81	0.77	0.02	0.88	0.68	0.02
d, Delay for Lane Group [s/veh]	77.90	65.64	56.33	78.91	64.73	52.18	79.40	7.37	3.44	84.16	12.31	7.26
Lane Group LOS	E	E	E	E	E	D	E	A	A	F	B	A
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	6.35	10.09	3.28	6.35	9.73	0.26	3.67	3.68	0.08	6.60	9.07	0.13
50th-Percentile Queue Length [ft]	158.67	252.17	81.90	158.74	243.22	6.52	91.79	91.97	2.08	164.91	226.71	3.22
95th-Percentile Queue Length [veh]	10.48	15.30	5.90	10.48	14.84	0.47	6.61	6.62	0.15	10.81	14.01	0.23
95th-Percentile Queue Length [ft]	261.95	382.38	147.41	262.06	371.11	11.73	165.23	165.54	3.74	270.21	350.17	5.79

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.90	65.64	56.33	78.91	64.73	52.18	79.40	7.37	3.44	84.16	12.31	7.26
Movement LOS	E	E	E	E	E	D	E	A	A	F	B	A
d_A, Approach Delay [s/veh]	67.60			69.69			11.40			19.25		
Approach LOS	E			E			B			B		
d_I, Intersection Delay [s/veh]	27.25											
Intersection LOS	C											
Intersection V/C	0.746											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	14.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.795

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	212	62	169	64	74	55	0	1583	46	0	1750	104
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	10.00	0.70	2.00	5.20	7.00	0.00	1.40	2.40	0.00	1.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	73	0	0	99
Total Hourly Volume [veh/h]	212	62	169	64	74	55	0	1583	0	0	1750	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	53	16	42	16	19	14	0	396	0	0	438	1
Total Analysis Volume [veh/h]	212	62	169	64	74	55	0	1583	0	0	1750	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	20			27			66			41		
Bicycle Volume [bicycles/h]	14			12			4			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	142.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	3	0	0	4	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	10	0	0	10	0
Maximum Green [s]	0	24	0	0	24	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.7	0.0	0.0	3.7	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	87	0	0	31	0	0	32	0	0	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.2	0.0	0.0	2.2	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	24	24	24	16	16	98	98	98	98
g / C, Green / Cycle	0.16	0.16	0.16	0.11	0.11	0.65	0.65	0.65	0.65
(v / s)_i Volume / Saturation Flow Rate	0.13	0.04	0.14	0.04	0.09	0.49	0.00	0.54	0.00
s, saturation flow rate [veh/h]	1601	1555	1226	1597	1401	3211	1419	3217	1407
c, Capacity [veh/h]	252	245	193	171	150	2100	928	2104	920
d1, Uniform Delay [s]	61.25	55.35	61.64	62.20	65.77	0.00	0.00	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.35	0.54	11.66	1.36	13.19	2.57	0.00	4.02	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

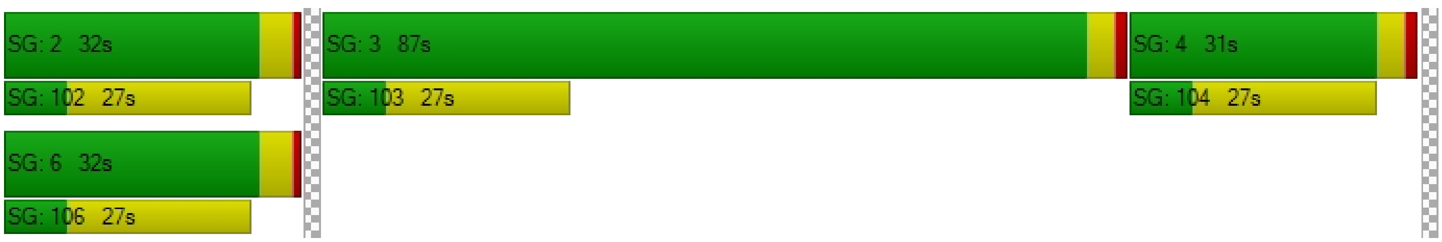
X, volume / capacity	0.84	0.25	0.87	0.37	0.86	0.75	0.00	0.83	0.01
d, Delay for Lane Group [s/veh]	68.60	55.89	73.30	63.56	78.96	2.57	0.00	4.02	0.01
Lane Group LOS	E	E	E	E	E	A	A	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	8.38	2.11	6.93	2.37	5.45	0.75	0.00	1.17	0.00
50th-Percentile Queue Length [ft]	209.44	52.86	173.33	59.13	136.32	18.71	0.00	29.35	0.07
95th-Percentile Queue Length [veh]	13.12	3.81	11.25	4.26	9.28	1.35	0.00	2.11	0.00
95th-Percentile Queue Length [ft]	328.11	95.15	281.29	106.44	232.06	33.69	0.00	52.84	0.12

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	68.60	55.89	73.30	63.56	78.96	78.96	0.00	2.57	0.00	0.00	4.02	0.01
Movement LOS	E	E	E	E	E	E		A	A		A	A
d_A, Approach Delay [s/veh]	68.61			73.85			2.57			4.01		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	14.03											
Intersection LOS	B											
Intersection V/C	0.795											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	48.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.844

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	48	377	117	461	255	82	118	1391	613	242	1556	53
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	1.10	0.00	0.40	0.40	1.30	0.90	1.80	1.70	0.60	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	80	0	0	454	0	0	33
Total Hourly Volume [veh/h]	48	377	117	461	255	2	118	1391	159	242	1556	20
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	94	29	115	64	1	30	348	40	61	389	5
Total Analysis Volume [veh/h]	48	377	117	461	255	2	118	1391	159	242	1556	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	31			12			0			37		
Bicycle Volume [bicycles/h]	13			14			5			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	3	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	4	4	4	8	10	10	8	10	10
Maximum Green [s]	0	30	0	16	16	16	4	16	16	4	16	16
Amber [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.2	3.7	3.7	3.2	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	49	0	31	31	31	37	34	34	36	33	33
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	0	0	7	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	0	0	20	20	20	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.2	2.7	2.7	2.2	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.70	4.70	4.20	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.70	2.70	2.20	2.70	2.70
g_i, Effective Green Time [s]	27	27	24	24	24	12	60	60	22	70	70
g / C, Green / Cycle	0.18	0.18	0.16	0.16	0.16	0.08	0.40	0.40	0.15	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.16	0.16	0.13	0.13	0.00	0.07	0.39	0.10	0.13	0.44	0.01
s, saturation flow rate [veh/h]	1864	1557	3500	1892	1440	1793	3554	1551	1799	3568	1562
c, Capacity [veh/h]	334	279	561	303	231	142	1424	621	264	1672	732
d1, Uniform Delay [s]	59.85	60.17	60.89	61.11	52.95	66.12	34.26	22.87	55.71	14.46	8.77
k, delay calibration	0.11	0.12	0.11	0.11	0.11	0.11	0.50	0.50	0.18	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.04	10.74	3.08	6.23	0.01	11.85	18.97	0.99	18.09	10.75	0.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

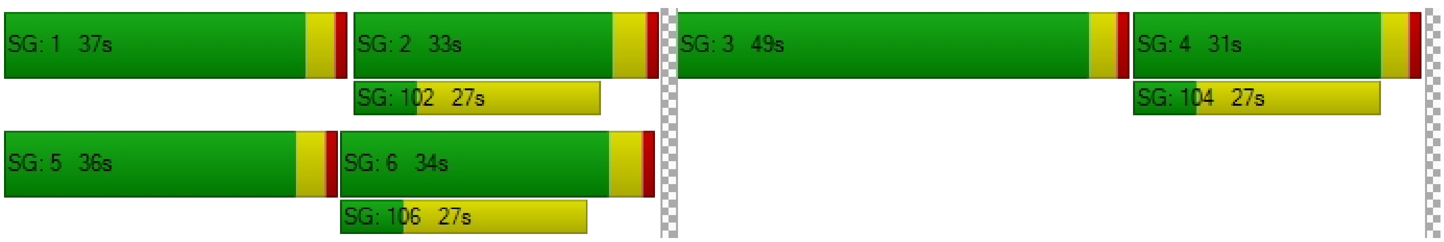
X, volume / capacity	0.87	0.90	0.82	0.84	0.01	0.83	0.98	0.26	0.92	0.93	0.03
d, Delay for Lane Group [s/veh]	66.89	70.91	63.97	67.33	52.96	77.97	53.23	23.86	73.80	25.21	8.84
Lane Group LOS	E	E	E	E	D	E	D	C	E	C	A
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	11.47	10.18	8.76	9.98	0.07	4.78	25.98	3.11	9.52	13.75	0.17
50th-Percentile Queue Length [ft]	286.78	254.39	219.01	249.60	1.63	119.59	649.52	77.76	237.97	343.63	4.30
95th-Percentile Queue Length [veh]	17.03	15.41	13.61	15.17	0.12	8.37	34.34	5.60	14.58	19.83	0.31
95th-Percentile Queue Length [ft]	425.65	385.17	340.37	379.15	2.94	209.27	858.50	139.96	364.47	495.64	7.73

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	66.89	68.32	70.91	63.97	67.33	52.96	77.97	53.23	23.86	73.80	25.21	8.84
Movement LOS	E	E	E	E	E	D	E	D	C	E	C	A
d_A, Approach Delay [s/veh]		68.75			65.13			52.18			31.50	
Approach LOS		E			E			D			C	
d_I, Intersection Delay [s/veh]	48.11											
Intersection LOS	D											
Intersection V/C	0.844											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.593

Intersection Setup

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	71	6	39	58	45	48	77	1977	21	82	1908	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	39	0	0	0	0	0	0
Total Hourly Volume [veh/h]	71	6	39	58	45	9	77	1977	21	82	1908	65
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	2	10	15	11	2	19	494	5	21	477	16
Total Analysis Volume [veh/h]	71	6	39	58	45	9	77	1977	21	82	1908	65
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			16			0		
Bicycle Volume [bicycles/h]	9			16			5			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	19.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	8	8	4	8	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	8	8	0	8	0	4	10	10	4	10	10
Maximum Green [s]	30	30	30	0	30	0	20	40	40	20	40	40
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.7	3.7	3.0	3.7	3.7
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	31	31	31	0	31	0	38	104	104	15	81	81
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	7	7	0	7	0	0	7	7	0	7	7
Pedestrian Clearance [s]	20	20	20	0	20	0	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.7	2.7	2.0	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	0.0	6.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.70	4.70	4.00	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.70	2.70	2.00	2.70	2.70
g_i, Effective Green Time [s]	25	25	25	8	104	104	8	105	105
g / C, Green / Cycle	0.16	0.16	0.16	0.05	0.70	0.70	0.06	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.14	0.07	0.01	0.04	0.37	0.37	0.05	0.36	0.37
s, saturation flow rate [veh/h]	826	1400	1560	1810	3575	1865	1810	3582	1844
c, Capacity [veh/h]	174	266	255	98	2487	1298	102	2500	1287
d1, Uniform Delay [s]	65.66	56.26	52.78	68.72	1.93	1.93	68.54	1.82	1.82
k, delay calibration	0.29	0.11	0.11	0.11	0.50	0.50	0.13	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.12	0.92	0.06	13.07	0.80	1.54	15.76	0.78	1.52
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

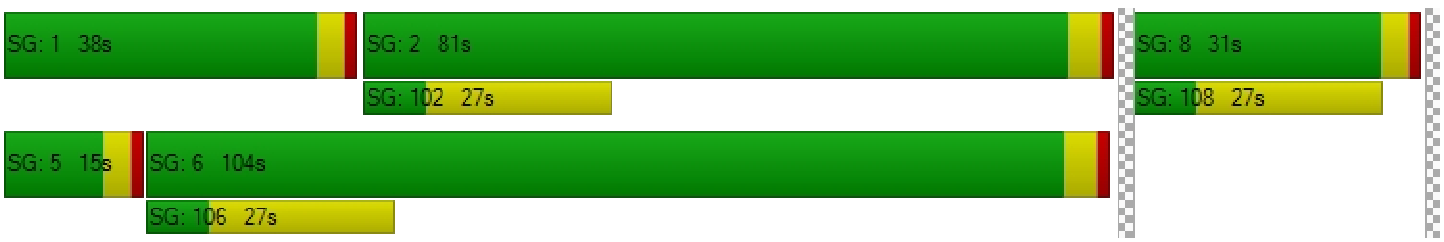
X, volume / capacity	0.67	0.39	0.04	0.79	0.53	0.53	0.81	0.52	0.52
d, Delay for Lane Group [s/veh]	76.77	57.18	52.83	81.79	2.73	3.47	84.30	2.60	3.35
Lane Group LOS	E	E	D	F	A	A	F	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	4.96	3.68	0.30	3.22	1.92	2.27	3.49	1.82	2.15
50th-Percentile Queue Length [ft]	124.08	92.12	7.48	80.38	47.92	56.77	87.25	45.44	53.72
95th-Percentile Queue Length [veh]	8.62	6.63	0.54	5.79	3.45	4.09	6.28	3.27	3.87
95th-Percentile Queue Length [ft]	215.42	165.81	13.47	144.69	86.26	102.18	157.04	81.80	96.69

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.77	76.77	76.77	57.18	57.18	52.83	81.79	2.98	3.47	84.30	2.84	3.35
Movement LOS	E	E	E	E	E	D	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	76.77			56.83			5.91			6.10		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	9.20											
Intersection LOS	A											
Intersection V/C	0.593											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	16.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.745

Intersection Setup

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound				Northwestbound			Southeastbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	55.00	100.0	100.0	100.0	100.0	275.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				30.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Crosswalk	Yes			Yes				No			Yes		

volumes

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	249	0	182	0	0	0	0	346	2051	0	0	1610	103
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	0.00	1.60	0.00	0.00	0.00	0.00	0.90	1.70	0.00	0.00	1.60	1.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	211	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	249	0	0	0	0	0	0	346	2051	0	0	1610	103
Peak Hour Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	62	0	0	0	0	0	0	87	513	0	0	403	26
Total Analysis Volume [veh/h]	249	0	0	0	0	0	0	346	2051	0	0	1610	103
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27			0				0			17		
Bicycle Volume [bicycles/h]	2			0				7			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	34.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Permi	Permi	Permi	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	4	0	0	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	10	0	0	0	0	10	0	10	10	0	0	10	0
Maximum Green [s]	25	0	0	0	0	25	0	30	45	0	0	45	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	35	0	0	0	0	35	0	58	115	0	0	57	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	25	0	0	0	0	25	0	0	20	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No					No		No	No			No	
Maximum Recall	No					No		No	No			No	
Pedestrian Recall	No					No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	L	C	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	31	112	78	78
g / C, Green / Cycle	0.21	0.21	0.21	0.21	0.75	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.18	0.00	0.00	0.19	0.40	0.32	0.32
s, saturation flow rate [veh/h]	1373	1590	1900	1793	5089	3561	1804
c, Capacity [veh/h]	316	331	420	373	3791	1841	932
d1, Uniform Delay [s]	59.33	0.00	0.00	53.10	0.13	15.31	15.22
k, delay calibration	0.36	0.11	0.11	0.12	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.44	0.00	0.00	11.17	0.56	1.58	3.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.00	0.00	0.93	0.54	0.62	0.61
d, Delay for Lane Group [s/veh]	72.76	0.00	0.00	64.27	0.69	16.89	18.22
Lane Group LOS	E	A	A	E	A	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	10.50	0.00	0.00	13.39	0.33	9.17	9.45
50th-Percentile Queue Length [ft]	262.61	0.00	0.00	334.80	8.23	229.18	236.36
95th-Percentile Queue Length [veh]	15.82	0.00	0.00	19.39	0.59	14.13	14.50
95th-Percentile Queue Length [ft]	395.49	0.00	0.00	484.85	14.82	353.31	362.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.76	0.00	0.00	0.00	0.00	0.00	0.00	64.27	0.69	0.00	0.00	17.28	18.22
Movement LOS	E		A	A	A	A	A	E	A			B	B
d_A, Approach Delay [s/veh]	72.76			0.00				9.87			17.33		
Approach LOS	E			A				A			B		
d_I, Intersection Delay [s/veh]	16.40												
Intersection LOS	B												
Intersection V/C	0.745												

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	8.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.699

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	26	0	39	4	3	0	319	2398	6	44	2483	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	2.85	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.90	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	35	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	0	4	4	3	0	319	2398	6	44	2483	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	1	1	1	0	80	600	2	11	621	2
Total Analysis Volume [veh/h]	26	0	4	4	3	0	319	2398	6	44	2483	6
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			2			0			3		
Bicycle Volume [bicycles/h]	0			0			17			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	89.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	11	0	4	10	0	4	10	0
Maximum Green [s]	0	29	0	0	29	0	26	35	0	26	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Split [s]	0	31	0	0	31	0	76	26	0	93	43	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	15	0	0	15	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	29	123	123	5	99	99
g / C, Green / Cycle	0.07	0.07	0.07	0.19	0.82	0.82	0.03	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.01	0.18	0.44	0.44	0.02	0.46	0.46
s, saturation flow rate [veh/h]	1277	1570	1116	1810	3575	1875	1810	3585	1880
c, Capacity [veh/h]	131	103	111	349	2939	1541	59	2372	1244
d1, Uniform Delay [s]	66.96	65.65	65.76	54.46	0.00	0.00	71.12	4.19	4.19
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.73	0.15	0.24	9.48	0.71	1.35	17.31	1.65	3.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

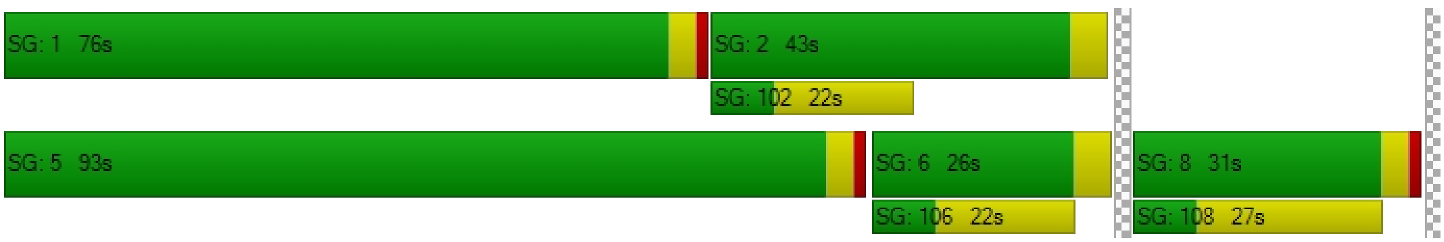
X, volume / capacity	0.20	0.04	0.06	0.91	0.54	0.54	0.75	0.69	0.69
d, Delay for Lane Group [s/veh]	67.69	65.80	65.99	63.94	0.71	1.35	88.43	5.84	7.32
Lane Group LOS	E	E	E	E	A	A	F	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.99	0.15	0.27	12.09	0.29	0.58	1.94	4.26	4.98
50th-Percentile Queue Length [ft]	24.78	3.75	6.63	302.19	7.20	14.40	48.50	106.40	124.45
95th-Percentile Queue Length [veh]	1.78	0.27	0.48	17.79	0.52	1.04	3.49	7.64	8.64
95th-Percentile Queue Length [ft]	44.60	6.74	11.94	444.74	12.97	25.93	87.30	190.98	215.93

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	67.69	67.69	65.80	65.99	65.99	65.99	63.94	0.93	1.35	88.43	6.35	7.32
Movement LOS	E	E	E	E	E	E	E	A	A	F	A	A
d_A, Approach Delay [s/veh]	67.44			65.99			8.31			7.78		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	8.47											
Intersection LOS	A											
Intersection V/C	0.699											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	11.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.586

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	30.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	419	393	103	468	366	166
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.60	0.90	0.50	2.30	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	419	393	103	468	366	166
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	105	98	26	117	92	42
Total Analysis Volume [veh/h]	419	393	103	468	366	166
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		31	
Bicycle Volume [bicycles/h]	10		15		8	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	0
Maximum Green [s]	30	30	15	40	25	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	30	30	0	30	0	0
Vehicle Extension [s]	2.0	2.0	2.0	2.0	2.0	0.0
Walk [s]	7	7	0	0	7	0
Pedestrian Clearance [s]	10	10	0	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	0.0
Minimum Recall	Yes		Yes	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	13	13	3	20	10	10
g / C, Green / Cycle	0.34	0.34	0.07	0.52	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.23	0.27	0.06	0.25	0.20	0.11
s, saturation flow rate [veh/h]	1852	1481	1801	1857	1810	1555
c, Capacity [veh/h]	632	506	135	972	474	408
d1, Uniform Delay [s]	10.72	11.30	17.37	5.81	13.06	11.66
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.45	0.99	3.35	0.14	1.02	0.24
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

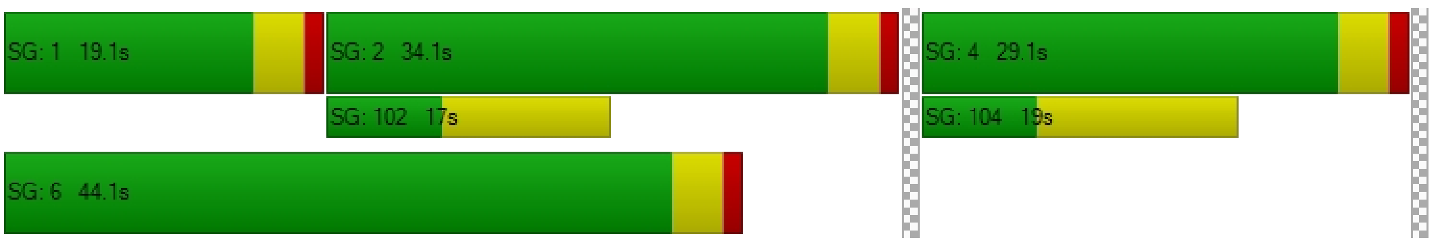
X, volume / capacity	0.66	0.78	0.76	0.48	0.77	0.41
d, Delay for Lane Group [s/veh]	11.17	12.28	20.71	5.94	14.07	11.90
Lane Group LOS	B	B	C	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	2.30	2.33	0.91	1.53	2.40	0.94
50th-Percentile Queue Length [ft]	57.38	58.21	22.64	38.33	59.94	23.61
95th-Percentile Queue Length [veh]	4.13	4.19	1.63	2.76	4.32	1.70
95th-Percentile Queue Length [ft]	103.29	104.78	40.76	68.99	107.90	42.50

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.17	12.28	20.71	5.94	14.07	11.90
Movement LOS	B	B	C	A	B	B
d_A, Approach Delay [s/veh]	11.71		8.61		13.40	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	11.25					
Intersection LOS	B					
Intersection V/C	0.586					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 39: Sand Hill Rd/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	44.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.712

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	361	611	215	479	1172	235	158	691	188	126	658	223
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	0.80	0.90	0.00	0.80	1.00	1.90	0.70	0.50	0.00	0.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	361	611	215	479	1172	235	158	691	188	126	658	223
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	90	153	54	120	293	59	40	173	47	32	165	56
Total Analysis Volume [veh/h]	361	611	215	479	1172	235	158	691	188	126	658	223
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			12			5			3		
Bicycle Volume [bicycles/h]	28			9			33			20		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	133
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	8	8	4	8	8	8	8	8	8	8	8
Maximum Green [s]	30	60	60	30	60	60	25	30	30	25	30	30
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.1	3.6	3.6	3.1	3.6	3.6
All red [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Split [s]	20	39	39	42	61	61	13	39	39	13	39	39
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	24	24	0	24	24	0	24	24	0	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	3.6	3.6	2.0	3.6	3.6	2.1	3.6	3.6	2.1	3.6	3.6
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	5.60	5.60	4.00	5.60	5.60	4.10	5.60	5.60	4.10	5.60	5.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.60	3.60	2.00	3.60	3.60	2.10	3.60	3.60	2.10	3.60	3.60
g_i, Effective Green Time [s]	16	56	56	21	61	61	8	29	29	8	29	29
g / C, Green / Cycle	0.12	0.42	0.42	0.16	0.46	0.46	0.06	0.22	0.22	0.06	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.10	0.17	0.14	0.14	0.33	0.15	0.05	0.19	0.12	0.04	0.18	0.15
s, saturation flow rate [veh/h]	3476	3589	1552	3514	3589	1570	3449	3592	1509	3514	3610	1534
c, Capacity [veh/h]	413	1495	646	565	1646	720	212	781	328	213	782	332
d1, Uniform Delay [s]	57.74	27.33	26.33	54.33	29.00	22.97	61.52	50.53	46.62	60.99	50.01	47.86
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.12
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.95	0.83	1.38	3.64	2.65	1.21	5.19	3.59	1.58	2.62	2.56	2.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

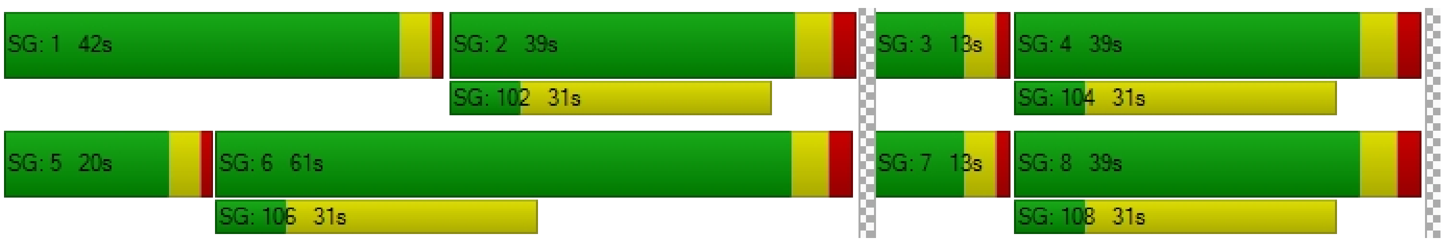
X, volume / capacity	0.87	0.41	0.33	0.85	0.71	0.33	0.75	0.89	0.57	0.59	0.84	0.67
d, Delay for Lane Group [s/veh]	63.68	28.16	27.71	57.97	31.65	24.17	66.71	54.12	48.20	63.62	52.57	50.47
Lane Group LOS	E	C	C	E	C	C	E	D	D	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	6.28	6.96	4.85	8.03	15.30	4.91	2.77	11.44	5.69	2.15	10.68	6.99
50th-Percentile Queue Length [ft]	157.05	174.07	121.28	200.83	382.53	122.72	69.26	285.89	142.24	53.64	266.96	174.66
95th-Percentile Queue Length [veh]	10.39	11.29	8.46	12.68	21.72	8.54	4.99	16.98	9.60	3.86	16.04	11.32
95th-Percentile Queue Length [ft]	259.81	282.26	211.58	317.03	542.91	213.56	124.66	424.54	240.04	96.54	400.94	283.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.68	28.16	27.71	57.97	31.65	24.17	66.71	54.12	48.20	63.62	52.57	50.47
Movement LOS	E	C	C	E	C	C	E	D	D	E	D	D
d_A, Approach Delay [s/veh]	38.88			37.40			54.96			53.49		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	44.47											
Intersection LOS	D											
Intersection V/C	0.712											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	812.3
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Base Volume Input [veh/h]	11	1951	0	0	751	31	105	0	110	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.40	2.00	2.00	2.50	2.00	4.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	1951	0	0	751	31	105	0	110	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	488	0	0	188	8	26	0	28	0	0	0
Total Analysis Volume [veh/h]	11	1951	0	0	751	31	105	0	110	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.02	0.00	0.00	0.01	0.00	2.07	0.00	0.18	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	9.32	0.00	0.00	0.00	0.00	0.00	700.26	812.30	635.09	0.00	0.00	0.00
Movement LOS	A	A			A	A	F	F	F			
95th-Percentile Queue Length [veh]	0.04	0.00	0.00	0.00	0.00	0.00	19.15	19.15	19.15	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	0.99	0.00	0.00	0.00	0.00	0.00	478.69	478.69	478.69	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.05			0.00			666.92			0.00		
Approach LOS	A			A			F			A		
d_I, Intersection Delay [s/veh]	48.49											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 71: Chilco Street/Terminal Avenue

Control Type:	All-way stop	Delay (sec / veh):	16.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street		Chilco Street		Terminal Avenue	
Approach	Eastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Chilco Street		Chilco Street		Terminal Avenue	
Base Volume Input [veh/h]	40	14	21	112	502	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	40	14	21	112	502	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	4	5	28	126	41
Total Analysis Volume [veh/h]	40	14	21	112	502	162
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.28	0.64	7.32
95th-Percentile Queue Length [ft]	6.89	15.95	183.10
Approach Delay [s/veh]	9.15	8.80	18.65
Approach LOS	A	A	C
Intersection Delay [s/veh]	16.51		
Intersection LOS	C		

Intersection Level Of Service Report
Intersection 74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	8.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.685

Intersection Setup

Name	University Avenue				O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue				O'Brien Drive	
Base Volume Input [veh/h]	11	1802	802	23	171	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	2.40	2.50	0.00	4.70	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	1802	802	23	171	77
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	451	201	6	43	19
Total Analysis Volume [veh/h]	11	1802	802	23	171	77
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	6		0		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	94.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Protected	Permissive
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	8	8	0	6	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	9	72	81	0	19	0
Vehicle Extension [s]	2.0	4.0	4.0	0.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	5	79	83	83	11	11
g / C, Green / Cycle	0.05	0.79	0.83	0.83	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.01	0.51	0.22	0.22	0.10	0.05
s, saturation flow rate [veh/h]	1659	3533	1854	1836	1728	1572
c, Capacity [veh/h]	89	2805	1547	1532	182	166
d1, Uniform Delay [s]	48.95	4.33	1.76	1.77	44.39	42.06
k, delay calibration	0.50	0.50	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.86	1.15	0.42	0.43	8.98	0.75
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.12	0.64	0.27	0.27	0.94	0.46
d, Delay for Lane Group [s/veh]	51.81	5.48	2.19	2.20	53.37	42.81
Lane Group LOS	D	A	A	A	D	D
Critical Lane Group	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.35	6.11	1.22	1.22	4.62	1.81
50th-Percentile Queue Length [ft]	8.63	152.71	30.45	30.58	115.51	45.29
95th-Percentile Queue Length [veh]	0.62	10.16	2.19	2.20	8.15	3.26
95th-Percentile Queue Length [ft]	15.54	254.04	54.80	55.05	203.64	81.53

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.81	5.48	2.19	2.20	53.37	42.81
Movement LOS	D	A	A	A	D	D
d_A, Approach Delay [s/veh]	5.76		2.19		50.09	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	8.55					
Intersection LOS	A					
Intersection V/C	0.685					

Sequence

Ring 1	5	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 77: University Avenue/Donohoe Street

Control Type:	Signalized	Delay (sec / veh):	177.0
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.188

Intersection Setup

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	150.00	100.00	70.00	200.00	100.00	100.00	200.00	100.00	200.00	200.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	430	533	750	105	1027	314	13	145	262	353	875	778
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	0.00	0.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	430	533	750	105	1027	314	13	145	262	353	875	778
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	108	133	188	26	257	79	3	36	66	88	219	195
Total Analysis Volume [veh/h]	430	533	750	105	1027	314	13	145	262	353	875	778
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			46			35			0		
Bicycle Volume [bicycles/h]	5			3			3			5		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	6	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	4	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	30	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	14	41	41	9	36	0	0	17	0	0	33	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	20	0	0	0	0	0	19	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No	No	No	No			No			No	
Maximum Recall	No	Yes	Yes	No	Yes			No			No	
Pedestrian Recall	No	No	No	No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	R	L	C	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	37	37	5	32	32	13	13	13	29	29	29	29
g / C, Green / Cycle	0.10	0.37	0.37	0.05	0.32	0.32	0.13	0.13	0.13	0.29	0.29	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.14	0.17	0.53	0.07	0.40	0.42	0.01	0.09	0.18	0.22	0.40	0.36	0.40
s, saturation flow rate [veh/h]	3101	3192	1404	1597	1710	1537	1597	1676	1429	1629	1676	1293	1277
c, Capacity [veh/h]	310	1181	519	80	547	492	208	218	186	472	486	375	370
d1, Uniform Delay [s]	45.00	23.82	31.50	47.50	34.00	34.00	38.16	41.43	43.50	32.18	35.50	35.50	35.50
k, delay calibration	0.17	0.50	0.50	0.45	0.50	0.50	0.11	0.17	0.50	0.26	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	180.83	1.25	210.56	201.74	132.88	158.02	0.13	5.33	213.63	5.68	189.8	128.3	186.2
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.39	0.45	1.44	1.32	1.26	1.32	0.06	0.67	1.41	0.75	1.39	1.24	1.38
d, Delay for Lane Group [s/veh]	225.83	25.07	242.06	249.24	166.88	192.02	38.28	46.76	257.13	37.86	225.3	163.8	221.7
Lane Group LOS	F	C	F	F	F	F	D	D	F	D	F	F	F
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	11.60	4.88	42.42	6.45	33.08	33.16	0.29	3.70	15.56	8.33	37.17	22.26	27.95
50th-Percentile Queue Length [ft]	289.93	122.01	1060.61	161.22	826.91	828.93	7.15	92.52	389.10	208.3	929.2	556.4	698.7
95th-Percentile Queue Length [veh]	19.16	8.50	65.26	11.37	48.80	49.88	0.52	6.66	25.04	13.07	56.28	33.79	43.28
95th-Percentile Queue Length [ft]	478.91	212.59	1631.48	284.30	1220.07	1247.02	12.88	166.54	625.97	326.6	1407.	844.7	1081.

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	225.83	25.07	242.06	249.24	175.09	192.02	38.28	46.76	257.13	37.86	211.51	205.95
Movement LOS	F	C	F	F	F	F	D	D	F	D	F	F
d_A, Approach Delay [s/veh]	170.47			184.15			177.73			177.20		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	176.97											
Intersection LOS	F											
Intersection V/C	1.188											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	24.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Valparaiso Ave						University Drive (North)					
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

volumes

Name	Valparaiso Ave						University Drive (North)					
Base Volume Input [veh/h]	24	472	106	54	564	36	256	34	80	45	41	72
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.00	0.00	1.80	0.00	0.50	8.30	1.80	0.00	7.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	472	106	54	564	36	256	34	80	45	41	72
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	118	27	14	141	9	64	9	20	11	10	18
Total Analysis Volume [veh/h]	24	472	106	54	564	36	256	34	80	45	41	72
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			11		
Bicycle Volume [bicycles/h]	11			7			1			8		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	25	30	0	25	30	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	14	0	0	0	0	0	0	0	0	13	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	0.00	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	24	31	25	25	25	25
g / C, Green / Cycle	0.48	0.38	0.48	0.39	0.38	0.38	0.38
(v / s)_i Volume / Saturation Flow Rate	0.03	0.32	0.05	0.33	0.35	0.03	0.07
s, saturation flow rate [veh/h]	940	1794	989	1843	1071	1299	1562
c, Capacity [veh/h]	374	676	389	726	504	134	597
d1, Uniform Delay [s]	11.72	18.42	12.05	17.52	20.81	31.91	13.24
k, delay calibration	0.23	0.30	0.11	0.30	0.26	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.15	8.32	0.16	6.61	4.93	1.47	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.85	0.14	0.83	0.73	0.34	0.19
d, Delay for Lane Group [s/veh]	11.87	26.74	12.21	24.13	25.74	33.38	13.39
Lane Group LOS	B	C	B	C	C	C	B
Critical Lane Group	No	Yes	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.17	8.41	0.36	8.21	5.63	0.74	1.04
50th-Percentile Queue Length [ft]	4.18	210.25	9.10	205.18	140.64	18.46	26.09
95th-Percentile Queue Length [veh]	0.30	13.17	0.66	12.91	9.52	1.33	1.88
95th-Percentile Queue Length [ft]	7.53	329.14	16.38	322.63	237.89	33.23	46.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.87	26.74	26.74	12.21	24.13	24.13	25.74	25.74	25.74	33.38	13.39	13.39
Movement LOS	B	C	C	B	C	C	C	C	C	C	B	B
d_A, Approach Delay [s/veh]	26.15			23.14			25.74			19.08		
Approach LOS	C			C			C			B		
d_I, Intersection Delay [s/veh]	24.34											
Intersection LOS	C											
Intersection V/C	0.731											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.674

Intersection Setup

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	209	3	108	19	3	66	21	909	107	69	1750	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.50	33.30	3.70	5.30	0.00	0.00	11.10	1.50	3.20	7.20	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	3	108	19	3	66	21	909	107	69	1750	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	1	27	5	1	17	5	227	27	17	438	4
Total Analysis Volume [veh/h]	209	3	108	19	3	66	21	909	107	69	1750	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			3		
Bicycle Volume [bicycles/h]	1			0			17			19		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	60.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	13	0	0	13	0	12	52	0	12	52	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	3.0	0.0	3.0	6.0	0.0	2.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	10	10	10	7	7	4	58	58	7	61	61
g / C, Green / Cycle	0.12	0.12	0.12	0.08	0.08	0.04	0.64	0.64	0.07	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.07	0.07	0.07	0.01	0.04	0.01	0.26	0.07	0.04	0.47	0.47
s, saturation flow rate [veh/h]	1801	1360	1524	1718	1626	1629	3564	1518	1688	1874	1867
c, Capacity [veh/h]	209	158	177	142	135	68	2272	968	126	1257	1252
d1, Uniform Delay [s]	37.80	37.80	37.95	38.41	39.67	42.00	7.96	6.38	40.29	9.27	9.29
k, delay calibration	0.10	0.10	0.12	0.11	0.11	0.11	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.39	3.15	3.61	0.42	3.00	2.53	0.53	0.23	1.37	3.31	3.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

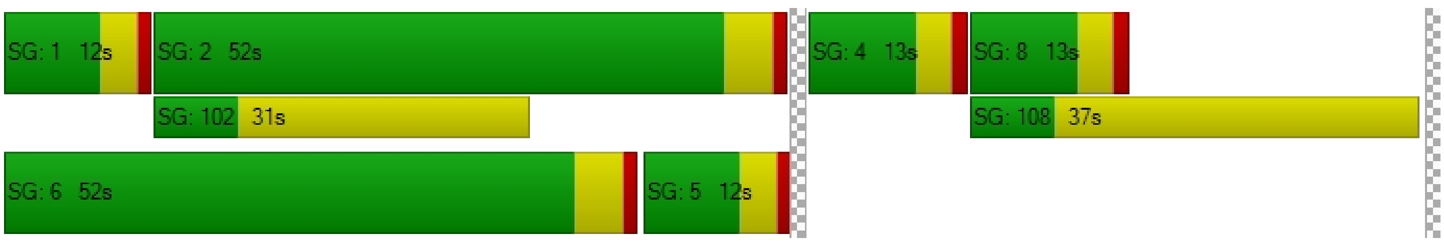
X, volume / capacity	0.58	0.58	0.61	0.13	0.51	0.31	0.40	0.11	0.55	0.70	0.71
d, Delay for Lane Group [s/veh]	40.19	40.95	41.56	38.83	42.67	44.53	8.49	6.61	41.66	12.58	12.65
Lane Group LOS	D	D	D	D	D	D	A	A	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	2.66	2.04	2.44	0.41	1.58	0.49	3.65	0.72	1.48	9.32	9.35
50th-Percentile Queue Length [ft]	66.50	51.04	61.01	10.18	39.42	12.19	91.27	17.99	36.90	233.04	233.78
95th-Percentile Queue Length [veh]	4.79	3.67	4.39	0.73	2.84	0.88	6.57	1.30	2.66	14.33	14.37
95th-Percentile Queue Length [ft]	119.69	91.87	109.83	18.32	70.96	21.94	164.28	32.38	66.42	358.22	359.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.51	40.95	41.56	38.83	42.67	42.67	44.53	8.49	6.61	41.66	12.61	12.65
Movement LOS	D	D	D	D	D	D	D	A	A	D	B	B
d_A, Approach Delay [s/veh]	40.87			41.84			9.03			13.71		
Approach LOS	D			D			A			B		
d_I, Intersection Delay [s/veh]	15.63											
Intersection LOS	B											
Intersection V/C	0.674											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	47.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.726

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	401	685	423	398	535	100
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.30	1.10	0.00	0.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	401	685	423	398	535	100
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	100	171	106	100	134	25
Total Analysis Volume [veh/h]	401	685	423	398	535	100
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	29		41		20	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal group	0	4	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	10	7	0	8	0
Maximum Green [s]	0	40	30	0	50	0
Amber [s]	0.0	3.6	3.1	0.0	3.9	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	80	20	0	36	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.6	2.1	0.0	2.9	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60	4.10	4.10	4.90	4.90
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60	2.10	2.10	2.90	2.90
g_i, Effective Green Time [s]	35	35	35	62	62	26	26
g / C, Green / Cycle	0.25	0.25	0.25	0.46	0.46	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.22	0.22	0.22	0.26	0.29	0.16	0.07
s, saturation flow rate [veh/h]	1629	1701	1556	1624	1392	3256	1391
c, Capacity [veh/h]	414	432	395	741	635	618	264
d1, Uniform Delay [s]	48.65	48.65	48.64	27.18	28.15	53.41	48.09
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.98	5.72	6.20	3.18	4.63	3.82	0.90
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.88	0.87	0.57	0.63	0.87	0.38
d, Delay for Lane Group [s/veh]	54.63	54.36	54.85	30.36	32.78	57.23	48.98
Lane Group LOS	D	D	D	C	C	E	D
Critical Lane Group	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	12.46	12.98	11.92	10.75	10.65	9.21	3.05
50th-Percentile Queue Length [ft]	311.58	324.49	298.10	268.66	266.28	230.19	76.36
95th-Percentile Queue Length [veh]	18.25	18.89	17.59	16.12	16.00	14.18	5.50
95th-Percentile Queue Length [ft]	456.32	472.20	439.68	403.07	400.09	354.59	137.45

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	54.60	54.61	30.36	32.78	57.23	48.98
Movement LOS	D	D	C	C	E	D
d_A, Approach Delay [s/veh]	54.61		31.54		55.93	
Approach LOS	D		C		E	
d_I, Intersection Delay [s/veh]	47.49					
Intersection LOS	D					
Intersection V/C	0.726					

Sequence

Ring 1	-	6	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 110: Marsh Road/101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	13.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.896

Intersection Setup

Name	Marsh Road		Marsh Road		101 NB Ramps	
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Marsh Road		Marsh Road		101 NB Ramps	
Base Volume Input [veh/h]	2269	0	0	904	544	258
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	0.00	0.00	3.00	5.10	12.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2269	0	0	904	544	258
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	567	0	0	226	136	65
Total Analysis Volume [veh/h]	2269	0	0	904	544	258
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	1		2		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	76.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	55	0	0	55	25	17
Vehicle Extension [s]	3.0	0.0	0.0	3.0	2.0	2.0
Walk [s]	7	0	0	0	5	0
Pedestrian Clearance [s]	12	0	0	0	15	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	Yes			Yes	No	No
Maximum Recall	No			No	No	No
Pedestrian Recall	No			No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	58	58	18	78
g / C, Green / Cycle	0.73	0.73	0.22	0.97
(v / s)_i Volume / Saturation Flow Rate	0.65	0.26	0.16	0.18
s, saturation flow rate [veh/h]	3465	3512	3344	1441
c, Capacity [veh/h]	2530	2565	735	1365
d1, Uniform Delay [s]	8.42	3.91	29.04	0.13
k, delay calibration	0.50	0.50	0.04	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.52	0.38	0.56	0.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.35	0.74	0.19
d, Delay for Lane Group [s/veh]	13.94	4.30	29.59	0.44
Lane Group LOS	B	A	C	A
Critical Lane Group	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	12.18	2.03	4.74	0.12
50th-Percentile Queue Length [ft]	304.55	50.82	118.61	2.91
95th-Percentile Queue Length [veh]	17.91	3.66	8.32	0.21
95th-Percentile Queue Length [ft]	447.66	91.47	207.91	5.24

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.94	0.00	0.00	4.30	29.59	0.44
Movement LOS	B			A	C	A
d_A, Approach Delay [s/veh]	13.94		4.30		20.22	
Approach LOS	B		A		C	
d_I, Intersection Delay [s/veh]	13.01					
Intersection LOS	B					
Intersection V/C	0.896					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 111: University Avenue/Woodland Avenue

Control Type:	Signalized	Delay (sec / veh):	58.1
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.820

Intersection Setup

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	1	0	0	0
Pocket Length [ft]	170.00	100.00	100.00	220.00	100.00	100.00	100.00	100.00	40.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Base Volume Input [veh/h]	28	834	18	313	905	475	13	73	318	439	92	49
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	834	18	313	905	475	13	73	318	439	92	49
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	209	5	78	226	119	3	18	80	110	23	12
Total Analysis Volume [veh/h]	28	834	18	313	905	475	13	73	318	439	92	49
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	58			0			6			37		
Bicycle Volume [bicycles/h]	10			7			4			6		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	7	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	8	26	0	20	38	0	0	23	0	0	31	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	15	0	0	0	0	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	2	32	32	16	46	46	19	19	17	17
g / C, Green / Cycle	0.02	0.32	0.32	0.16	0.46	0.46	0.19	0.19	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.26	0.26	0.20	0.28	0.36	0.05	0.23	0.14	0.09
s, saturation flow rate [veh/h]	1597	1676	1661	1597	3192	1332	1664	1401	3101	1502
c, Capacity [veh/h]	35	535	530	255	1459	609	316	266	530	257
d1, Uniform Delay [s]	48.69	31.13	31.16	42.00	20.57	22.91	34.59	40.50	40.02	37.92
k, delay calibration	0.04	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.28	11.88	12.08	131.01	1.99	9.57	0.46	118.23	3.37	1.82
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

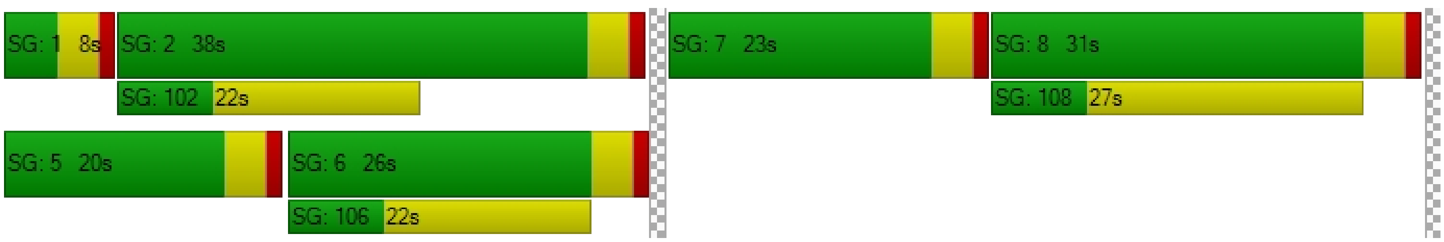
X, volume / capacity	0.80	0.80	0.80	1.23	0.62	0.78	0.27	1.19	0.83	0.55
d, Delay for Lane Group [s/veh]	62.97	43.01	43.24	173.01	22.57	32.48	35.05	158.73	43.40	39.74
Lane Group LOS	E	D	D	F	C	C	D	F	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.83	10.96	10.91	15.52	8.10	10.61	1.82	15.19	5.40	3.27
50th-Percentile Queue Length [ft]	20.78	274.05	272.87	387.89	202.50	265.34	45.48	379.78	135.03	81.64
95th-Percentile Queue Length [veh]	1.50	16.39	16.33	24.05	12.77	15.96	3.27	23.49	9.21	5.88
95th-Percentile Queue Length [ft]	37.40	409.79	408.32	601.30	319.18	398.91	81.86	587.37	230.31	146.96

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.97	43.12	43.24	173.01	22.57	32.48	35.05	35.05	158.73	43.40	39.74	39.74
Movement LOS	E	D	D	F	C	C	D	D	F	D	D	D
d_A, Approach Delay [s/veh]	43.76			53.16			132.40			42.51		
Approach LOS	D			D			F			D		
d_I, Intersection Delay [s/veh]	58.10											
Intersection LOS	E											
Intersection V/C	0.820											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 131: Chilco Street/Hamilton Avenue

Control Type:	All-way stop	Delay (sec / veh):	41.6
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	╋			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	19	63	18	101	582	51	22	131	22	9	21	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	19	63	18	101	582	51	22	131	22	9	21	61
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	16	5	25	146	13	6	33	6	2	5	15
Total Analysis Volume [veh/h]	19	63	18	101	582	51	22	131	22	9	21	61
Pedestrian Volume [ped/h]	3			4			2			5		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.56	16.94	1.25	0.54
95th-Percentile Queue Length [ft]	14.04	423.47	31.34	13.42
Approach Delay [s/veh]	9.79	57.01	11.78	10.14
Approach LOS	A	F	B	B
Intersection Delay [s/veh]	41.65			
Intersection LOS	E			

Intersection Level Of Service Report
Intersection 132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	8.9
Analysis Method:	HCM 2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	912	1615	102	61	185
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.10	0.80	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	912	1615	102	61	185
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	228	404	26	15	46
Total Analysis Volume [veh/h]	0	912	1615	102	61	185
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23		0		2	
Bicycle Volume [bicycles/h]	16		34		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	89
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal group	0	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	4	0
Maximum Green [s]	0	64	64	0	32	0
Amber [s]	0.0	3.6	3.6	0.0	3.1	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	69	69	0	20	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.6	0.6	0.0	2.1	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.60	2.60	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.60	0.60	2.10	2.10
g_i, Effective Green Time [s]	66	66	16	16
g / C, Green / Cycle	0.75	0.75	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.25	0.48	0.03	0.11
Total Saturation Flow Adjustment	0.94	0.94	0.95	0.85
s, saturation flow rate [veh/h]	3578	3557	1805	1615
c, Capacity [veh/h]	2670	2654	322	289
d1, Uniform Delay [s]	3.85	5.55	31.07	33.90
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.35	1.23	1.30	10.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.34	0.65	0.19	0.64
d, Delay for Lane Group [s/veh]	4.20	6.78	32.37	44.37
Lane Group LOS	A	A	C	D
Critical Lane Group	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	4.78	13.46	1.40	5.04
50th-Percentile Queue Length [ft]	119.40	336.55	35.03	126.04
95th-Percentile Queue Length [veh]	9.48	22.45	3.30	9.91
95th-Percentile Queue Length [ft]	236.97	561.27	82.52	247.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	4.20	6.78	6.78	32.37	44.37
Movement LOS		A	A	A	C	D
d_A, Approach Delay [s/veh]	4.20		6.78		41.40	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	8.92					
Intersection LOS	A					
Intersection V/C	0.618					

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	42.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	51.460

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	109	0	114	90	0	103	73	1068	7	28	1307	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.60	0.00	2.70	2.20	0.00	1.90	3.10	0.50	0.00	14.30	0.50	5.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	109	0	114	90	0	103	73	1068	7	28	1307	20
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	0	29	23	0	26	18	267	2	7	327	5
Total Analysis Volume [veh/h]	109	0	114	90	0	103	73	1068	7	28	1307	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			16			3			0		
Bicycle Volume [bicycles/h]	12			0			22			22		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	20.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	12	0	0	12	0	4	10	0	6	10	0
Maximum Green [s]	0	25	0	0	25	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	42	0	0	42	0	8	32	0	16	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	40	40	40	40	6	39	39	5	38	38
g / C, Green / Cycle	0.44	0.44	0.44	0.44	0.07	0.43	0.43	0.06	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	51.07	0.07	43.05	0.07	0.04	0.28	0.28	0.02	0.35	0.35
s, saturation flow rate [veh/h]	2	1544	2	1582	1755	1891	1885	1583	1891	1876
c, Capacity [veh/h]	81	684	81	701	117	821	819	88	801	795
d1, Uniform Delay [s]	45.00	15.06	45.00	14.92	40.90	20.13	20.13	40.84	23.07	23.11
k, delay calibration	0.50	0.11	0.50	0.11	0.45	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	217.83	0.11	133.71	0.10	20.46	4.06	4.08	2.03	9.77	9.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.35	0.17	1.11	0.15	0.62	0.66	0.66	0.32	0.83	0.83
d, Delay for Lane Group [s/veh]	262.83	15.18	178.71	15.02	61.37	24.19	24.21	42.87	32.84	33.09
Lane Group LOS	F	B	F	B	E	C	C	D	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	6.71	1.41	4.81	1.26	2.19	9.06	9.05	0.64	14.02	14.01
50th-Percentile Queue Length [ft]	167.66	35.15	120.34	31.44	54.71	226.60	226.26	16.01	350.39	350.28
95th-Percentile Queue Length [veh]	12.07	2.53	8.66	2.26	3.94	14.00	13.98	1.15	20.16	20.15
95th-Percentile Queue Length [ft]	301.78	63.27	216.62	56.60	98.47	350.04	349.60	28.82	503.88	503.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	262.83	262.83	15.18	178.71	178.71	15.02	61.37	24.20	24.21	42.87	32.96	33.09
Movement LOS	F	F	B	F	F	B	E	C	C	D	C	C
d_A, Approach Delay [s/veh]	136.23			91.35			26.56			33.17		
Approach LOS	F			F			C			C		
d_I, Intersection Delay [s/veh]	42.29											
Intersection LOS	D											
Intersection V/C	51.460											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	5.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.467

Intersection Setup

Name	Branner Drive						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Branner Drive						Sand Hill Road					
Base Volume Input [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	5.00	0.00	2.30	4.50	1.10	0.00	5.90	2.00	4.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	4	5	0	11	6	269	2	4	330	6
Total Analysis Volume [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			0			5		
Bicycle Volume [bicycles/h]	2			0			35			15		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	58.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	15	0	0	15	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	39	0	0	39	0	8	43	0	8	43	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	2.9	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	9	9	4	71	71	3	71	71
g / C, Green / Cycle	0.10	0.10	0.04	0.79	0.79	0.04	0.79	0.79
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.01	0.29	0.29	0.01	0.36	0.36
s, saturation flow rate [veh/h]	1578	1595	1732	1879	1874	1709	1863	1849
c, Capacity [veh/h]	204	215	74	1490	1485	67	1470	1459
d1, Uniform Delay [s]	36.78	37.74	41.79	2.72	2.72	41.97	3.13	3.14
k, delay calibration	0.10	0.10	0.04	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	0.72	0.83	0.69	0.69	0.73	1.03	1.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

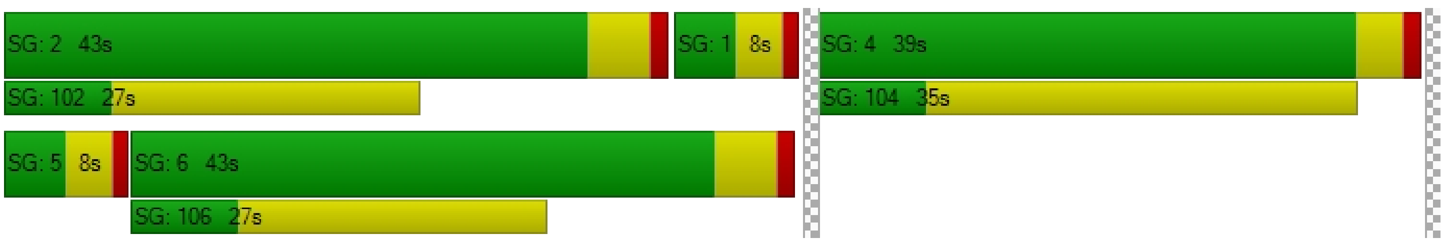
X, volume / capacity	0.09	0.29	0.30	0.36	0.36	0.25	0.46	0.46
d, Delay for Lane Group [s/veh]	36.97	38.46	42.62	3.41	3.41	42.70	4.17	4.18
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.39	1.34	0.48	1.67	1.67	0.37	2.43	2.43
50th-Percentile Queue Length [ft]	9.79	33.49	11.91	41.75	41.69	9.23	60.81	60.65
95th-Percentile Queue Length [veh]	0.70	2.41	0.86	3.01	3.00	0.66	4.38	4.37
95th-Percentile Queue Length [ft]	17.62	60.27	21.44	75.15	75.05	16.61	109.46	109.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.97	36.97	36.97	38.46	38.46	38.46	42.62	3.41	3.41	42.70	4.17	4.18
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	36.97			38.46			4.19			4.65		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.53											
Intersection LOS	A											
Intersection V/C	0.467											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	49.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.418

Intersection Setup

Name				Sand Hill Road						Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name				Sand Hill Road						Sharon Park Drive		
Base Volume Input [veh/h]	164	916	1	18	1348	278	47	24	67	307	5	296
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.60	1.30	100.00	0.00	1.10	0.80	0.00	0.00	17.60	0.00	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	916	1	18	1348	278	47	24	67	307	5	296
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	229	0	5	337	70	12	6	17	77	1	74
Total Analysis Volume [veh/h]	164	916	1	18	1348	278	47	24	67	307	5	296
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			6			10		
Bicycle Volume [bicycles/h]	32			32			2			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	69.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	6	10	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	10	43	0	10	43	0	0	37	0	0	37	0
Vehicle Extension [s]	3.0	7.0	0.0	3.0	7.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.50	2.50	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.50	0.50	0.00	0.00	0.00
g_i, Effective Green Time [s]	8	45	45	4	41	41	35	35	35
g / C, Green / Cycle	0.09	0.50	0.50	0.05	0.45	0.45	0.39	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.09	0.24	0.24	0.01	0.44	0.46	0.71	0.48	0.19
s, saturation flow rate [veh/h]	1799	1876	1875	1810	1879	1731	195	656	1581
c, Capacity [veh/h]	160	938	937	84	849	782	129	333	612
d1, Uniform Delay [s]	40.98	14.88	14.88	41.32	24.11	24.66	26.00	30.85	20.80
k, delay calibration	0.50	0.50	0.50	0.11	0.50	0.50	0.50	0.50	0.12
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	78.09	1.82	1.82	1.27	24.90	38.19	98.58	35.45	0.64
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

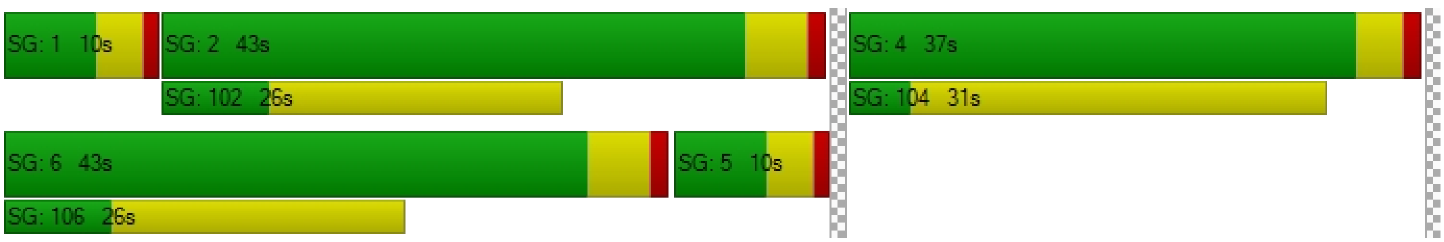
X, volume / capacity	1.03	0.49	0.49	0.21	0.97	1.02	1.07	0.94	0.48
d, Delay for Lane Group [s/veh]	119.07	16.71	16.71	42.59	49.00	62.84	124.58	66.30	21.43
Lane Group LOS	F	B	B	D	D	F	F	E	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	6.88	6.05	6.05	0.41	21.51	23.44	5.30	10.25	4.71
50th-Percentile Queue Length [ft]	171.98	151.23	151.19	10.16	537.72	585.91	132.56	256.27	117.78
95th-Percentile Queue Length [veh]	11.29	10.08	10.08	0.73	29.11	31.93	9.41	15.50	8.27
95th-Percentile Queue Length [ft]	282.13	252.07	252.01	18.28	727.87	798.18	235.32	387.54	206.78

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	119.07	16.71	16.71	42.59	54.36	62.84	124.58	124.58	124.58	66.30	66.30	21.43
Movement LOS	F	B	B	D	D	E	F	F	F	E	E	C
d_A, Approach Delay [s/veh]	32.24			55.67			124.58			44.46		
Approach LOS	C			E			F			D		
d_I, Intersection Delay [s/veh]	49.15											
Intersection LOS	D											
Intersection V/C	1.418											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	29.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.848

Intersection Setup

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Base Volume Input [veh/h]	125	31	2131	16	25	3	8	477	136	2356	63	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	19.20	0.00	2.90	0.00	0.00	0.00	0.00	0.40	2.20	2.90	14.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	31	2131	16	25	3	8	477	136	2356	63	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	8	533	4	6	1	2	119	34	589	16	3
Total Analysis Volume [veh/h]	125	31	2131	16	25	3	8	477	136	2356	63	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			2			0			0		
Bicycle Volume [bicycles/h]	0			2			0			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	200
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	55.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	3	3	6	4	6	4	1	4	8	2	8
Auxiliary Signal Groups			2,3									
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	6	6	0	4	0	4	12	4	0	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	4.7	3.6	3.6	0.0	3.6	0.0	3.6	3.6	3.6	0.0	4.7	0.0
All red [s]	1.0	1.0	1.0	0.0	0.5	0.0	0.5	0.0	0.5	0.0	1.0	0.0
Split [s]	108	14	14	0	32	0	32	46	32	0	108	0
Vehicle Extension [s]	4.5	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	4.5	0.0
Walk [s]	5	0	0	0	5	0	5	5	5	0	5	0
Pedestrian Clearance [s]	16	0	0	0	22	0	22	26	22	0	16	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No		No			No			Yes	
Maximum Recall		No	No		No			No			No	
Pedestrian Recall		No	No		No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	22	162	8	8	34	34	34	128	128
g / C, Green / Cycle	0.11	0.81	0.04	0.04	0.17	0.17	0.17	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.09	0.51	0.02	0.01	0.12	0.15	0.09	0.46	0.05
s, saturation flow rate [veh/h]	1827	4167	1269	1681	1889	1722	1580	5123	1606
c, Capacity [veh/h]	205	3304	80	63	319	291	267	3287	1031
d1, Uniform Delay [s]	86.21	8.79	94.77	93.93	78.43	81.41	75.61	23.77	13.47
k, delay calibration	0.38	0.50	0.04	0.04	0.10	0.24	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.26	0.98	0.63	1.34	2.54	18.18	0.56	1.37	0.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

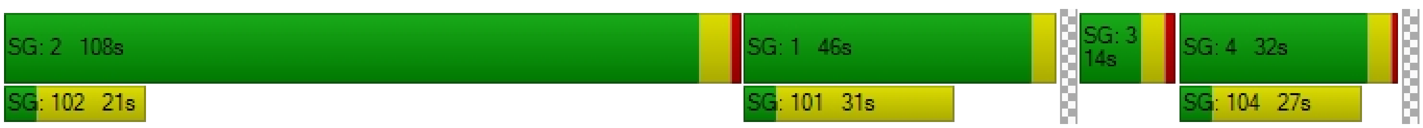
X, volume / capacity	0.76	0.65	0.26	0.37	0.70	0.90	0.51	0.72	0.07
d, Delay for Lane Group [s/veh]	104.47	9.77	95.40	95.28	80.97	99.60	76.17	25.14	13.61
Lane Group LOS	F	A	F	F	F	F	E	C	B
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	8.96	12.84	1.08	1.22	11.26	14.75	6.48	25.14	1.40
50th-Percentile Queue Length [ft]	224.09	321.12	26.93	30.61	281.60	368.71	162.11	628.51	34.90
95th-Percentile Queue Length [veh]	13.87	18.72	1.94	2.20	16.77	21.05	10.66	33.36	2.51
95th-Percentile Queue Length [ft]	346.84	468.06	48.47	55.10	419.20	526.16	266.52	834.09	62.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	104.47	104.47	9.77	95.40	95.30	95.28	80.97	91.14	76.17	25.14	13.61	13.61
Movement LOS	F	F	A	F	F	F	F	F	E	C	B	B
d_A, Approach Delay [s/veh]	16.23			95.33			87.73			24.78		
Approach LOS	B			F			F			C		
d_I, Intersection Delay [s/veh]	28.99											
Intersection LOS	C											
Intersection V/C	0.848											

Sequence

Ring 1	-	2	1	3	4	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	7.7
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name	Santa Cruz Avenue				Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Santa Cruz Avenue				Elder Ave	
Base Volume Input [veh/h]	75	820	687	85	49	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	75	820	687	85	49	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	19	205	172	21	12	11
Total Analysis Volume [veh/h]	75	820	687	85	49	44
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		2		12	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	4	10	10	0	4	0
Maximum Green [s]	20	60	40	0	20	0
Amber [s]	3.1	3.5	3.5	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	4.0	4.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	13	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.5	2.5	0.0	2.1	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.50	4.50	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.50	2.50	2.10	2.10
g_i, Effective Green Time [s]	2	26	19	2	2
g / C, Green / Cycle	0.06	0.70	0.53	0.07	0.07
(v / s)_i Volume / Saturation Flow Rate	0.04	0.44	0.42	0.03	0.03
s, saturation flow rate [veh/h]	1810	1872	1857	1810	1615
c, Capacity [veh/h]	106	1310	984	122	109
d1, Uniform Delay [s]	17.05	2.96	6.98	16.50	16.50
k, delay calibration	0.11	0.15	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.25	0.71	2.01	2.14	2.42
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

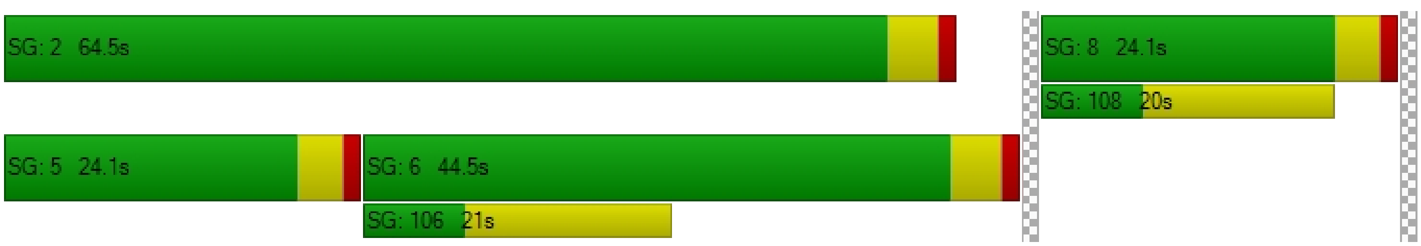
X, volume / capacity	0.71	0.63	0.78	0.40	0.41
d, Delay for Lane Group [s/veh]	25.30	3.67	8.99	18.64	18.92
Lane Group LOS	C	A	A	B	B
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.79	0.86	3.10	0.41	0.37
50th-Percentile Queue Length [ft]	19.72	21.61	77.42	10.19	9.35
95th-Percentile Queue Length [veh]	1.42	1.56	5.57	0.73	0.67
95th-Percentile Queue Length [ft]	35.50	38.89	139.35	18.34	16.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.30	3.67	8.99	8.99	18.64	18.92
Movement LOS	C	A	A	A	B	B
d_A, Approach Delay [s/veh]	5.48		8.99		18.77	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.72					
Intersection LOS	A					
Intersection V/C	0.619					

Sequence

Ring 1	-	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	43.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.993

Intersection Setup

Name	Chilco Street		Bayfront Expressway (SR 84)		Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	300.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chilco Street		Bayfront Expressway (SR 84)		Bayfront Expy	
Base Volume Input [veh/h]	386	518	137	1335	2416	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.50	3.10	21.10	4.80	3.10	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	386	518	137	1335	2416	156
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	130	34	334	604	39
Total Analysis Volume [veh/h]	386	518	137	1335	2416	156
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2		11		0	
Bicycle Volume [bicycles/h]	5		1		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	4	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	Lead	-	-	-
Minimum Green [s]	10	0	4	10	10	0
Maximum Green [s]	36	0	20	50	50	0
Amber [s]	3.0	0.0	3.0	5.0	5.0	0.0
All red [s]	0.5	0.0	0.0	0.5	0.5	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	2.0	0.0	2.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	38	0	0	38	38	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	1.0	3.5	3.5	0.0
Minimum Recall	No		No	Yes	Yes	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	3.00	5.50	5.50	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	1.00	3.50	3.50	3.50
g_i, Effective Green Time [s]	38	38	12	65	50	50
g / C, Green / Cycle	0.35	0.35	0.11	0.59	0.46	0.46
(v / s)_i Volume / Saturation Flow Rate	0.12	0.34	0.09	0.27	0.48	0.10
s, saturation flow rate [veh/h]	3331	1528	1494	4939	5020	1558
c, Capacity [veh/h]	1152	529	161	2916	2285	709
d1, Uniform Delay [s]	26.58	35.55	48.12	12.63	29.93	18.12
k, delay calibration	0.04	0.50	0.04	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	34.52	4.72	0.11	28.67	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

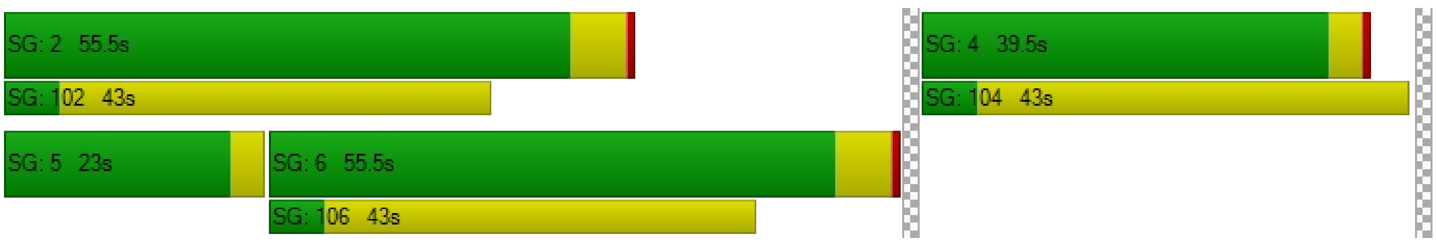
X, volume / capacity	0.34	0.98	0.85	0.46	1.06	0.22
d, Delay for Lane Group [s/veh]	26.64	70.08	52.84	12.74	58.60	18.28
Lane Group LOS	C	E	D	B	F	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	3.74	18.44	3.88	5.89	25.26	2.41
50th-Percentile Queue Length [ft]	93.39	461.07	97.06	147.37	631.54	60.28
95th-Percentile Queue Length [veh]	6.72	25.49	6.99	9.88	34.93	4.34
95th-Percentile Queue Length [ft]	168.11	637.15	174.71	246.91	873.34	108.51

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.64	70.08	52.84	12.74	58.60	18.28
Movement LOS	C	E	D	B	F	B
d_A, Approach Delay [s/veh]	51.53		16.48		56.16	
Approach LOS	D		B		E	
d_I, Intersection Delay [s/veh]	43.51					
Intersection LOS	D					
Intersection V/C	0.993					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	18.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.860

Intersection Setup

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	1	1	0
Pocket Length [ft]	100.00	300.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	839	114	2516	167	26	1716
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.80	0.00	2.80	0.90	0.00	4.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	839	114	2516	167	26	1716
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	210	29	629	42	7	429
Total Analysis Volume [veh/h]	839	114	2516	167	26	1716
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		26	
Bicycle Volume [bicycles/h]	0		2		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	0	10	0	7	10
Maximum Green [s]	41	0	40	0	21	40
Amber [s]	3.0	0.0	5.0	0.0	3.0	5.0
All red [s]	0.5	0.0	0.5	0.0	0.0	0.5
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	2.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	35	0	35	0	0	35
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	3.5	0.0	1.0	3.5
Minimum Recall	No		Yes		No	Yes
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	5.50	5.50	3.00	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	3.50	3.50	1.00	3.50
g_i, Effective Green Time [s]	24	24	39	39	3	45
g / C, Green / Cycle	0.31	0.31	0.51	0.51	0.04	0.59
(v / s)_i Volume / Saturation Flow Rate	0.24	0.07	0.50	0.11	0.01	0.35
s, saturation flow rate [veh/h]	3452	1575	5035	1566	1810	4934
c, Capacity [veh/h]	1086	496	2588	805	71	2925
d1, Uniform Delay [s]	23.48	19.16	17.86	10.00	35.44	9.62
k, delay calibration	0.11	0.11	0.11	0.11	0.04	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.20	0.23	3.98	0.13	1.18	0.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

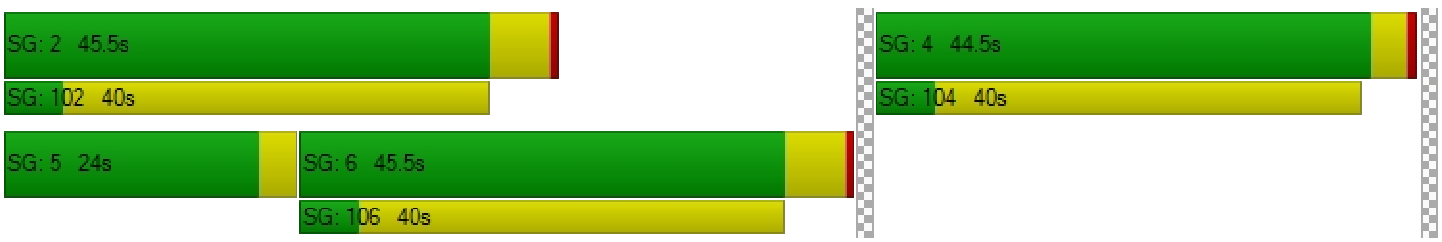
X, volume / capacity	0.77	0.23	0.97	0.21	0.37	0.59
d, Delay for Lane Group [s/veh]	24.68	19.39	21.84	10.13	36.62	9.81
Lane Group LOS	C	B	C	B	D	A
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	6.68	1.47	12.08	1.27	0.46	4.42
50th-Percentile Queue Length [ft]	166.95	36.82	301.96	31.72	11.53	110.50
95th-Percentile Queue Length [veh]	10.92	2.65	17.78	2.28	0.83	7.87
95th-Percentile Queue Length [ft]	272.90	66.28	444.45	57.09	20.75	196.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.68	19.39	21.84	10.13	36.62	9.81
Movement LOS	C	B	C	B	D	A
d_A, Approach Delay [s/veh]	24.05		21.11		10.21	
Approach LOS	C		C		B	
d_I, Intersection Delay [s/veh]	18.10					
Intersection LOS	B					
Intersection V/C	0.860					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 204: Chilco Street/Newbridge Street

Control Type:	All-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	1	1	42	4	4	1	35	1	3	33	16
Total Analysis Volume [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.04	1.09	0.70	1.04
95th-Percentile Queue Length [ft]	1.12	27.33	17.62	26.06
Approach Delay [s/veh]	7.87	9.72	8.84	9.06
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	9.21			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 206: Chilco Street/Ivy Drive

Control Type:	All-way stop	Delay (sec / veh):	13.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Ivy Drive			Ivy Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	┼			┼			┼			┼		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Ivy Drive			Ivy Drive		
Base Volume Input [veh/h]	27	62	11	233	265	17	4	16	12	11	20	58
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	62	11	233	265	17	4	16	12	11	20	58
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	16	3	58	66	4	1	4	3	3	5	15
Total Analysis Volume [veh/h]	27	62	11	233	265	17	4	16	12	11	20	58
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.46	4.67	0.15	0.43
95th-Percentile Queue Length [ft]	11.53	116.66	3.71	10.64
Approach Delay [s/veh]	8.57	14.91	8.58	8.77
Approach LOS	A	B	A	A
Intersection Delay [s/veh]	13.03			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	206.8
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	Terminal Avenue			Chilco Street			Constitution Drive					
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Terminal Avenue			Chilco Street			Constitution Drive					
Base Volume Input [veh/h]	14	140	27	131	160	2	86	21	349	270	18	678
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	21.40	1.50	20.00	11.80	3.80	0.00	3.60	50.00	2.60	2.50	50.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	140	27	131	160	2	86	21	349	270	18	678
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	35	7	33	40	1	22	5	87	68	5	170
Total Analysis Volume [veh/h]	14	140	27	131	160	2	86	21	349	270	18	678
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.96	4.33	0.71	5.83	59.77
95th-Percentile Queue Length [ft]	48.94	108.34	17.82	145.66	1494.25
Approach Delay [s/veh]	16.64	23.44	23.26		384.74
Approach LOS	C	C	C		F
Intersection Delay [s/veh]	206.82				
Intersection LOS	F				

Intersection Level Of Service Report
Intersection 209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	23.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.053

Intersection Setup

Name							Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name							Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	11	0	4	2	481	3	31	373	16	13	0	56
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.70	0.00	0.00	16.70	0.00	7.70	0.00	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	4	2	481	3	31	373	16	13	0	56
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	1	120	1	8	93	4	3	0	14
Total Analysis Volume [veh/h]	11	0	4	2	481	3	31	373	16	13	0	56
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.00	0.06	0.00	0.10
d_M, Delay for Movement [s/veh]	23.07	19.80	11.24	8.05	0.00	0.00	8.40	0.00	0.00	21.92	20.50	12.72
Movement LOS	C	C	B	A	A	A	A	A	A	C	C	B
95th-Percentile Queue Length [veh]	0.19	0.19	0.19	2.05	2.05	2.05	1.84	1.84	1.84	0.54	0.54	0.54
95th-Percentile Queue Length [ft]	4.63	4.63	4.63	51.27	51.27	51.27	46.05	46.05	46.05	13.45	13.45	13.45
d_A, Approach Delay [s/veh]	19.91			0.03			0.62			14.46		
Approach LOS	C			A			A			B		
d_I, Intersection Delay [s/veh]	1.59											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	13.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Chrysler Drive									Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive									Independence Drive		
Base Volume Input [veh/h]	0	139	0	1	28	30	0	0	15	293	3	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	5.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	139	0	1	28	30	0	0	15	293	3	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	35	0	0	7	8	0	0	4	73	1	2
Total Analysis Volume [veh/h]	0	139	0	1	28	30	0	0	15	293	3	6
Pedestrian Volume [ped/h]	0			0			5			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.39	0.00	0.01
d_M, Delay for Movement [s/veh]	7.31	0.00	0.00	8.60	0.00	0.00	9.81	10.27	9.05	13.01	13.29	11.67
Movement LOS	A	A	A	A	A	A	A	B	A	B	B	B
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.19	0.19	0.19	0.05	0.05	0.05	1.95	1.95	1.95
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	4.68	4.68	4.68	1.26	1.26	1.26	48.78	48.78	48.78
d_A, Approach Delay [s/veh]	0.00			0.15			9.05			12.98		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	7.89											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	14.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Chrysler Drive				Jefferson Drive	
Approach	Southbound		Northeastbound		Northwestbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chrysler Drive				Jefferson Drive	
Base Volume Input [veh/h]	35	60	428	7	2	172
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	22.20	42.90	0.80	71.40	0.00	2.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	60	428	7	2	172
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	15	107	2	1	43
Total Analysis Volume [veh/h]	35	60	428	7	2	172
Pedestrian Volume [ped/h]	1		0		1	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.28
d_M, Delay for Movement [s/veh]	8.64	0.00	0.00	0.00	14.87	13.06
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh]	0.31	0.31	0.00	0.00	1.15	1.15
95th-Percentile Queue Length [ft]	7.66	7.66	0.00	0.00	28.76	28.76
d_A, Approach Delay [s/veh]	3.18		0.00		13.08	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.66					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 215: Chrysler Dr/Constitution Dr

Control Type:	Signalized	Delay (sec / veh):	51.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.771

Intersection Setup

Name	Chrysler Drive						Constitution Drive					
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive						Constitution Drive					
Base Volume Input [veh/h]	416	79	17	324	285	9	2	2	78	1	500	82
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	0.00	100.00	1.50	1.80	11.10	50.00	50.00	5.10	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	416	79	17	324	285	9	2	2	78	1	500	82
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	104	20	4	81	71	2	1	1	20	0	125	21
Total Analysis Volume [veh/h]	416	79	17	324	285	9	2	2	78	1	500	82
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			5			5			5		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split
Signal group	0	6	0	0	8	0	0	4	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	32	0	0	26	0	0	26	0	0	20	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	35	0	0	31	0	0	31	0	0	24	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	2.00	0.00	2.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	30	30	30	30	19	19
g / C, Green / Cycle	0.33	0.33	0.33	0.33	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.31	0.27	0.18	0.08	0.18	0.18
s, saturation flow rate [veh/h]	1634	1186	1670	969	1710	1471
c, Capacity [veh/h]	543	337	547	358	354	304
d1, Uniform Delay [s]	29.22	37.27	24.69	22.22	34.62	34.71
k, delay calibration	0.36	0.50	0.50	0.50	0.30	0.31
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	21.57	40.25	3.75	1.48	17.16	20.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

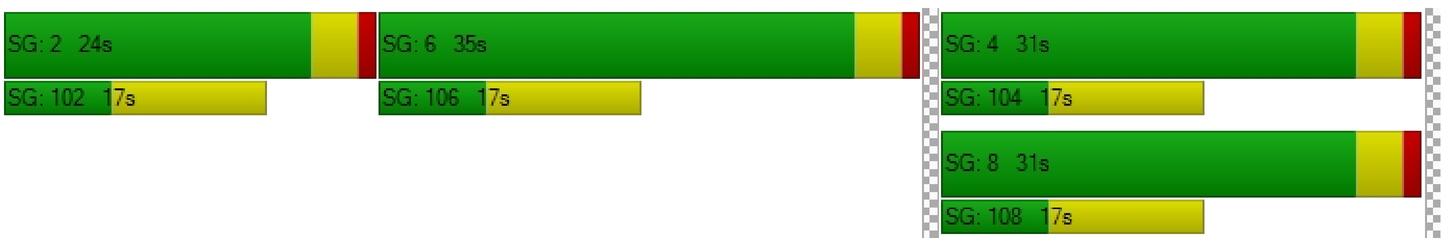
X, volume / capacity	0.94	0.96	0.54	0.23	0.88	0.89
d, Delay for Lane Group [s/veh]	50.79	77.52	28.45	23.71	51.78	55.70
Lane Group LOS	D	E	C	C	D	E
Critical Lane Group	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	13.55	10.93	5.53	1.39	8.15	7.42
50th-Percentile Queue Length [ft]	338.75	273.30	138.34	34.83	203.69	185.47
95th-Percentile Queue Length [veh]	19.59	16.35	9.39	2.51	12.83	11.89
95th-Percentile Queue Length [ft]	489.67	408.86	234.78	62.70	320.72	297.15

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	50.79	50.79	50.79	77.52	28.45	28.45	23.71	23.71	23.71	51.78	53.26	55.70
Movement LOS	D	D	D	E	C	C	C	C	C	D	D	E
d_A, Approach Delay [s/veh]	50.79			54.18			23.71			53.60		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	51.63											
Intersection LOS	D											
Intersection V/C	0.771											

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 233: Sand Hill Circle/Sand Hill Road

Control Type:	Signalized	Delay (sec / veh):	74.0
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.165

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Base Volume Input [veh/h]	2	52	0	0	98	239	0	0	0	8	2362	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.70	2.00	2.00	5.70	1.10	2.00	2.00	2.00	0.00	0.90	11.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	52	0	0	98	239	0	0	0	8	2362	7
Peak Hour Factor	0.8900	0.8900	1.0000	1.0000	0.8900	0.8900	1.0000	1.0000	1.0000	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	0	0	28	67	0	0	0	2	663	2
Total Analysis Volume [veh/h]	2	58	0	0	110	269	0	0	0	9	2654	8
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	2			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Split	Split	Split
Signal group	1	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	55	0	0	55	0	0	0	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	55	0	0	55	0	0	0	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	14	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No						No	
Maximum Recall		No			No						No	
Pedestrian Recall		No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R		C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		0.00	0.00
g_i, Effective Green Time [s]	14	14	14		33	33
g / C, Green / Cycle	0.28	0.28	0.28		0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.17		0.74	0.74
s, saturation flow rate [veh/h]	1789	1798	1577		1882	1712
c, Capacity [veh/h]	557	484	425		1224	1113
d1, Uniform Delay [s]	13.78	14.20	16.07		8.73	8.73
k, delay calibration	0.11	0.11	0.11		0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	0.08	0.24	1.56		74.13	75.37
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00

Lane Group Results

X, volume / capacity	0.11	0.23	0.63		1.14	1.14
d, Delay for Lane Group [s/veh]	13.87	14.44	17.64		82.86	84.11
Lane Group LOS	B	B	B		F	F
Critical Lane Group	No	No	Yes		No	Yes
50th-Percentile Queue Length [veh]	0.46	0.88	2.54		33.10	30.48
50th-Percentile Queue Length [ft]	11.58	22.04	63.44		827.46	762.02
95th-Percentile Queue Length [veh]	0.83	1.59	4.57		47.30	43.95
95th-Percentile Queue Length [ft]	20.84	39.68	114.19		1182.53	1098.75

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.87	13.87	0.00	0.00	14.44	17.64	0.00	0.00	0.00	82.86	83.45	84.11
Movement LOS	B	B			B	B				F	F	F
d_A, Approach Delay [s/veh]	13.87			16.71			0.00			83.45		
Approach LOS	B			B			A			F		
d_I, Intersection Delay [s/veh]	73.98											
Intersection LOS	E											
Intersection V/C	1.165											

Sequence

Ring 1	8	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	10.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.428

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Base Volume Input [veh/h]	0	23	193	129	0	0	44	805	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.00	4.30	0.00	2.00	2.00	5.30	1.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	23	193	129	0	0	44	805	0	0	0	0
Peak Hour Factor	1.0000	0.9300	0.9300	0.9300	1.0000	1.0000	0.9300	0.9300	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	6	52	35	0	0	12	216	0	0	0	0
Total Analysis Volume [veh/h]	0	25	208	139	0	0	47	866	0	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			23			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Protecte	Permiss	Overlap	Permiss	Permiss	Protecte	Protecte	Permiss
Signal group	0	8	5	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups			5,8				1,6					
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	5	5	5	0	0	5	5	0	0	0	0
Maximum Green [s]	0	14	30	25	0	0	16	30	0	0	0	0
Amber [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0
All red [s]	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Split [s]	0	14	30	25	0	0	16	30	0	0	0	0
Vehicle Extension [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	10	0	0	0	0	5	10	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	0	0	10	10	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No	No			No	No				
Maximum Recall		No	No	No			No	No				
Pedestrian Recall		No	No	No			No	No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	L	C	
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	
g_i, Effective Green Time [s]	6	12	6	29	15	
g / C, Green / Cycle	0.16	0.32	0.16	0.75	0.40	
(v / s)_i Volume / Saturation Flow Rate	0.01	0.13	0.08	0.03	0.24	
s, saturation flow rate [veh/h]	1900	1548	1810	1718	3582	
c, Capacity [veh/h]	304	430	281	1181	1420	
d1, Uniform Delay [s]	13.64	11.49	14.74	1.92	9.17	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.11	0.84	1.34	0.01	0.43	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

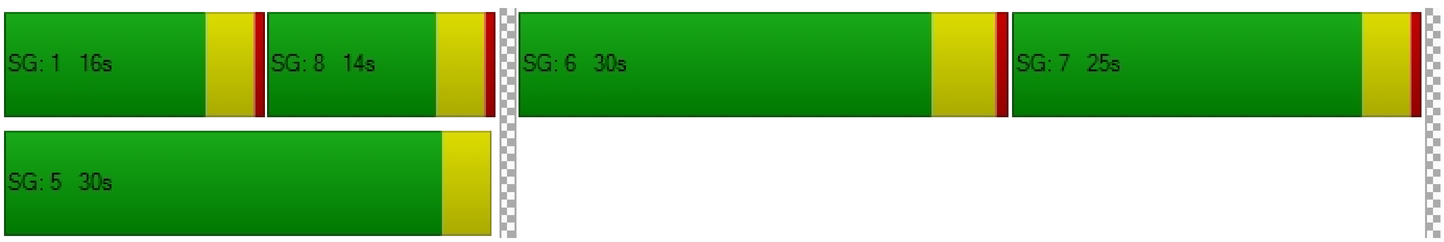
X, volume / capacity	0.08	0.48	0.49	0.04	0.61	
d, Delay for Lane Group [s/veh]	13.76	12.34	16.08	1.93	9.60	
Lane Group LOS	B	B	B	A	A	
Critical Lane Group	No	Yes	Yes	No	Yes	
50th-Percentile Queue Length [veh]	0.15	1.13	0.95	0.00	1.82	
50th-Percentile Queue Length [ft]	3.74	28.26	23.64	0.11	45.51	
95th-Percentile Queue Length [veh]	0.27	2.03	1.70	0.01	3.28	
95th-Percentile Queue Length [ft]	6.74	50.87	42.55	0.20	81.92	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	13.76	12.34	16.08	0.00	0.00	1.93	9.60	0.00	0.00	0.00	0.00
Movement LOS		B	B	B			A	A				
d_A, Approach Delay [s/veh]	12.49			16.08			9.20			0.00		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	10.54											
Intersection LOS	B											
Intersection V/C	0.428											

Sequence

Ring 1	8	1	6	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 243: University Avenue/US 101 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	69.7
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.995

Intersection Setup

Name	University Avenue		University Avenue		US 101 SB Ramps	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	0	1
Pocket Length [ft]	100.00	160.00	230.00	100.00	100.00	220.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		US 101 SB Ramps	
Base Volume Input [veh/h]	1310	325	942	1530	316	801
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1310	325	942	1530	316	801
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	328	81	236	383	79	200
Total Analysis Volume [veh/h]	1310	325	942	1530	316	801
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	9		7		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Protected	Permissive	Protected	Permissive
Signal group	6	7	5	2	7	0
Auxiliary Signal Groups		6,7				
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	10	6	4	10	6	0
Maximum Green [s]	30	30	30	30	30	0
Amber [s]	4.0	3.5	3.0	4.5	3.5	0.0
All red [s]	0.5	0.5	0.5	0.5	0.5	0.0
Split [s]	41	29	30	71	29	0
Vehicle Extension [s]	3.0	2.0	2.0	3.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.5	2.0	1.5	3.0	2.0	0.0
Minimum Recall	Yes	No	No	Yes	No	
Maximum Recall	No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R
L, Total Lost Time per Cycle [s]	4.50	4.00	3.50	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.50	0.00	1.50	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	37	66	27	66	25	25	25
g / C, Green / Cycle	0.37	0.66	0.27	0.66	0.25	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.41	0.13	0.30	0.48	0.20	0.28	0.28
s, saturation flow rate [veh/h]	3192	2459	3101	3192	1597	1425	1425
c, Capacity [veh/h]	1165	1623	822	2107	399	356	356
d1, Uniform Delay [s]	31.75	6.66	36.75	11.10	35.06	37.50	37.50
k, delay calibration	0.50	0.04	0.08	0.50	0.25	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	67.55	0.02	68.51	2.23	8.03	85.72	85.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.12	0.20	1.15	0.73	0.79	1.12	1.12
d, Delay for Lane Group [s/veh]	99.30	6.68	105.26	13.33	43.10	123.22	123.22
Lane Group LOS	F	A	F	B	D	F	F
Critical Lane Group	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	24.47	1.23	17.62	10.29	7.96	17.01	17.01
50th-Percentile Queue Length [ft]	611.65	30.84	440.46	257.25	199.05	425.20	425.20
95th-Percentile Queue Length [veh]	35.19	2.22	26.45	15.55	12.59	25.37	25.37
95th-Percentile Queue Length [ft]	879.71	55.50	661.30	388.77	314.74	634.28	634.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	99.30	6.68	105.26	13.33	43.10	123.22
Movement LOS	F	A	F	B	D	F
d_A, Approach Delay [s/veh]	80.89		48.36		100.55	
Approach LOS	F		D		F	
d_I, Intersection Delay [s/veh]	69.70					
Intersection LOS	E					
Intersection V/C	0.995					

Sequence

Ring 1	2	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 245: University Avenue/Runnymede Street

Control Type:	Signalized	Delay (sec / veh):	15.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.566

Intersection Setup

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	120.00	100.00	100.00	130.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Base Volume Input [veh/h]	24	970	43	43	1033	36	20	121	23	100	95	119
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	24	970	43	43	1033	36	20	121	23	100	95	119
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	243	11	11	258	9	5	30	6	25	24	30
Total Analysis Volume [veh/h]	24	970	43	43	1033	36	20	121	23	100	95	119
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			8			16			8		
Bicycle Volume [bicycles/h]	6			7			0			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	76.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	60	0	0	60	0	0	40	0	0	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	65	65	65	65	65	65	27	27
g / C, Green / Cycle	0.65	0.65	0.65	0.65	0.65	0.65	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.05	0.30	0.31	0.09	0.32	0.32	0.11	0.24
s, saturation flow rate [veh/h]	473	1676	1647	499	1676	1652	1487	1285
c, Capacity [veh/h]	295	1095	1075	313	1095	1079	437	391
d1, Uniform Delay [s]	14.67	8.65	8.66	14.56	8.86	8.87	29.87	35.82
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.22
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.54	1.43	1.46	0.91	1.57	1.61	0.53	7.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

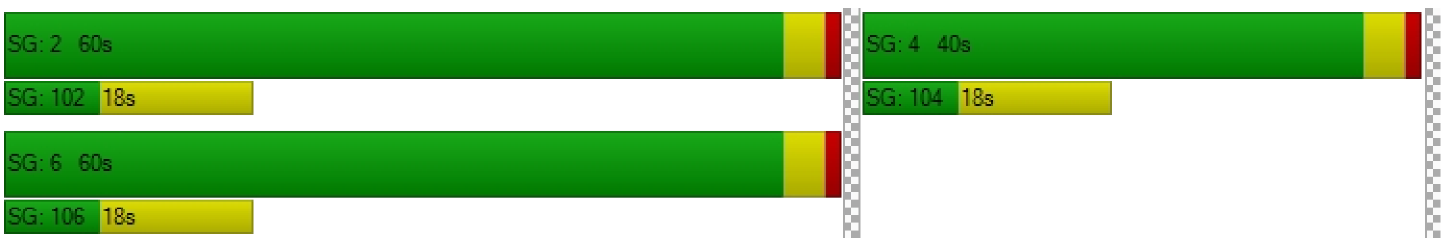
X, volume / capacity	0.08	0.47	0.47	0.14	0.49	0.49	0.38	0.80
d, Delay for Lane Group [s/veh]	15.21	10.08	10.12	15.47	10.43	10.48	30.40	43.48
Lane Group LOS	B	B	B	B	B	B	C	D
Critical Lane Group	No	No	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.35	5.57	5.50	0.63	6.02	5.97	3.29	8.21
50th-Percentile Queue Length [ft]	8.70	139.22	137.55	15.74	150.47	149.15	82.21	205.33
95th-Percentile Queue Length [veh]	0.63	9.44	9.35	1.13	10.04	9.97	5.92	12.91
95th-Percentile Queue Length [ft]	15.67	235.97	233.72	28.33	251.06	249.29	147.97	322.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	15.21	10.10	10.12	15.47	10.45	10.48	30.40	30.40	30.40	43.48	43.48	43.48
Movement LOS	B	B	B	B	B	B	C	C	C	D	D	D
d_A, Approach Delay [s/veh]	10.22			10.65			30.40			43.48		
Approach LOS	B			B			C			D		
d_I, Intersection Delay [s/veh]	15.64											
Intersection LOS	B											
Intersection V/C	0.566											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 246: University Avenue/Bell Street

Control Type:	Signalized	Delay (sec / veh):	16.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	60.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Base Volume Input [veh/h]	48	999	102	81	1112	39	26	142	69	115	119	27
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	999	102	81	1112	39	26	142	69	115	119	27
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	250	26	20	278	10	7	36	17	29	30	7
Total Analysis Volume [veh/h]	48	999	102	81	1112	39	26	142	69	115	119	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			17			19			7		
Bicycle Volume [bicycles/h]	3			4			1			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	62	0	0	62	0	0	38	0	0	38	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	64	64	64	64	64	64	28	28
g / C, Green / Cycle	0.64	0.64	0.64	0.64	0.64	0.64	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.11	0.33	0.34	0.18	0.35	0.35	0.16	0.25
s, saturation flow rate [veh/h]	438	1676	1613	459	1676	1652	1520	1028
c, Capacity [veh/h]	262	1070	1029	275	1070	1054	469	342
d1, Uniform Delay [s]	17.97	9.83	9.87	18.83	10.01	10.03	30.33	35.78
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.27
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.53	1.83	1.93	2.70	1.97	2.01	0.85	8.48
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

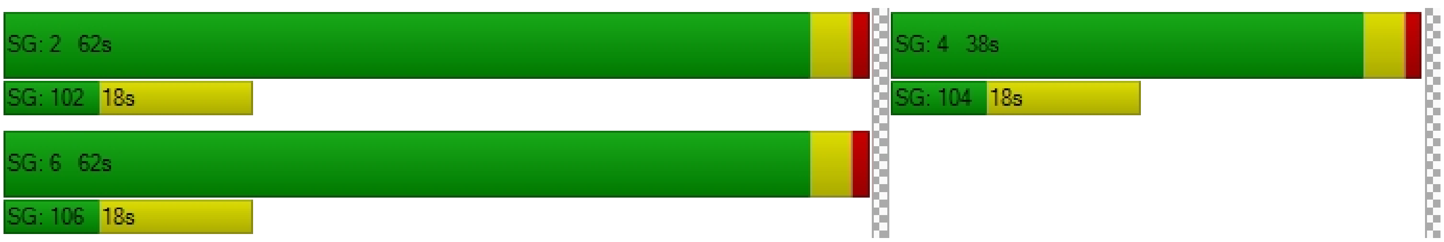
X, volume / capacity	0.18	0.52	0.53	0.29	0.54	0.54	0.51	0.76
d, Delay for Lane Group [s/veh]	19.50	11.66	11.80	21.53	11.97	12.04	31.17	44.26
Lane Group LOS	B	B	B	C	B	B	C	D
Critical Lane Group	No	No	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.82	6.76	6.60	1.47	7.13	7.08	4.93	6.98
50th-Percentile Queue Length [ft]	20.40	169.01	164.90	36.70	178.30	176.94	123.17	174.56
95th-Percentile Queue Length [veh]	1.47	11.02	10.81	2.64	11.51	11.44	8.57	11.32
95th-Percentile Queue Length [ft]	36.72	275.61	270.19	66.05	287.79	286.02	214.18	282.90

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	19.50	11.72	11.80	21.53	12.00	12.04	31.17	31.17	31.17	44.26	44.26	44.26
Movement LOS	B	B	B	C	B	B	C	C	C	D	D	D
d_A, Approach Delay [s/veh]	12.05			12.63			31.17			44.26		
Approach LOS	B			B			C			D		
d_I, Intersection Delay [s/veh]	16.79											
Intersection LOS	B											
Intersection V/C	0.600											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 247: University Avenue/Bay Road

Control Type:	Signalized	Delay (sec / veh):	107.5
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.985

Intersection Setup

Name	University Avenue			University Avenue						Bay Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	170.00	100.00	170.00	170.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue						Bay Road		
Base Volume Input [veh/h]	33	1114	42	154	688	58	140	205	475	197	324	150
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	33	1114	42	154	688	58	140	205	475	197	324	150
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	279	11	39	172	15	35	51	119	49	81	38
Total Analysis Volume [veh/h]	33	1114	42	154	688	58	140	205	475	197	324	150
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	60			27			12			35		
Bicycle Volume [bicycles/h]	1			5			2			7		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	8	37	0	13	42	0	0	36	0	0	34	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	23	0	0	17	0	0	27	0	0	26	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	33	33	9	39	39	36	36	36	26	26	26
g / C, Green / Cycle	0.02	0.28	0.28	0.08	0.33	0.33	0.30	0.30	0.30	0.21	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.02	0.35	0.35	0.10	0.23	0.23	0.09	0.12	0.35	0.12	0.19	0.12
s, saturation flow rate [veh/h]	1597	1676	1651	1597	1676	1607	1597	1676	1368	1597	1676	1281
c, Capacity [veh/h]	40	464	457	120	547	525	482	506	413	341	358	273
d1, Uniform Delay [s]	58.25	43.41	43.41	55.50	35.14	35.29	32.06	33.33	41.89	42.35	46.02	42.05
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.50	0.11	0.11	0.50	0.11	0.28	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	33.19	131.28	132.97	177.68	6.99	7.62	0.33	0.52	92.12	1.55	18.96	1.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

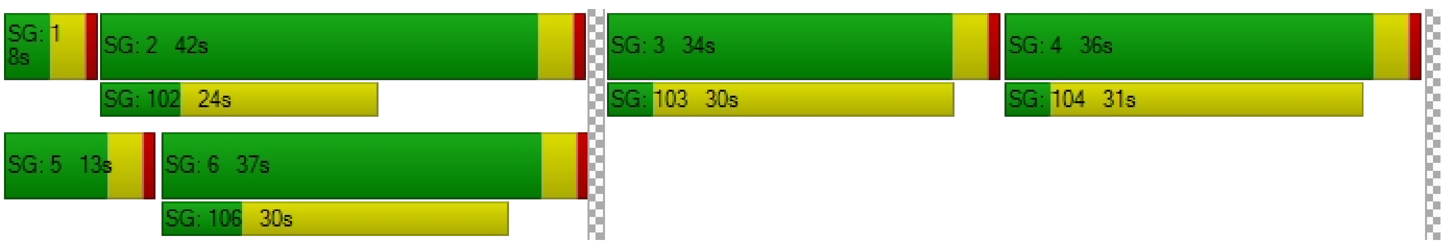
X, volume / capacity	0.83	1.25	1.26	1.29	0.69	0.70	0.29	0.41	1.15	0.58	0.91	0.55
d, Delay for Lane Group [s/veh]	91.44	174.69	176.39	233.18	42.12	42.91	32.39	33.85	134.01	43.90	64.98	43.76
Lane Group LOS	F	F	F	F	D	D	C	C	F	D	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.37	30.66	30.42	9.56	10.73	10.56	3.20	4.88	22.74	5.44	11.35	4.13
50th-Percentile Queue Length [ft]	34.31	766.62	760.55	238.94	268.37	264.12	80.10	122.07	568.62	136.05	283.68	103.33
95th-Percentile Queue Length [veh]	2.47	45.15	44.89	15.82	16.11	15.90	5.77	8.51	33.25	9.27	16.87	7.44
95th-Percentile Queue Length [ft]	61.76	1128.77	1122.18	395.61	402.70	397.38	144.18	212.67	831.37	231.69	421.80	185.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	91.44	175.50	176.39	233.18	42.48	42.91	32.39	33.85	134.01	43.90	64.98	43.76
Movement LOS	F	F	F	F	D	D	C	C	F	D	E	D
d_A, Approach Delay [s/veh]	173.20			75.14			91.62			54.04		
Approach LOS	F			E			F			D		
d_I, Intersection Delay [s/veh]	107.53											
Intersection LOS	F											
Intersection V/C	0.985											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 249: Donohoe Street/US 101 NB Off-ramp/Capitol Avenue

Control Type:	Signalized	Delay (sec / veh):	31.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.734

Intersection Setup

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	857	0	646	0	0	0	0	893	0	0	687	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	857	0	646	0	0	0	0	893	0	0	687	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9500	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	214	0	162	0	0	0	0	223	0	0	172	0
Total Analysis Volume [veh/h]	857	0	646	0	0	0	0	893	0	0	687	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			23			0			2		
Bicycle Volume [bicycles/h]	0			0			1			3		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Protecte	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	0	5	0	0	6	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	4	0	4	0	0	4	0	4	0	0	4	0
Maximum Green [s]	30	0	30	0	0	30	0	30	0	0	30	0
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	56	0	56	0	0	8	0	36	0	0	36	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	7	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	26	0	26	0	0	0	0	19	0	0	19	0
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No		No			No		No			No	
Maximum Recall	No		No			Yes		No			No	
Pedestrian Recall	No		No			No		No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	R	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	48	48	9	31	31	31
g / C, Green / Cycle	0.48	0.48	0.09	0.31	0.31	0.31
(v / s)_i Volume / Saturation Flow Rate	0.28	0.45	0.00	0.28	0.14	0.14
s, saturation flow rate [veh/h]	3101	1423	1425	3192	3192	1676
c, Capacity [veh/h]	1495	686	130	977	977	513
d1, Uniform Delay [s]	18.52	24.54	0.00	33.42	28.10	27.88
k, delay calibration	0.11	0.38	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.35	18.51	0.00	3.84	0.35	0.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

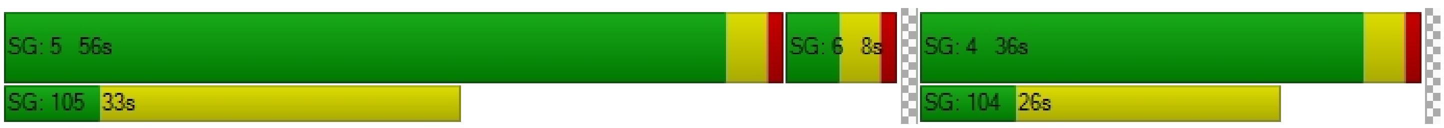
X, volume / capacity	0.57	0.94	0.00	0.91	0.47	0.45
d, Delay for Lane Group [s/veh]	18.87	43.05	0.00	37.26	28.45	28.49
Lane Group LOS	B	D	A	D	C	C
Critical Lane Group	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	6.88	17.14	0.00	10.69	4.43	4.44
50th-Percentile Queue Length [ft]	172.11	428.42	0.00	267.25	110.83	110.94
95th-Percentile Queue Length [veh]	11.19	23.93	0.00	16.05	7.89	7.89
95th-Percentile Queue Length [ft]	279.68	598.14	0.00	401.30	197.16	197.31

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	18.87	0.00	43.05	0.00	0.00	0.00	0.00	37.26	0.00	0.00	28.47	28.49
Movement LOS	B		D			A		D			C	C
d_A, Approach Delay [s/veh]	29.26			0.00			37.26			28.47		
Approach LOS	C			A			D			C		
d_I, Intersection Delay [s/veh]	31.40											
Intersection LOS	C											
Intersection V/C	0.734											

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



General Plan & Facebook Expansion

Vistro File: J:\...\2040(b)_PM.vistro
Scenario 1: Existing GP plus Facebook Conditions PM

Report File: J:\...\Cumulative 2040 Existing General Plan Plus Facebook Project Conditions Conditions PM.pdf
5/19/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	984	974	1570	404	3932

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	29	1083	4	69	1058	212	27	9	471	257	15	1	3235

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	185	720	84	30	697	377	499	16	136	133	56	98	3031

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	2	681	108	194	841	54	101	65	14	88	19	149	2316

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
5	Middlefield Rd/Marsh Rd	426	399	324	288	502	393	2332

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	208	636	481	708	435	73	2541

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringwood Ave	87	105	57	64	1	275	10	775	97	423	634	6	2534

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
13	Middlefield Rd/Lytton Ave	238	179	68	2	66	8	84	445	16	16	512	179	1813

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14	Middlefield Rd/University Ave	66	340	35	81	374	86	27	319	87	101	370	55	1941

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	4315	62	304	813	78	1577	7149

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	28	54	1648	316	591	165	43	2872	935	359	880	10	7901

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	50	1299	3	13	1842	30	359	33	86	139	17	61	3932

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	68	1339	2052	15	73	311	3858

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1368	217	72	2266	218	44	4185

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	301	1484	263	74	2388	22	34	166	254	240	285	87	5598

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	35	1284	925	262	504	68	3078

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	8	935	10	54	719	29	117	2	28	21	2	97	2022

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	12	826	3	5	680	84	102	4	31	1	1	4	1753

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	32	705	14	26	597	6	61	51	69	56	43	28	1688

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	47	95	259	441	115	411	92	429	216	309	592	38	3044

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	62	653	137	35	574	26	296	238	71	53	136	26	2307

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	15	386	108	35	308	56	80	239	39	29	120	30	1445

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	34	27	55	107	9	238	24	1774	102	80	1498	16	3964

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	436	173	95	98	285	68	99	1539	46	71	1256	385	4551

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	152	259	171	151	252	90	90	1478	97	154	1415	131	4440

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	212	62	169	64	74	55	1583	46	1750	104	4119

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	48	377	117	461	255	82	118	1391	613	242	1556	53	5313

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	71	6	39	58	45	48	77	1977	21	82	1908	65	4397

ID	Intersection Name	Northeastbound		Southwestbound				Northwestbound		Southeastbound		Total Volume
		Left	Right	U-T	Left	Thru	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	249	182	0	0	0	0	346	2051	1610	103	4541

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	26	0	39	4	3	0	319	2398	6	44	2483	6	5328

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	419	393	103	468	366	166	1915

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Sand Hill Rd/Santa Cruz Ave	361	611	215	479	1172	235	158	691	188	126	658	223	5117

ID	Intersection Name	Northbound		Southbound		Eastbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
58	University Avenue and Adams Drive	11	1951	751	31	105	0	110	2959

ID	Intersection Name	Eastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
71	Chilco Street/Terminal Avenue	40	14	21	112	502	162	851

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	11	1802	802	23	171	77	2886

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
77	University Avenue/Donohoe Street	430	533	750	105	1027	314	13	145	262	353	875	778	5585

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	24	472	106	54	564	36	256	34	80	45	41	72	1784

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	209	3	108	19	3	66	21	909	107	69	1750	16	3280

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	401	685	423	398	535	100	2542

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road/101 NB Ramps	2269	904	544	258	3975

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
111	University Avenue/Woodland Avenue	28	834	18	313	905	475	13	73	318	439	92	49	3557

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
131	Chilco Street/Hamilton Avenue	19	63	18	101	582	51	22	131	22	9	21	61	1100

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	912	1615	102	61	185	2875

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	109	0	114	90	0	103	73	1068	7	28	1307	20	2919

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	2	0	17	20	0	43	22	1076	7	17	1321	24	2549

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	164	916	1	18	1348	278	47	24	67	307	5	296	3471

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	125	31	2131	16	25	3	8	477	136	2356	63	13	5384

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	75	820	687	85	49	44	1760

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	386	518	137	1335	2416	156	4948

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	839	114	2516	167	26	1716	5378

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
199	Bafront Expwy/Bldg 21	319	556	2869	65	97	1160	5066

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
201	Bayfront Expwy/Bldg 20	278	487	3425	60	92	979	5321

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
204	Chilco Street/Newbridge Street	1	5	5	168	16	14	5	139	2	12	133	64	564

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
206	Chilco Street/Ivy Drive	27	62	11	233	265	17	4	16	12	11	20	58	736

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	14	140	27	131	160	2	86	21	349	270	18	678	1896

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	11	0	4	2	481	3	31	373	16	13	0	56	990

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	0	139	0	1	28	30	0	0	15	293	3	6	515

ID	Intersection Name	Southbound		Northeastbound		Northwestbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
214	Chrysler Dr/Jefferson Dr	35	60	428	7	2	172	704

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	416	79	17	324	285	9	2	2	78	1	500	82	1795

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Circle/Sand Hill Road	2	52	98	239	8	2362	7	2768

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	23	193	129	44	805	1194

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
243	University Avenue/US 101 SB Ramps	1310	325	942	1530	316	801	5224

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
245	University Avenue/Runnymede Street	24	970	43	43	1033	36	20	121	23	100	95	119	2627

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
246	University Avenue/Bell Street	48	999	102	81	1112	39	26	142	69	115	119	27	2879

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
247	University Avenue/Bay Road	33	1114	42	154	688	58	140	205	475	197	324	150	3580

ID	Intersection Name	Northbound		Southbound	Eastbound	Westbound		Total Volume
		Left	Right	Right	Thru	Thru	Right	
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	857	646	0	893	687	0	3083

2040 plus Project – AM Peak Hour

TJKM

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General Plan & Facebook Expansion

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Scenario 1: Proposed General Plan Conditions AM

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5/19/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM 2010	SEB Left	0.907	19.7	B
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM 2010	NEB Left	0.731	28.1	C
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM 2010	WB Right	0.733	33.3	C
4	Marsh Rd/Bay Rd	Signalized	HCM 2010	SB Left	0.742	21.2	C
5	Middlefield Rd/Marsh Rd	Signalized	HCM 2010	EB Left	0.864	30.5	C
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM 2010	NWB Left	0.678	40.4	D
10	Middlefield Rd/Ringswood Ave	Signalized	HCM 2010	SEB Left	0.433	22.5	C
13	Middlefield Rd/Lytton Ave	Signalized	HCM 2010	SWB Thru	0.573	37.3	D
14	Middlefield Rd/University Ave	Signalized	HCM 2010	SEB Left	0.489	36.4	D
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM 2010	NWB Left	1.142	82.1	F
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM 2010	NB Left	1.147	155.7	F
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM 2010	SB Left	0.823	10.9	B
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM 2010	NB Left	0.668	13.7	B
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM 2010	SB Left	0.744	17.3	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM 2010	SB Left	0.959	59.5	E
21	Willow Rd/Bay Rd	Signalized	HCM 2010	NEB Left	0.721	11.9	B
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM 2010	NB Left	0.757	23.1	C
23	Willow Rd/Coleman Ave	Signalized	HCM 2010	EB Left	0.751	20.4	C
24	Willow Rd/Gilbert Ave	Signalized	HCM 2010	EB Left	0.630	23.5	C
25	Middlefield Rd-Willow Rd	Signalized	HCM 2010	NEB Thru	0.570	59.0	E
26	Ravenswood Ave/Laurel St	Signalized	HCM 2010	NWB Left	0.763	27.3	C
28	Oak Grove Ave/Laurel St	Signalized	HCM 2010	SEB Thru	0.530	8.3	A

29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM 2010	SEB Left	1.005	40.2	D
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM 2010	NWB Left	0.969	59.4	E
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM 2010	NWB Left	0.890	36.9	D
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM 2010	NEB Right	0.925	22.6	C
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM 2010	NWB Left	1.057	88.7	F
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM 2010	SEB Left	0.626	6.2	A
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM 2010	NEB Left	0.773	15.7	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM 2010	SEB Left	0.671	5.3	A
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM 2010	SWB Left	0.548	9.9	A
39	Santa Cruz Ave/Sand Hill Rd	Signalized	HCM 2010	SEB Left	0.734	44.8	D
58	University Avenue and Adams Drive	Two-way stop	HCM 2010	EB Left	6.157	2,552.0	F
71	Chilco Street/Terminal Avenue	All-way stop	HCM 2010	EB Left		10.9	B
74	University Ave/O'Brien Dr	Signalized	HCM 2010	NB Left	0.508	28.0	C
77	University Avenue/Donohoe Street	Signalized	HCM 2010	EB Right	1.130	136.4	F
88	Valparaiso Ave/ University Dr	Signalized	HCM 2010	SEB Left	0.643	20.4	C
103	Addison Wesley/Sand Hill Rd	Signalized	HCM 2010	WB Left	0.699	12.6	B
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM 2010	WB Right	0.728	40.6	D
110	Marsh Road and US 101 NB Ramps	Signalized	HCM 2010	NWB Left	0.792	14.0	B
111	University Avenue / Woodland Avenue	Signalized	HCM 2010	NWB Right	0.806	54.2	D
131	Chilco Street/Hamilton Avenue	All-way stop	HCM 2010	SB Thru		8.7	A
132	Oak Ave/Sand Hill Rd	Signalized	HCM 2000	SEB Right	0.732	13.5	B
156	Saga Ln/Sand Hill Rd	Signalized	HCM 2010	SB Left	8.632	38.4	D

157	Branner Dr/Sand Hill Rd	Signalized	HCM 2010	EB Left	0.539	6.5	A
162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM 2010	SEB Left	1.202	43.3	D
163	Bayfront Expy/Marsh Rd	Signalized	HCM 2010	EB Right	0.992	50.4	D
181	Santa Cruz Ave/Elder Ave	Signalized	HCM 2010	NEB Left	0.638	9.6	A
195	Bayfront Expy/Chilco St	Signalized	HCM 2010	WB Left	0.891	29.8	C
196	Bayfront Expy/Chrysler Drive	Signalized	HCM 2010	WB Left	0.807	8.9	A
199	Bayfront Expwy/Bldg 21	Signalized	HCM 2010	WB Left	0.927	44.7	D
201	Bayfront Expwy/Bldg 20	Signalized	HCM 2010	WB Left	0.894	38.9	D
204	Chilco Street/Newbridge Street	All-way stop	HCM 2010	SB Left		8.6	A
206	Chilco Street/Ivy Drive	All-way stop	HCM 2010	SB Thru		8.2	A
207	Chilco St/Constitution Dr	All-way stop	HCM 2010	SB Left		160.9	F
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM 2000	NEB Thru	0.000	9.7	A
213	Chrysler Dr/Independence Dr	Two-way stop	HCM 2010	NWB Thru	0.016	10.9	B
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM 2010	NWB Thru	0.000	13.8	B
215	Chrysler Dr/Constitution Dr	Signalized	HCM 2010	NEB Right	0.414	32.4	C
233	Sand Hill Road and Sand Hill Circle	Signalized	HCM 2010	NB Thru	0.580	14.4	B
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM 2010	NB Right	0.933	86.1	F
243	University Avenue/US 101 SB Ramps	Signalized	HCM 2010	WB Right	0.940	52.9	D
245	University Avenue/Runnymede Street	Signalized	HCM 2010	SB Left	0.723	15.7	B
246	University Avenue/Bell Street	Signalized	HCM 2010	WB Thru	0.600	13.7	B
247	University Avenue/Bay Road	Signalized	HCM 2010	NEB Left	0.661	41.1	D
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	Signalized	HCM 2010	WB Right	0.521	45.1	D

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	19.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.907

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	847	1749	279	1091	320
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	3.60	2.15	5.10	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	847	1749	279	1091	320
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	212	437	70	273	80
Total Analysis Volume [veh/h]	0	847	1749	279	1091	320
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	4		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	52.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	0	6	2	0	4	5
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	32	32	0	32	10
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	50	50	0	30	21
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	7	0	0	5	0
Pedestrian Clearance [s]	0	16	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	2.1	0.0	0.0	1.1
Minimum Recall		Yes	Yes		No	No
Maximum Recall		No	No		No	No
Pedestrian Recall		No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	4.10	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.10	0.00	0.00
g_i, Effective Green Time [s]	48	46	28	28
g / C, Green / Cycle	0.60	0.57	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.21	0.50	0.33	0.20
s, saturation flow rate [veh/h]	4000	3492	3344	1562
c, Capacity [veh/h]	2395	1999	1174	549
d1, Uniform Delay [s]	8.16	14.63	24.95	21.14
k, delay calibration	0.50	0.50	0.04	0.16
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.41	5.72	1.64	1.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

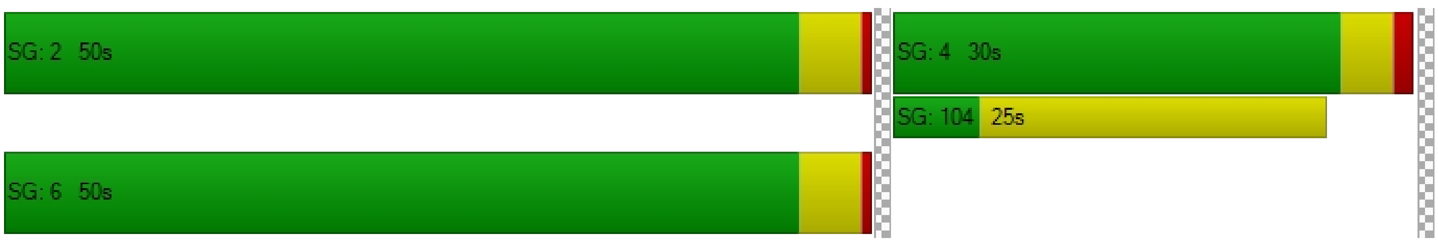
X, volume / capacity	0.35	0.88	0.93	0.58
d, Delay for Lane Group [s/veh]	8.57	20.35	26.59	22.61
Lane Group LOS	A	C	C	C
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	3.25	12.75	9.61	4.87
50th-Percentile Queue Length [ft]	81.13	318.71	240.20	121.67
95th-Percentile Queue Length [veh]	5.84	18.60	14.69	8.48
95th-Percentile Queue Length [ft]	146.03	465.10	367.29	212.12

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	8.57	20.35	0.00	26.59	22.61
Movement LOS		A	C		C	C
d_A, Approach Delay [s/veh]	8.57		20.35		25.69	
Approach LOS	A		C		C	
d_I, Intersection Delay [s/veh]	19.74					
Intersection LOS	B					
Intersection V/C	0.907					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	28.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Road		
Base Volume Input [veh/h]	28	1184	14	439	1422	296	16	4	77	251	13	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	3.00	7.10	3.90	4.00	1.00	0.00	0.00	12.70	1.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	59	0	0	0
Total Hourly Volume [veh/h]	28	1184	14	439	1422	296	16	4	18	251	13	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	296	4	110	356	74	4	1	5	63	3	1
Total Analysis Volume [veh/h]	28	1184	14	439	1422	296	16	4	18	251	13	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			1			2		
Bicycle Volume [bicycles/h]	2			0			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	70.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	0	6	0	4	4	4
Maximum Green [s]	15	40	40	15	40	40	0	20	0	20	20	20
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	10	45	45	26	61	61	0	42	0	47	47	47
Vehicle Extension [s]	2.5	3.5	3.5	2.0	3.5	3.5	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	0	7	7	0	7	7	0	8	0	8	8	8
Pedestrian Clearance [s]	0	21	21	0	21	21	0	28	0	24	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	5	94	94	24	113	113	7	7	27	27
g / C, Green / Cycle	0.03	0.59	0.59	0.15	0.71	0.71	0.04	0.04	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.22	0.22	0.13	0.47	0.50	0.01	0.01	0.14	0.01
s, saturation flow rate [veh/h]	1747	3512	1833	3382	1827	1721	1827	2536	1779	1803
c, Capacity [veh/h]	57	2071	1081	506	1291	1216	82	113	295	299
d1, Uniform Delay [s]	75.97	17.34	17.34	66.38	12.98	13.72	73.74	73.45	64.73	56.16
k, delay calibration	0.08	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.10	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.73	0.53	1.02	1.80	2.72	3.47	1.15	0.48	6.50	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

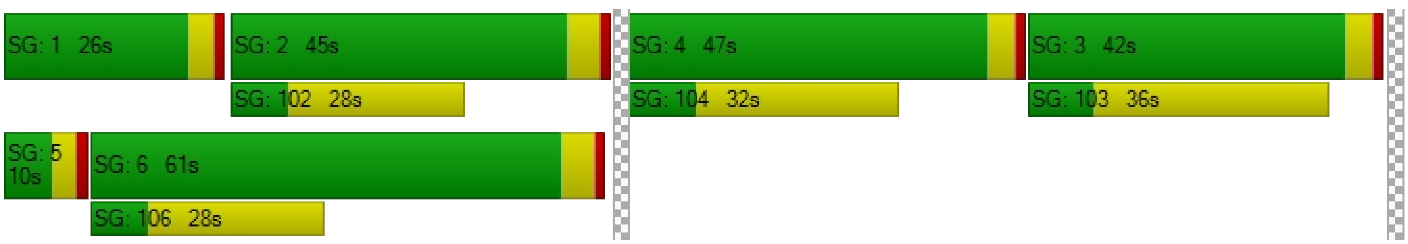
X, volume / capacity	0.49	0.38	0.38	0.87	0.67	0.71	0.25	0.16	0.85	0.06
d, Delay for Lane Group [s/veh]	80.71	17.87	18.36	68.19	15.70	17.19	74.88	73.93	71.23	56.22
Lane Group LOS	F	B	B	E	B	B	E	E	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.21	7.82	8.32	8.87	17.06	18.18	0.83	0.37	10.58	0.63
50th-Percentile Queue Length [ft]	30.24	195.60	207.96	221.68	426.50	454.53	20.76	9.20	264.48	15.76
95th-Percentile Queue Length [veh]	2.18	12.41	13.05	13.75	23.83	25.17	1.49	0.66	15.91	1.13
95th-Percentile Queue Length [ft]	54.42	310.28	326.21	343.77	595.85	629.35	37.37	16.57	397.83	28.36

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	80.71	18.03	18.36	68.19	16.29	17.19	74.88	74.88	73.93	71.23	56.22	56.22
Movement LOS	F	B	B	E	B	B	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	19.47			26.97			74.43			70.22		
Approach LOS	B			C			E			E		
d_I, Intersection Delay [s/veh]	28.12											
Intersection LOS	C											
Intersection V/C	0.731											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	33.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.733

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Drive		
Base Volume Input [veh/h]	99	767	90	28	1103	449	472	50	209	29	17	27
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	1.60	5.60	7.40	5.10	3.00	6.50	8.50	4.50	25.90	37.50	28.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	15	0	0	0
Total Hourly Volume [veh/h]	99	767	90	28	1103	449	472	50	194	29	17	27
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	192	23	7	276	112	118	13	49	7	4	7
Total Analysis Volume [veh/h]	99	767	90	28	1103	449	472	50	194	29	17	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			5			3			3		
Bicycle Volume [bicycles/h]	10			5			2			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	50.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	23	77	77	10	64	64	37	36	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	12	12	0	16	16	25	25	25	0	25	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	13	108	108	5	101	101	30	30	30	9	9
g / C, Green / Cycle	0.08	0.68	0.68	0.03	0.63	0.63	0.18	0.18	0.18	0.06	0.06
(v / s)_i Volume / Saturation Flow Rate	0.06	0.23	0.23	0.02	0.44	0.47	0.15	0.15	0.13	0.02	0.04
s, saturation flow rate [veh/h]	1740	1870	1790	1685	1808	1609	1699	1683	1508	1437	1212
c, Capacity [veh/h]	139	1265	1210	55	1138	1013	313	310	278	81	69
d1, Uniform Delay [s]	71.78	10.93	10.95	76.02	19.69	20.60	62.91	62.89	61.04	72.61	73.82
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.55	0.75	0.79	2.63	3.65	4.91	4.51	4.50	2.36	1.96	7.21
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

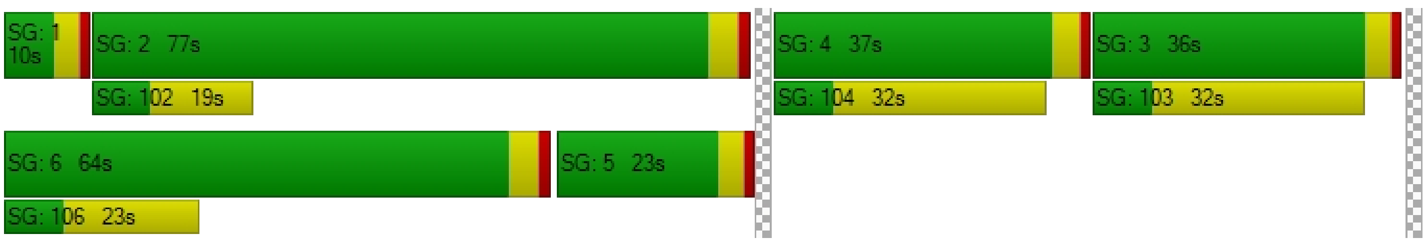
X, volume / capacity	0.71	0.35	0.35	0.51	0.70	0.74	0.84	0.84	0.70	0.36	0.64
d, Delay for Lane Group [s/veh]	74.33	11.68	11.74	78.65	23.34	25.51	67.42	67.38	63.40	74.56	81.03
Lane Group LOS	E	B	B	E	C	C	E	E	E	E	F
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	4.06	6.69	6.47	1.18	20.35	20.25	10.81	10.69	7.66	1.21	1.93
50th-Percentile Queue Length [ft]	101.57	167.25	161.80	29.38	508.82	506.36	270.32	267.17	191.38	30.15	48.24
95th-Percentile Queue Length [veh]	7.31	10.93	10.64	2.12	27.75	27.64	16.21	16.05	12.19	2.17	3.47
95th-Percentile Queue Length [ft]	182.82	273.30	266.11	52.88	693.78	690.88	405.14	401.20	304.83	54.27	86.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	74.33	11.70	11.74	78.65	23.93	25.51	67.40	67.38	63.40	74.56	81.03	81.03
Movement LOS	E	B	B	E	C	C	E	E	E	E	F	F
d_A, Approach Delay [s/veh]	18.19			25.35			66.32			78.46		
Approach LOS	B			C			E			E		
d_I, Intersection Delay [s/veh]	33.28											
Intersection LOS	C											
Intersection V/C	0.733											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	21.2
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.742

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	1	803	82	289	933	33	193	132	12	45	19	173
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.20	2.40	7.10	6.20	3.20	3.50	2.60	0.00	0.00	5.30	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	803	82	289	933	33	193	132	12	45	19	173
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	201	21	72	233	8	48	33	3	11	5	43
Total Analysis Volume [veh/h]	1	803	82	289	933	33	193	132	12	45	19	173
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			4			0		
Bicycle Volume [bicycles/h]	4			4			6			8		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	40	60	40	25	40	60	31	31	31	0	31	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	43	11	43	32	43	11	37	37	37	0	37	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	29	29	17	48	48	28	28
g / C, Green / Cycle	0.36	0.36	0.22	0.60	0.60	0.35	0.35
(v / s)_i Volume / Saturation Flow Rate	0.25	0.25	0.17	0.27	0.27	0.28	0.15
s, saturation flow rate [veh/h]	1876	1642	1690	1789	1764	1197	1558
c, Capacity [veh/h]	721	592	369	1080	1065	485	593
d1, Uniform Delay [s]	21.90	21.95	29.55	8.64	8.65	25.10	20.17
k, delay calibration	0.50	0.50	0.04	0.50	0.50	0.25	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.57	6.79	1.40	1.35	1.38	4.03	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.65	0.70	0.78	0.45	0.45	0.69	0.40
d, Delay for Lane Group [s/veh]	26.47	28.74	30.95	10.00	10.04	29.13	20.49
Lane Group LOS	C	C	C	A	B	C	C
Critical Lane Group	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	7.90	7.28	5.13	4.21	4.17	6.30	3.31
50th-Percentile Queue Length [ft]	197.53	181.94	128.17	105.23	104.35	157.62	82.69
95th-Percentile Queue Length [veh]	12.51	11.70	8.84	7.57	7.51	10.42	5.95
95th-Percentile Queue Length [ft]	312.78	292.54	221.01	189.34	187.82	260.57	148.85

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.47	27.41	28.74	30.95	10.02	10.04	29.13	29.13	29.13	20.49	20.49	20.49
Movement LOS	C	C	C	C	B	B	C	C	C	C	C	C
d_A, Approach Delay [s/veh]	27.53			14.84			29.13			20.49		
Approach LOS	C			B			C			C		
d_I, Intersection Delay [s/veh]	21.25											
Intersection LOS	C											
Intersection V/C	0.742											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 5: Middlefield Rd/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	30.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.864

Intersection Setup

Name	Marsh Road		Middlefield Road		Middlefield Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	225.00	150.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	509	310	374	391	225	455
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	242	0	0	0	427
Total Hourly Volume [veh/h]	509	68	374	391	225	28
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	127	17	94	98	56	7
Total Analysis Volume [veh/h]	509	68	374	391	225	28
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	9		0		0	
Bicycle Volume [bicycles/h]	1		28		19	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Overlap	Protected	Permissive	Permissive	Permissive
Signal group	3	1	1	2	2	2
Auxiliary Signal Groups		1,3				4,6
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	6	20	20	20	20	20
Maximum Green [s]	53	23	23	17	17	17
Amber [s]	3.2	3.0	3.0	3.2	3.2	3.2
All red [s]	2.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	0	0	30	30	30
Vehicle Extension [s]	2.5	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	0	0	8	8	8
Pedestrian Clearance [s]	0	0	0	12	12	12
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	3.2	2.0	2.0	2.2	2.2	2.2
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	5.20	4.00	4.00	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.20	0.00	2.00	2.20	2.20	2.20
g_i, Effective Green Time [s]	21	41	14	17	17	17
g / C, Green / Cycle	0.32	0.62	0.22	0.26	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.29	0.04	0.21	0.21	0.12	0.02
s, saturation flow rate [veh/h]	1774	1551	1774	1863	1863	1522
c, Capacity [veh/h]	576	962	385	477	477	390
d1, Uniform Delay [s]	21.21	5.01	25.76	23.22	20.87	18.69
k, delay calibration	0.08	0.04	0.09	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.56	0.01	14.23	14.49	3.32	0.36
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.07	0.97	0.82	0.47	0.07
d, Delay for Lane Group [s/veh]	24.78	5.02	39.99	37.71	24.18	19.05
Lane Group LOS	C	A	D	D	C	B
Critical Lane Group	Yes	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	7.38	0.30	6.98	7.26	3.20	0.35
50th-Percentile Queue Length [ft]	184.58	7.39	174.53	181.43	79.97	8.65
95th-Percentile Queue Length [veh]	11.84	0.53	11.31	11.68	5.76	0.62
95th-Percentile Queue Length [ft]	295.99	13.31	282.86	291.88	143.94	15.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.78	5.02	39.99	37.71	24.18	19.05
Movement LOS	C	A	D	D	C	B
d_A, Approach Delay [s/veh]	22.45		38.83		23.62	
Approach LOS	C		D		C	
d_I, Intersection Delay [s/veh]	30.49					
Intersection LOS	C					
Intersection V/C	0.864					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	40.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.678

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	93	572	446	364	420	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	11.80	4.20	3.10	2.50	3.30	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	93	0	446	364	420	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	23	0	112	91	105	19
Total Analysis Volume [veh/h]	93	0	446	364	420	75
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2		21		0	
Bicycle Volume [bicycles/h]	22		39		37	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	10	10	0
Maximum Green [s]	50	35	35	35	35	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	50	35	35	35	35	0
Vehicle Extension [s]	2.5	3.6	3.0	3.6	3.6	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	10	12	0	12	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	2.6	0.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	Yes	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	4.60	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	2.60	0.00
g_i, Effective Green Time [s]	11	11	33	102	70
g / C, Green / Cycle	0.09	0.09	0.28	0.85	0.58
(v / s)_i Volume / Saturation Flow Rate	0.06	0.00	0.28	0.22	0.31
s, saturation flow rate [veh/h]	1457	1395	1580	1668	1599
c, Capacity [veh/h]	138	133	434	1418	927
d1, Uniform Delay [s]	52.49	0.00	43.50	1.73	15.33
k, delay calibration	0.08	0.08	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.16	0.00	50.18	0.44	2.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

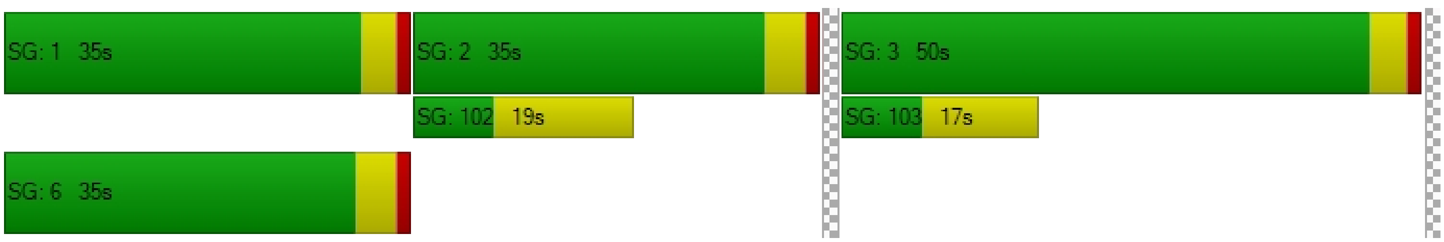
X, volume / capacity	0.67	0.00	1.03	0.26	0.53
d, Delay for Lane Group [s/veh]	56.65	0.00	93.68	2.16	17.53
Lane Group LOS	E	A	F	A	B
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	2.87	0.00	18.67	1.05	8.37
50th-Percentile Queue Length [ft]	71.77	0.00	466.77	26.23	209.22
95th-Percentile Queue Length [veh]	5.17	0.00	26.19	1.89	13.11
95th-Percentile Queue Length [ft]	129.18	0.00	654.65	47.21	327.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.65	0.00	93.68	2.16	17.53	17.53
Movement LOS	E	A	F	A	B	B
d_A, Approach Delay [s/veh]	56.65		52.55		17.53	
Approach LOS	E		D		B	
d_I, Intersection Delay [s/veh]	40.42					
Intersection LOS	D					
Intersection V/C	0.678					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Middlefield Rd/Ringswood Ave

Control Type:	Signalized	Delay (sec / veh):	22.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.433

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	5	3	12	136	44	251	55	559	84	216	653	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	8.30	4.40	0.00	4.00	0.00	3.20	0.00	4.60	4.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	222	0	0	96	0	0	0
Total Hourly Volume [veh/h]	5	3	12	136	44	29	55	559	0	216	653	62
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	1	3	34	11	7	14	140	0	54	163	16
Total Analysis Volume [veh/h]	5	3	12	136	44	29	55	559	0	216	653	62
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6			27			5			11		
Bicycle Volume [bicycles/h]	6			23			39			34		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	2	8	2	6	8	6	1	6	8	5	2	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	35	35	35	50	35	50	50	50	35	35	35	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.0	3.6	3.2	3.5	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	35	35	35	50	35	50	50	50	35	35	35	0
Vehicle Extension [s]	3.6	2.9	3.6	3.6	2.9	3.6	3.0	3.6	2.9	3.0	3.6	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	12	12	12	12	12	0	12	12	0	12	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	2.6	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.6	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.50	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.60	2.60
g_i, Effective Green Time [s]	24	24	24	24	7	70	70	17	81	81
g / C, Green / Cycle	0.20	0.20	0.20	0.20	0.06	0.59	0.59	0.14	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.00	0.01	0.13	0.02	0.03	0.16	0.00	0.12	0.20	0.20
s, saturation flow rate [veh/h]	1384	1629	1341	1471	1810	3505	1615	1730	1827	1758
c, Capacity [veh/h]	119	327	322	295	102	2053	946	247	1226	1179
d1, Uniform Delay [s]	55.22	38.69	45.83	39.10	55.08	12.26	0.00	50.36	8.10	8.12
k, delay calibration	0.10	0.10	0.12	0.10	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.14	0.05	1.71	0.14	4.32	0.33	0.00	9.33	0.62	0.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

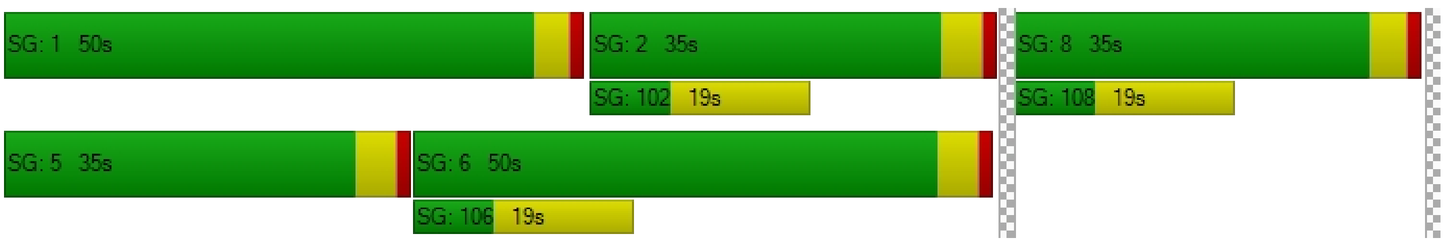
X, volume / capacity	0.04	0.05	0.56	0.10	0.54	0.27	0.00	0.87	0.30	0.30
d, Delay for Lane Group [s/veh]	55.36	38.74	47.54	39.24	59.40	12.59	0.00	59.70	8.72	8.77
Lane Group LOS	E	D	D	D	E	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.15	0.37	5.16	0.71	1.73	3.65	0.00	6.92	3.76	3.67
50th-Percentile Queue Length [ft]	3.81	9.29	129.05	17.86	43.26	91.27	0.00	173.12	94.08	91.64
95th-Percentile Queue Length [veh]	0.27	0.67	8.89	1.29	3.11	6.57	0.00	11.24	6.77	6.60
95th-Percentile Queue Length [ft]	6.86	16.72	222.20	32.14	77.87	164.29	0.00	281.01	169.34	164.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.36	38.74	38.74	47.54	47.54	39.24	59.40	12.59	0.00	59.70	8.74	8.77
Movement LOS	E	D	D	D	D	D	E	B	A	E	A	A
d_A, Approach Delay [s/veh]	42.90			46.39			16.78			20.56		
Approach LOS	D			D			B			C		
d_I, Intersection Delay [s/veh]	22.55											
Intersection LOS	C											
Intersection V/C	0.433											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Middlefield Rd/Lytton Ave

Control Type:	Signalized	Delay (sec / veh):	37.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.573

Intersection Setup

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	119	39	71	4	120	6	129	273	7	5	464	337
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	119	39	71	4	120	6	129	273	7	5	464	337
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	30	10	18	1	30	2	32	68	2	1	116	84
Total Analysis Volume [veh/h]	119	39	71	4	120	6	129	273	7	5	464	337
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			3			7			7		
Bicycle Volume [bicycles/h]	4			28			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	32.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	4	0	0	1	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	4	0	0	12	0	0	12	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	20	0	0	18	0	0	20	0	0	42	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	6	0	0	5	0	0	6	0	0	6	0
Pedestrian Clearance [s]	0	10	0	0	9	0	0	10	0	0	8	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	9	9	9	36	36	30	30
g / C, Green / Cycle	0.09	0.09	0.09	0.36	0.36	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.07	0.06	0.07	0.12	0.11	0.25	0.20
s, saturation flow rate [veh/h]	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	157	157	162	643	643	541	541
d1, Uniform Delay [s]	44.48	44.34	44.53	23.44	23.21	32.70	30.48
k, delay calibration	0.08	0.08	0.08	0.50	0.50	0.30	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.18	4.47	6.70	1.37	1.23	9.05	2.86
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

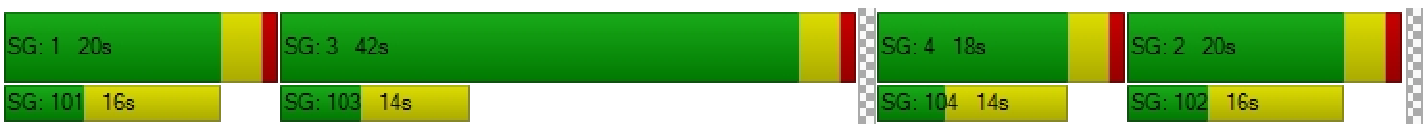
X, volume / capacity	0.75	0.72	0.80	0.33	0.31	0.84	0.65
d, Delay for Lane Group [s/veh]	49.66	48.81	51.23	24.82	24.43	41.75	33.34
Lane Group LOS	D	D	D	C	C	D	C
Critical Lane Group	Yes	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	3.07	2.91	3.47	3.90	3.57	11.50	7.83
50th-Percentile Queue Length [ft]	76.63	72.69	86.80	97.54	89.13	287.45	195.67
95th-Percentile Queue Length [veh]	5.52	5.23	6.25	7.02	6.42	17.06	12.41
95th-Percentile Queue Length [ft]	137.94	130.84	156.25	175.58	160.43	426.47	310.37

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	49.63	48.81	48.81	51.23	51.23	51.23	24.82	24.55	24.43	41.75	41.44	33.34
Movement LOS	D	D	D	D	D	D	C	C	C	D	D	C
d_A, Approach Delay [s/veh]	49.24			51.23			24.63			38.06		
Approach LOS	D			D			C			D		
d_I, Intersection Delay [s/veh]	37.28											
Intersection LOS	D											
Intersection V/C	0.573											

Sequence

Ring 1	1	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Middlefield Rd/University Ave

Control Type:	Signalized	Delay (sec / veh):	36.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.489

Intersection Setup

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	140.00	100.00	100.00	180.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	25	240	25	113	497	143	34	240	65	110	352	67
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	240	25	113	497	143	34	240	65	110	352	67
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	60	6	28	124	36	9	60	16	28	88	17
Total Analysis Volume [veh/h]	25	240	25	113	497	143	34	240	65	110	352	67
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			5			14			29		
Bicycle Volume [bicycles/h]	3			23			4			10		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	16.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	2	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	8	0	0	8	0	0	8	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	42	0	0	42	0	0	24	0	0	34	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	12	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	22	22	22	22	22	46	46	20	20
g / C, Green / Cycle	0.22	0.22	0.22	0.22	0.22	0.46	0.46	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.01	0.15	0.06	0.19	0.18	0.10	0.09	0.16	0.14
s, saturation flow rate [veh/h]	1750	1750	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	110	384	185	384	384	824	824	365	365
d1, Uniform Delay [s]	30.94	35.94	32.60	37.64	37.01	16.33	16.11	37.62	36.88
k, delay calibration	0.08	0.08	0.08	0.08	0.08	0.50	0.50	0.23	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.76	1.66	2.40	4.51	2.97	0.61	0.52	7.00	4.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

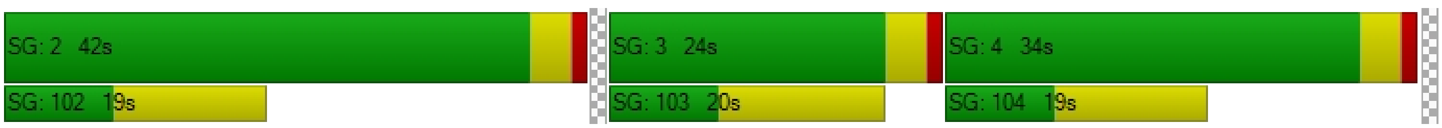
X, volume / capacity	0.23	0.69	0.61	0.87	0.80	0.22	0.19	0.77	0.68
d, Delay for Lane Group [s/veh]	31.70	37.60	35.00	42.15	39.98	16.94	16.63	44.62	41.62
Lane Group LOS	C	D	C	D	D	B	B	D	D
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	0.51	6.12	2.40	8.19	7.35	2.62	2.27	7.17	6.12
50th-Percentile Queue Length [ft]	12.66	153.09	59.91	204.72	183.75	65.61	56.80	179.22	153.00
95th-Percentile Queue Length [veh]	0.91	10.18	4.31	12.88	11.80	4.72	4.09	11.56	10.18
95th-Percentile Queue Length [ft]	22.78	254.54	107.83	322.05	294.91	118.10	102.24	288.99	254.43

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.70	37.60	37.60	35.00	41.43	39.98	16.94	16.82	16.63	44.62	43.07	41.62
Movement LOS	C	D	D	C	D	D	B	B	B	D	D	D
d_A, Approach Delay [s/veh]	37.09			40.19			16.80			43.21		
Approach LOS	D			D			B			D		
d_I, Intersection Delay [s/veh]	36.40											
Intersection LOS	D											
Intersection V/C	0.489											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	82.1
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.142

Intersection Setup

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Bayfront Expy (SR84)		Bayfront Expy (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	1162	113	1450	3960	888	359
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	3.50	1.60	3.10	2.20	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1162	113	1450	3960	888	359
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	291	28	363	990	222	90
Total Analysis Volume [veh/h]	1162	113	1450	3960	888	359
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal group	6	2	5	2	4	4
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	4
Maximum Green [s]	35	110	75	110	15	15
Amber [s]	5.0	5.4	3.0	5.4	3.0	3.0
All red [s]	1.0	0.5	0.5	0.5	1.0	1.0
Split [s]	30	0	0	0	30	30
Vehicle Extension [s]	3.5	3.5	2.0	3.5	2.0	2.0
Walk [s]	5	0	0	0	5	5
Pedestrian Clearance [s]	35	0	0	0	29	29
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	4.0	3.9	1.5	3.9	2.0	2.0
Minimum Recall	Yes		No	Yes	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	6.00	6.00	3.50	5.90	4.00	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	1.50	3.90	2.00	0.00
g_i, Effective Green Time [s]	38	38	54	95	15	73
g / C, Green / Cycle	0.31	0.31	0.45	0.79	0.12	0.61
(v / s)_i Volume / Saturation Flow Rate	0.24	0.07	0.42	0.79	0.26	0.09
s, saturation flow rate [veh/h]	4910	1541	3459	5020	3438	4139
c, Capacity [veh/h]	1537	482	1555	3979	429	2516
d1, Uniform Delay [s]	37.12	30.58	31.31	12.23	52.54	10.11
k, delay calibration	0.13	0.13	0.04	0.13	0.42	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.94	0.30	1.23	6.27	487.12	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

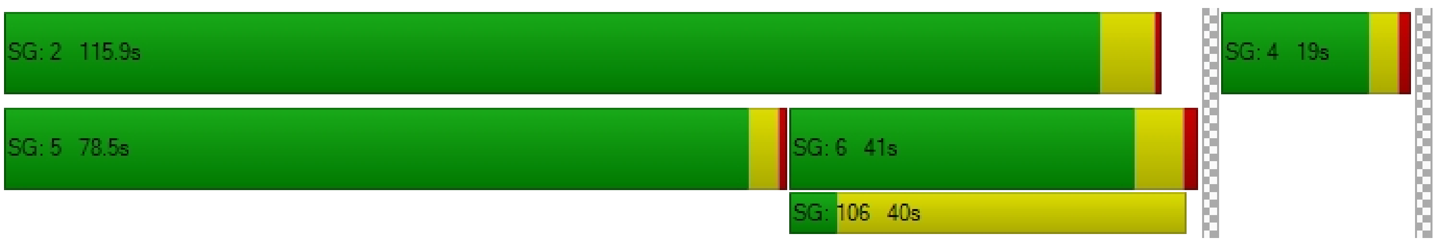
X, volume / capacity	0.76	0.23	0.93	1.00	2.07	0.14
d, Delay for Lane Group [s/veh]	38.06	30.88	32.54	18.49	539.66	10.12
Lane Group LOS	D	C	C	B	F	B
Critical Lane Group	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	9.71	2.34	18.16	20.41	35.45	1.31
50th-Percentile Queue Length [ft]	242.79	58.54	454.07	510.33	886.31	32.71
95th-Percentile Queue Length [veh]	14.82	4.22	25.15	27.82	55.85	2.36
95th-Percentile Queue Length [ft]	370.56	105.38	628.80	695.57	1396.27	58.88

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	38.06	30.88	32.54	18.49	539.66	10.12
Movement LOS	D	C	C	B	F	B
d_A, Approach Delay [s/veh]	37.43		22.26		387.21	
Approach LOS	D		C		F	
d_I, Intersection Delay [s/veh]	82.07					
Intersection LOS	F					
Intersection V/C	1.142					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	155.7
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.147

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Willow Road (SR 114)			Willow Road			Bayfront Expy (SR 84)			Bayfront Expy (SR 84)		
Base Volume Input [veh/h]	500	714	445	16	59	142	263	814	212	732	3641	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	10.90	4.20	10.20	37.50	30.50	40.50	4.60	6.20	12.30	6.70	3.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	16	0	0	106	0	0	0
Total Hourly Volume [veh/h]	500	714	445	16	59	126	263	814	106	732	3641	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	125	179	111	4	15	32	66	204	27	183	910	6
Total Analysis Volume [veh/h]	500	714	445	16	59	126	263	814	106	732	3641	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	17			6			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Split	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	7	7	4	8	4	1	6	2	5	2	6
Auxiliary Signal Groups			5,7									
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	5	5	5	0	5	0	4	4	5	5	5	4
Maximum Green [s]	18	15	15	0	18	0	16	40	90	65	90	40
Amber [s]	3.0	3.9	3.9	0.0	3.0	0.0	3.5	5.0	5.0	3.6	5.0	5.0
All red [s]	1.5	0.5	0.5	0.0	1.5	0.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	39	30	30	0	39	0	12	49	69	32	69	49
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	5	0	0	0	5	0	0	5	0	0	0	5
Pedestrian Clearance [s]	29	0	0	0	29	0	0	35	0	0	0	35
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.5	2.4	2.4	0.0	2.5	0.0	1.5	4.0	4.0	2.6	4.0	4.0
Minimum Recall		No	No		No		No	No		No	No	
Maximum Recall		No	No		No		No	No		No	No	
Pedestrian Recall		No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	20.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.40	4.40	4.40	4.60	4.50	4.50	4.50	3.50	6.00	6.00	4.60	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.40	2.40	2.40	0.00	2.50	2.50	2.50	1.50	4.00	4.00	2.60	4.00	4.00
g_i, Effective Green Time [s]	15	15	15	75	18	18	18	14	64	64	39	90	90
g / C, Green / Cycle	0.10	0.10	0.10	0.50	0.12	0.12	0.12	0.09	0.43	0.43	0.26	0.60	0.60
(v / s)_i Volume / Saturation Flow Rate	0.24	0.24	0.24	0.12	0.01	0.02	0.11	0.08	0.14	0.07	0.22	0.62	0.01
s, saturation flow rate [veh/h]	1632	1801	1659	3764	1316	2772	1123	3360	5836	1438	3293	5846	1615
c, Capacity [veh/h]	163	180	166	1896	158	333	135	309	2485	612	850	3503	968
d1, Uniform Delay [s]	67.50	67.50	67.50	20.96	58.79	59.34	65.42	67.10	28.74	26.69	53.09	30.06	12.23
k, delay calibration	0.50	0.50	0.50	0.11	0.11	0.11	0.36	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	656.3	635.5	630.5	0.06	0.28	0.25	50.64	6.58	0.08	0.13	2.73	20.28	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

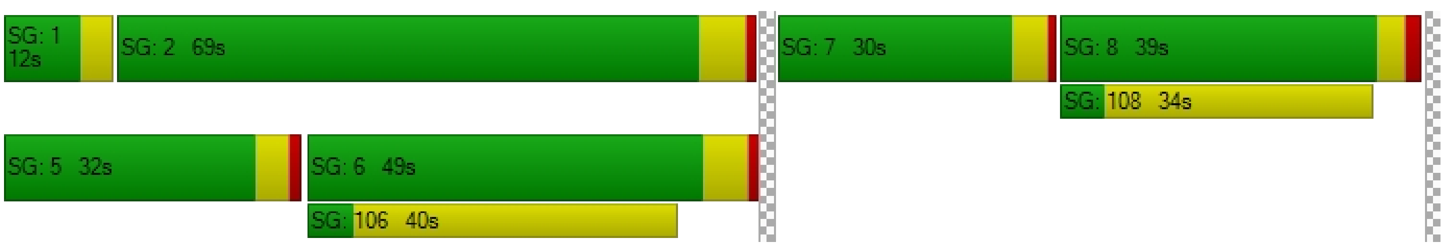
X, volume / capacity	2.42	2.37	2.36	0.23	0.10	0.18	0.94	0.85	0.33	0.17	0.86	1.04	0.02
d, Delay for Lane Group [s/veh]	723.8	703.0	698.0	21.03	59.07	59.59	116.06	73.67	28.81	26.83	55.82	50.34	12.24
Lane Group LOS	F	F	F	C	E	E	F	E	C	C	E	F	B
Critical Lane Group	Yes	No	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	35.94	38.64	35.36	2.93	0.57	1.04	6.75	5.27	6.65	2.43	13.51	46.78	0.34
50th-Percentile Queue Length [ft]	898.5	965.9	884.0	73.30	14.17	26.09	168.85	131.72	166.17	60.71	337.84	1169.54	8.47
95th-Percentile Queue Length [veh]	56.46	60.26	55.55	5.28	1.02	1.88	11.02	9.03	10.87	4.37	19.54	60.02	0.61
95th-Percentile Queue Length [ft]	1411.	1506.	1388.	131.9	25.50	46.96	275.41	225.83	271.87	109.28	488.56	1500.53	15.25

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	719.60	700.31	21.03	59.07	59.59	116.06	73.67	28.81	26.83	55.82	50.34	12.24
Movement LOS	F	F	C	E	E	F	E	C	C	E	F	B
d_A, Approach Delay [s/veh]		523.87			94.95			38.61			51.05	
Approach LOS		F			F			D			D	
d_I, Intersection Delay [s/veh]	155.69											
Intersection LOS	F											
Intersection V/C	1.147											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	10.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.823

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	170	1531	97	88	810	57	78	22	50	26	24	23
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	6.30	7.00	9.10	8.40	10.50	1.30	4.50	6.00	23.10	12.50	30.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	170	1531	97	88	810	57	78	22	50	26	24	23
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	43	383	24	22	203	14	20	6	13	7	6	6
Total Analysis Volume [veh/h]	170	1531	97	88	810	57	78	22	50	26	24	23
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			16			10			7		
Bicycle Volume [bicycles/h]	15			7			8			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	1	6	2	5	2	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	4	4	4	4	4	4
Maximum Green [s]	21	30	70	16	70	30	26	26	26	26	26	26
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.2	3.2	3.2
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	30	30	0	0	0	30	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	7	7	0	7	7	5	5	5	5	5	5
Pedestrian Clearance [s]	0	19	15	0	15	19	25	25	25	25	25	25
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.2	1.2	1.2
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	6.0	0.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	1.00	2.00	2.00	0.00	1.20
g_i, Effective Green Time [s]	5	25	25	3	22	22	5	5
g / C, Green / Cycle	0.12	0.58	0.58	0.07	0.52	0.52	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.10	0.46	0.47	0.05	0.25	0.25	0.09	0.05
s, saturation flow rate [veh/h]	1781	1787	1742	1659	1753	1703	1598	1494
c, Capacity [veh/h]	223	1037	1011	110	914	888	242	287
d1, Uniform Delay [s]	18.18	6.97	7.09	19.78	6.56	6.58	18.10	17.63
k, delay calibration	0.04	0.23	0.24	0.04	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.02	2.89	3.37	4.92	0.56	0.58	0.97	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

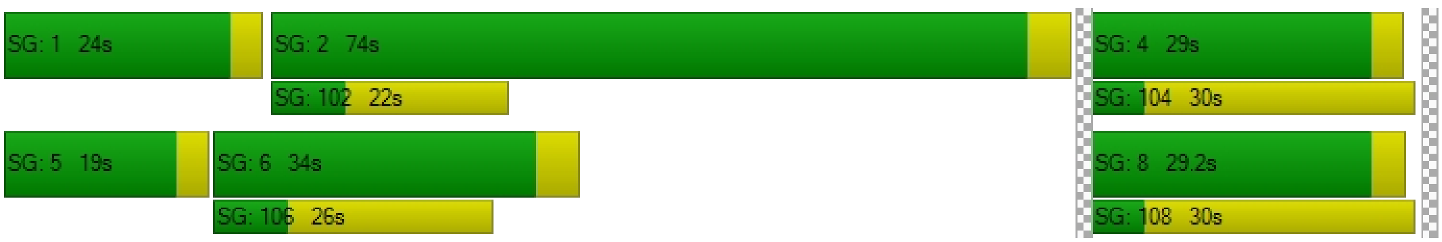
X, volume / capacity	0.76	0.79	0.80	0.80	0.48	0.48	0.62	0.25
d, Delay for Lane Group [s/veh]	20.20	9.86	10.46	24.71	7.12	7.16	19.07	17.80
Lane Group LOS	C	A	B	C	A	A	B	B
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	1.45	3.32	3.46	0.91	1.78	1.75	1.35	0.62
50th-Percentile Queue Length [ft]	36.36	82.93	86.44	22.87	44.56	43.73	33.78	15.40
95th-Percentile Queue Length [veh]	2.62	5.97	6.22	1.65	3.21	3.15	2.43	1.11
95th-Percentile Queue Length [ft]	65.45	149.28	155.59	41.17	80.20	78.71	60.81	27.71

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.20	10.14	10.46	24.71	7.14	7.16	19.07	19.07	19.07	17.80	17.80	17.80
Movement LOS	C	B	B	C	A	A	B	B	B	B	B	B
d_A, Approach Delay [s/veh]	11.11			8.76			19.07			17.80		
Approach LOS	B			A			B			B		
d_I, Intersection Delay [s/veh]	10.92											
Intersection LOS	B											
Intersection V/C	0.823											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	13.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.668

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	135.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	150	1781	842	9	17	147
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.30	5.70	10.30	22.20	0.00	6.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	150	1781	842	9	17	147
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	445	211	2	4	37
Total Analysis Volume [veh/h]	150	1781	842	9	17	147
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14		18		7	
Bicycle Volume [bicycles/h]	16		6		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	90.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lag	-
Minimum Green [s]	4	15	10	10	11	11
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	4.0	3.0	3.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	41	125	84	84	35	35
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	5	5
Pedestrian Clearance [s]	0	0	22	22	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	1.0	2.0	2.0	2.0	1.0	1.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	2.00	1.00	1.00
g_i, Effective Green Time [s]	16	135	116	116	18	18
g / C, Green / Cycle	0.10	0.84	0.73	0.73	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.08	0.52	0.25	0.25	0.01	0.10
s, saturation flow rate [veh/h]	1769	3423	1723	1715	1810	1440
c, Capacity [veh/h]	171	2883	1252	1247	206	164
d1, Uniform Delay [s]	71.31	4.14	7.92	7.93	63.41	69.95
k, delay calibration	0.04	0.50	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.47	1.00	0.74	0.75	0.06	6.69
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

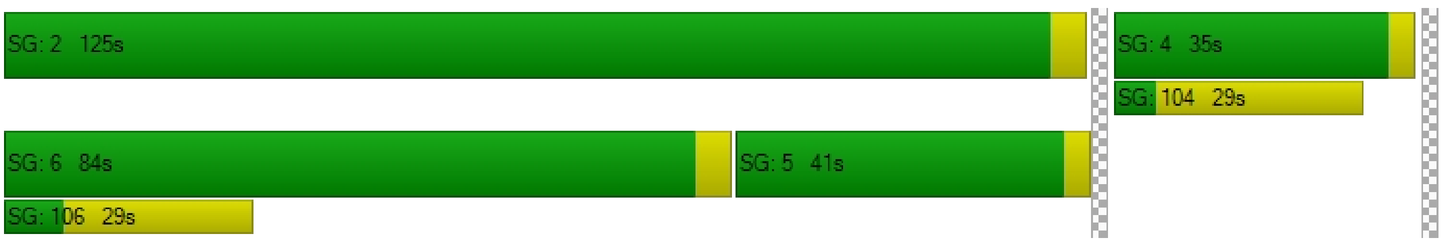
X, volume / capacity	0.88	0.62	0.34	0.34	0.08	0.90
d, Delay for Lane Group [s/veh]	76.78	5.14	8.66	8.68	63.47	76.64
Lane Group LOS	E	A	A	A	E	E
Critical Lane Group	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	6.29	7.23	5.24	5.25	0.63	6.28
50th-Percentile Queue Length [ft]	157.26	180.80	131.02	131.24	15.74	156.92
95th-Percentile Queue Length [veh]	10.40	11.64	9.00	9.01	1.13	10.39
95th-Percentile Queue Length [ft]	260.09	291.06	224.88	225.18	28.34	259.64

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.78	5.14	8.67	8.68	63.47	76.64
Movement LOS	E	A	A	A	E	E
d_A, Approach Delay [s/veh]	10.71		8.67		75.27	
Approach LOS	B		A		E	
d_I, Intersection Delay [s/veh]	13.71					
Intersection LOS	B					
Intersection V/C	0.668					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	17.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.744

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1839	329	54	969	311	92
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.40	5.30	7.40	9.70	10.30	8.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1839	329	54	969	311	92
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	460	82	14	242	78	23
Total Analysis Volume [veh/h]	1839	329	54	969	311	92
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		21	
Bicycle Volume [bicycles/h]	27		1		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	93.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	5	15	8	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	4.0	4.0	3.0	4.0	3.2	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	104	104	13	117	43	0
Vehicle Extension [s]	4.0	4.0	2.0	4.0	2.0	0.0
Walk [s]	7	7	0	0	0	0
Pedestrian Clearance [s]	17	17	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	1.0	2.0	1.2	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	3.00	4.00	3.20	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	1.00	2.00	1.20	1.20
g_i, Effective Green Time [s]	121	121	6	131	22	22
g / C, Green / Cycle	0.76	0.76	0.04	0.82	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.54	0.22	0.03	0.29	0.13	0.13
s, saturation flow rate [veh/h]	3432	1462	1685	3298	1641	1578
c, Capacity [veh/h]	2600	1108	68	2693	227	218
d1, Uniform Delay [s]	10.12	6.06	76.12	3.81	67.87	67.89
k, delay calibration	0.50	0.50	0.04	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.65	0.68	7.71	0.38	5.35	5.61
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.71	0.30	0.80	0.36	0.90	0.91
d, Delay for Lane Group [s/veh]	11.77	6.75	83.83	4.18	73.22	73.50
Lane Group LOS	B	A	F	A	E	E
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	15.37	3.38	2.34	3.46	8.64	8.34
50th-Percentile Queue Length [ft]	384.36	84.45	58.46	86.49	215.97	208.44
95th-Percentile Queue Length [veh]	21.80	6.08	4.21	6.23	13.46	13.07
95th-Percentile Queue Length [ft]	545.12	152.00	105.22	155.68	336.47	326.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.77	6.75	83.83	4.18	73.32	73.50
Movement LOS	B	A	F	A	E	E
d_A, Approach Delay [s/veh]	11.01		8.39		73.36	
Approach LOS	B		A		E	
d_I, Intersection Delay [s/veh]	17.25					
Intersection LOS	B					
Intersection V/C	0.744					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	59.5
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.959

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	163	2050	180	52	1151	10	67	306	509	332	146	51
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	5.70	6.60	2.00	10.00	30.00	10.80	4.10	1.80	2.90	7.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	44	0	0	34
Total Hourly Volume [veh/h]	163	2050	180	52	1151	10	67	306	465	332	146	17
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	513	45	13	288	3	17	77	116	83	37	4
Total Analysis Volume [veh/h]	163	2050	180	52	1151	10	67	306	465	332	146	17
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			39			14			15		
Bicycle Volume [bicycles/h]	11			5			6			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	97.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	4	4	8	3	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	4	4	4	0	4	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0
Split [s]	32	77	77	8	53	53	56	56	56	0	19	0
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	0.0	2.0	0.0
Walk [s]	0	5	5	0	7	7	5	5	5	0	0	0
Pedestrian Clearance [s]	0	19	19	0	16	16	23	23	23	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	3.0	3.0	1.0	3.0	3.0	2.0	2.0	2.0	0.0	1.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	5.00	5.00	3.00	5.00	5.00	4.00	4.00	4.00	3.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	3.00	3.00	1.00	3.00	3.00	2.00	2.00	2.00	1.00	1.00	1.00
g_i, Effective Green Time [s]	17	74	74	5	62	62	50	50	50	16	16	16
g / C, Green / Cycle	0.10	0.46	0.46	0.03	0.39	0.39	0.32	0.32	0.32	0.10	0.10	0.10
(v / s)_i Volume / Saturation Flow Rate	0.09	0.43	0.44	0.03	0.23	0.23	0.04	0.17	0.30	0.10	0.08	0.01
s, saturation flow rate [veh/h]	1774	3423	1704	1774	3289	1717	1633	1825	1525	3415	1767	1592
c, Capacity [veh/h]	184	1576	784	55	1275	666	514	574	480	342	177	159
d1, Uniform Delay [s]	70.75	40.93	41.87	77.35	39.03	39.05	39.18	45.14	54.05	71.78	70.63	65.50
k, delay calibration	0.04	0.50	0.50	0.30	0.50	0.50	0.04	0.04	0.41	0.04	0.30	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.46	11.82	24.38	77.67	2.07	3.94	0.04	0.29	30.31	8.71	22.24	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

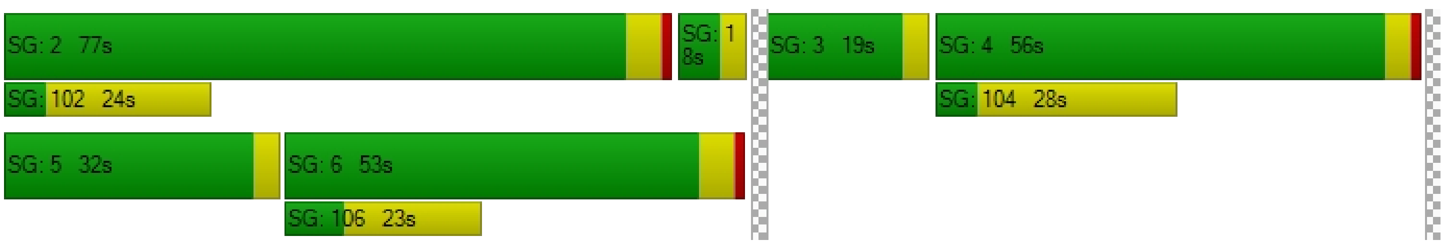
X, volume / capacity	0.89	0.94	0.96	0.94	0.60	0.60	0.13	0.53	0.97	0.97	0.83	0.11
d, Delay for Lane Group [s/veh]	76.22	52.75	66.25	155.01	41.11	42.99	39.23	45.43	84.37	80.49	92.88	65.61
Lane Group LOS	E	D	E	F	D	D	D	D	F	F	F	E
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	6.83	29.36	33.38	3.36	12.56	13.49	1.93	10.17	22.47	7.24	7.00	0.64
50th-Percentile Queue Length [ft]	170.74	734.05	834.59	84.00	314.07	337.27	48.27	254.34	561.72	180.94	174.97	16.06
95th-Percentile Queue Length [veh]	11.12	38.25	42.86	6.05	18.38	19.51	3.48	15.40	30.24	11.65	11.34	1.16
95th-Percentile Queue Length [ft]	277.89	956.22	1071.48	151.21	459.39	487.86	86.88	385.11	756.07	291.25	283.44	28.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.22	56.54	66.25	155.01	41.74	42.99	39.23	45.43	84.37	80.49	92.88	65.61
Movement LOS	E	E	E	F	D	D	D	D	F	F	F	E
d_A, Approach Delay [s/veh]	58.61			46.61			66.54			83.63		
Approach LOS	E			D			E			F		
d_I, Intersection Delay [s/veh]	59.52											
Intersection LOS	E											
Intersection V/C	0.959											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	11.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.721

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	80.00	100.00	100.00	100.00	100.00	175.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	67	1278	1161	445	363	60
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	2.40	3.00	1.80	3.30	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	299	0	77
Total Hourly Volume [veh/h]	67	1278	1161	146	363	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	320	290	37	91	0
Total Analysis Volume [veh/h]	67	1278	1161	146	363	0
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		9	
Bicycle Volume [bicycles/h]	14		6		2	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	10	20	20	4	4
Maximum Green [s]	16	36	36	36	36	36
Amber [s]	3.0	4.5	4.5	4.5	3.2	3.2
All red [s]	0.5	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	0	0
Pedestrian Clearance [s]	0	0	18	18	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.5	3.5	3.5	3.5	2.2	2.2
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	5.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	3.50	2.20	2.20
g_i, Effective Green Time [s]	3	31	25	25	13	13
g / C, Green / Cycle	0.05	0.58	0.46	0.46	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.04	0.36	0.33	0.09	0.21	0.00
s, saturation flow rate [veh/h]	1783	3533	3512	1547	1752	1593
c, Capacity [veh/h]	86	2039	1632	719	429	390
d1, Uniform Delay [s]	25.64	7.64	11.67	8.63	19.59	0.00
k, delay calibration	0.04	0.15	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.57	0.46	0.83	0.20	1.80	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

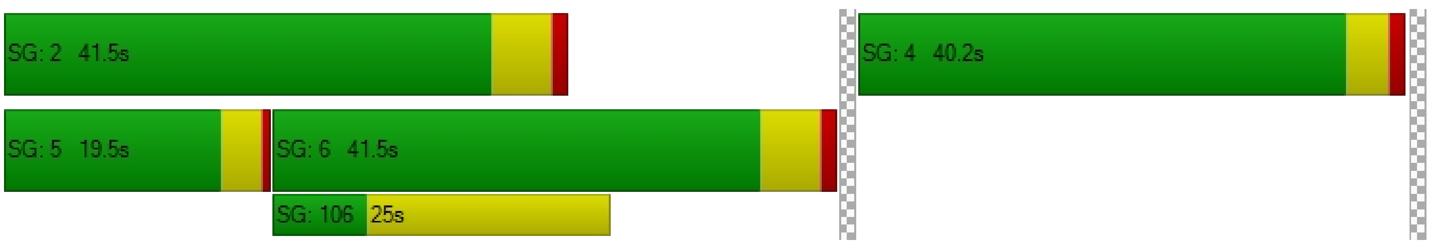
X, volume / capacity	0.78	0.63	0.71	0.20	0.85	0.00
d, Delay for Lane Group [s/veh]	31.22	8.09	12.50	8.82	21.40	0.00
Lane Group LOS	C	A	B	A	C	A
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	0.93	3.63	4.50	0.84	4.12	0.00
50th-Percentile Queue Length [ft]	23.32	90.86	112.52	21.02	102.91	0.00
95th-Percentile Queue Length [veh]	1.68	6.54	7.98	1.51	7.41	0.00
95th-Percentile Queue Length [ft]	41.98	163.55	199.51	37.84	185.23	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.22	8.09	12.50	8.82	21.40	0.00
Movement LOS	C	A	B	A	C	A
d_A, Approach Delay [s/veh]	9.24		12.09		21.40	
Approach LOS	A		B		C	
d_I, Intersection Delay [s/veh]	11.94					
Intersection LOS	B					
Intersection V/C	0.721					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	23.1
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.757

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	30	1184	18	41	1058	102	40	3	10	74	18	108
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	6	0	0	0
Total Hourly Volume [veh/h]	30	1184	18	41	1058	102	40	3	4	74	18	108
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	296	5	10	265	26	10	1	1	19	5	27
Total Analysis Volume [veh/h]	30	1184	18	41	1058	102	40	3	4	74	18	108
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			10			10			20		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	30	30	4	30	30	4	4	4	4	4	4
Maximum Green [s]	30	100	100	20	100	100	30	30	30	30	30	30
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	30	30	0	30	30	30	30	30	30	30	30
Vehicle Extension [s]	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	7	7	7	7	7	7
Pedestrian Clearance [s]	0	11	11	0	15	15	15	15	15	15	15	15
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
g_i, Effective Green Time [s]	3	84	84	4	85	24	24	24	24
g / C, Green / Cycle	0.02	0.67	0.67	0.03	0.68	0.19	0.19	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.02	0.32	0.32	0.02	0.62	0.06	0.00	0.05	0.08
s, saturation flow rate [veh/h]	1810	1900	1889	1810	1870	754	1615	1411	1628
c, Capacity [veh/h]	39	1270	1263	54	1265	202	314	152	316
d1, Uniform Delay [s]	61.00	10.09	10.09	60.34	17.25	50.49	40.77	57.55	44.08
k, delay calibration	0.11	0.23	0.23	0.11	0.37	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	27.34	0.59	0.59	19.74	9.31	0.52	0.02	2.41	0.81
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.47	0.47	0.76	0.92	0.21	0.01	0.49	0.40
d, Delay for Lane Group [s/veh]	88.34	10.68	10.69	80.08	26.56	51.01	40.79	59.96	44.90
Lane Group LOS	F	B	B	F	C	D	D	E	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.25	8.05	8.02	1.60	29.57	1.31	0.11	2.43	3.54
50th-Percentile Queue Length [ft]	31.29	201.34	200.47	39.98	739.25	32.84	2.65	60.71	88.38
95th-Percentile Queue Length [veh]	2.25	12.71	12.66	2.88	38.49	2.36	0.19	4.37	6.36
95th-Percentile Queue Length [ft]	56.31	317.69	316.57	71.96	962.20	59.11	4.76	109.27	159.09

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	88.34	10.68	10.69	80.08	26.56	26.56	51.01	51.01	40.79	59.96	44.90	44.90
Movement LOS	F	B	B	F	C	C	D	D	D	E	D	D
d_A, Approach Delay [s/veh]	12.57			28.39			50.14			50.47		
Approach LOS	B			C			D			D		
d_I, Intersection Delay [s/veh]	23.15											
Intersection LOS	C											
Intersection V/C	0.757											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	20.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.751

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Coleman Avenue			Coleman Avenue		
Base Volume Input [veh/h]	23	914	3	1	805	120	207	6	55	4	4	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	4.70	0.00	0.00	3.90	3.30	1.00	0.00	0.00	0.00	0.00	20.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	914	3	1	805	120	207	6	55	4	4	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	229	1	0	201	30	52	2	14	1	1	1
Total Analysis Volume [veh/h]	23	914	3	1	805	120	207	6	55	4	4	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			64			10			11		
Bicycle Volume [bicycles/h]	24			12			10			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	30.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	10	10	10	10	10	4	4	4	0	4	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	90	90	90	90	90	90	60	60	60	0	60	0
Vehicle Extension [s]	6.0	6.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	11	11	11	13	13	13	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	0.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	110	110	110	110	32	32
g / C, Green / Cycle	0.73	0.73	0.73	0.73	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.04	0.51	0.00	0.52	0.20	0.01
s, saturation flow rate [veh/h]	588	1813	619	1779	1365	1730
c, Capacity [veh/h]	301	1331	325	1306	331	397
d1, Uniform Delay [s]	25.28	10.73	22.98	11.06	57.99	47.01
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.49	2.93	0.02	3.27	4.99	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

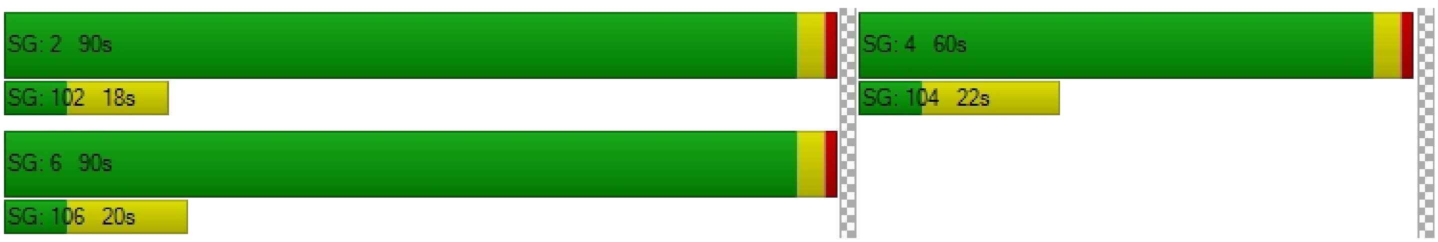
X, volume / capacity	0.08	0.69	0.00	0.71	0.81	0.03
d, Delay for Lane Group [s/veh]	25.78	13.67	22.99	14.32	62.98	47.04
Lane Group LOS	C	B	C	B	E	D
Critical Lane Group	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.55	16.70	0.02	16.97	10.46	0.40
50th-Percentile Queue Length [ft]	13.63	417.39	0.54	424.18	261.42	9.99
95th-Percentile Queue Length [veh]	0.98	23.40	0.04	23.72	15.76	0.72
95th-Percentile Queue Length [ft]	24.53	584.91	0.98	593.06	394.00	17.97

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.78	13.67	13.67	22.99	14.32	14.32	62.98	62.98	62.98	47.04	47.04	47.04
Movement LOS	C	B	B	C	B	B	E	E	E	D	D	D
d_A, Approach Delay [s/veh]	13.97			14.33			62.98			47.04		
Approach LOS	B			B			E			D		
d_I, Intersection Delay [s/veh]	20.44											
Intersection LOS	C											
Intersection V/C	0.751											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	23.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.630

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	3	745	40	27	835	4	64	121	29	88	126	113
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.20	10.00	7.40	3.60	0.00	2.70	0.00	0.00	2.60	0.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	3	745	40	27	835	4	64	121	29	88	126	113
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	186	10	7	209	1	16	30	7	22	32	28
Total Analysis Volume [veh/h]	3	745	40	27	835	4	64	121	29	88	126	113
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			20			4			5		
Bicycle Volume [bicycles/h]	23			28			16			15		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	68.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	12	12	12	12	12	12	5	5	5	0	5	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	107	107	107	107	107	107	43	43	43	0	43	0
Vehicle Extension [s]	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	14	14	14	14	14	14	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	109	109	109	109	33	33	33	33
g / C, Green / Cycle	0.73	0.73	0.73	0.73	0.22	0.22	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.00	0.44	0.04	0.46	0.06	0.08	0.07	0.14
s, saturation flow rate [veh/h]	666	1786	652	1832	1127	1815	1222	1670
c, Capacity [veh/h]	366	1297	371	1330	135	398	215	366
d1, Uniform Delay [s]	20.51	10.04	19.95	10.38	67.73	49.84	60.21	53.36
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.13
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.04	2.10	0.38	2.28	2.58	0.59	1.24	2.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.01	0.61	0.07	0.63	0.47	0.38	0.41	0.65
d, Delay for Lane Group [s/veh]	20.55	12.14	20.33	12.66	70.30	50.44	61.45	55.67
Lane Group LOS	C	B	C	B	E	D	E	E
Critical Lane Group	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.06	13.01	0.56	14.38	2.53	4.95	3.23	8.57
50th-Percentile Queue Length [ft]	1.54	325.19	13.92	359.52	63.14	123.78	80.83	214.22
95th-Percentile Queue Length [veh]	0.11	18.92	1.00	20.60	4.55	8.60	5.82	13.37
95th-Percentile Queue Length [ft]	2.77	473.06	25.06	515.00	113.66	215.01	145.49	334.24

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	20.55	12.14	12.14	20.33	12.66	12.66	70.30	50.44	50.44	61.45	55.67	55.67
Movement LOS	C	B	B	C	B	B	E	D	D	E	E	E
d_A, Approach Delay [s/veh]		12.17			12.90			56.38			57.22	
Approach LOS		B			B			E			E	
d_I, Intersection Delay [s/veh]	23.48											
Intersection LOS	C											
Intersection V/C	0.630											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	59.0
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.570

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	31	224	155	458	75	391	80	368	256	320	356	15
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.00	3.60	2.60	2.70	3.80	2.50	0.50	5.50	5.30	3.70	13.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	119	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	31	224	36	458	75	0	80	368	256	320	356	15
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	56	9	115	19	0	20	92	64	80	89	4
Total Analysis Volume [veh/h]	31	224	36	458	75	0	80	368	256	320	356	15
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			11			3		
Bicycle Volume [bicycles/h]	33			43			24			24		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	8	1	8	4	4	4	6	3	6	2	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	Lag	-	-
Minimum Green [s]	0	3	0	3	3	3	0	3	0	3	3	3
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.3	0.0	3.7	3.7	3.7	0.0	3.7	0.0	3.7	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	0	42	0	35	35	35	0	42	0	31	31	31
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	8	0	8	8	8	0	8	0	8	8	8
Pedestrian Clearance [s]	0	20	0	22	22	22	0	17	0	18	18	18
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.3	0.0	2.7	2.7	2.7	0.0	2.7	0.0	2.7	2.7	2.7
Minimum Recall		No			No			No			Yes	
Maximum Recall		No			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.30	4.30	4.30	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.30	2.30	2.30	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	21	21	21	64	64	64	23	23	23	23	24	24	24
g / C, Green / Cycle	0.14	0.14	0.14	0.43	0.43	0.43	0.15	0.15	0.15	0.15	0.16	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.02	0.12	0.03	0.15	0.15	0.00	0.05	0.12	0.12	0.13	0.13	0.13	0.13
s, saturation flow rate [veh/h]	1810	1810	1425	1764	1786	1556	1765	1891	1731	1411	1718	1799	1635
c, Capacity [veh/h]	252	252	199	755	764	666	268	287	263	215	271	284	258
d1, Uniform Delay [s]	56.50	63.38	56.97	28.86	28.86	0.00	56.47	61.21	61.51	62.03	61.42	61.40	61.46
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.22	10.16	0.43	1.28	1.27	0.00	0.61	4.69	5.98	9.71	7.31	6.92	7.84
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.12	0.89	0.18	0.35	0.35	0.00	0.30	0.78	0.81	0.86	0.85	0.85	0.85
d, Delay for Lane Group [s/veh]	56.72	73.53	57.40	30.15	30.13	0.00	57.09	65.90	67.49	71.75	68.74	68.32	69.30
Lane Group LOS	E	E	E	C	C	A	E	E	E	E	E	E	E
Critical Lane Group	No	Yes	No	Yes	No	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	1.05	9.14	1.24	6.87	6.95	0.00	2.76	8.68	8.35	7.47	9.12	9.49	8.75
50th-Percentile Queue Length [ft]	26.37	228.44	31.03	171.81	173.86	0.00	69.10	216.9	208.7	186.8	227.90	237.13	218.86
95th-Percentile Queue Length [veh]	1.90	14.09	2.23	11.17	11.28	0.00	4.98	13.51	13.09	11.96	14.07	14.54	13.61
95th-Percentile Queue Length [ft]	47.46	352.37	55.85	279.30	281.98	0.00	124.3	337.7	327.2	298.8	351.70	363.40	340.17

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.72	73.53	57.40	30.14	30.13	0.00	57.09	66.52	70.85	68.62	68.88	69.30
Movement LOS	E	E	E	C	C	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	69.75			30.14			66.92			68.77		
Approach LOS	E			C			E			E		
d_I, Intersection Delay [s/veh]	59.03											
Intersection LOS	E											
Intersection V/C	0.570											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	27.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.763

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	16	671	73	22	518	12	169	138	16	136	188	65
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.30	3.00	0.00	4.90	0.00	6.50	0.90	7.70	11.00	2.10	3.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	16	671	73	22	518	12	169	138	16	136	188	65
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	168	18	6	130	3	42	35	4	34	47	16
Total Analysis Volume [veh/h]	16	671	73	22	518	12	169	138	16	136	188	65
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	36			37			51			41		
Bicycle Volume [bicycles/h]	52			17			11			37		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	2	2	6	2	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	4	4	0	4	0	0	4	0	4	4	4
Maximum Green [s]	56	56	56	0	56	0	0	31	0	31	31	31
Amber [s]	3.1	3.1	3.1	0.0	3.1	0.0	0.0	3.1	0.0	3.1	3.1	3.1
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	0	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	2.0	2.0	2.0
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	14	0	14	14	14
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	0.0	2.1	0.0	0.0	2.1	0.0	2.1	2.1	2.1
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	42	42	42	42	11	11	21
g / C, Green / Cycle	0.49	0.49	0.49	0.49	0.13	0.13	0.24
(v / s)_i Volume / Saturation Flow Rate	0.02	0.41	0.03	0.29	0.10	0.09	0.22
s, saturation flow rate [veh/h]	887	1819	728	1800	1699	1799	1777
c, Capacity [veh/h]	306	887	163	878	217	229	430
d1, Uniform Delay [s]	24.53	19.08	35.14	15.98	36.30	35.75	31.60
k, delay calibration	0.11	0.19	0.11	0.11	0.11	0.11	0.10
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.07	3.82	0.37	0.67	6.02	3.39	7.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

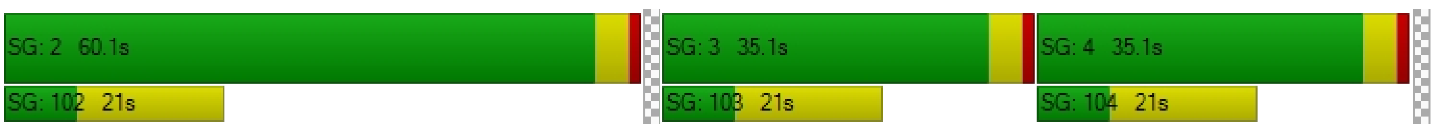
X, volume / capacity	0.05	0.84	0.13	0.60	0.78	0.67	0.91
d, Delay for Lane Group [s/veh]	24.60	22.90	35.51	16.65	42.32	39.15	38.65
Lane Group LOS	C	C	D	B	D	D	D
Critical Lane Group	No	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.25	12.67	0.43	7.16	3.72	3.23	8.51
50th-Percentile Queue Length [ft]	6.24	316.82	10.82	179.05	92.97	80.72	212.69
95th-Percentile Queue Length [veh]	0.45	18.51	0.78	11.55	6.69	5.81	13.29
95th-Percentile Queue Length [ft]	11.24	462.77	19.48	288.78	167.35	145.30	332.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.60	22.90	22.90	35.51	16.65	16.65	42.32	39.15	39.15	38.65	38.65	38.65
Movement LOS	C	C	C	D	B	B	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	22.94			17.40			40.81			38.65		
Approach LOS	C			B			D			D		
d_I, Intersection Delay [s/veh]	27.30											
Intersection LOS	C											
Intersection V/C	0.763											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	8.3
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.530

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	12	277	91	32	369	65	30	107	16	72	200	52
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	3.10	16.50	0.00	1.40	0.00	0.00	2.00	3.80	6.70	3.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	12	277	91	32	369	65	30	107	16	72	200	52
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	69	23	8	92	16	8	27	4	18	50	13
Total Analysis Volume [veh/h]	12	277	91	32	369	65	30	107	16	72	200	52
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	24			51			27			65		
Bicycle Volume [bicycles/h]	28			39			21			32		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	4	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	8	8	8	0	8	0	0	4	0	4	4	4
Maximum Green [s]	30	30	30	0	30	0	0	30	0	30	30	30
Amber [s]	3.2	3.2	3.2	0.0	3.2	0.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	30	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	12	0	12	12	12
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.2	2.2	2.2	0.0	2.2	0.0	0.0	2.2	0.0	2.2	2.2	2.2
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	14	14	11	11
g / C, Green / Cycle	0.43	0.43	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.22	0.27	0.09	0.20
s, saturation flow rate [veh/h]	1714	1742	1744	1636
c, Capacity [veh/h]	844	860	688	656
d1, Uniform Delay [s]	6.98	7.37	8.38	9.42
k, delay calibration	0.11	0.11	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.38	0.53	0.12	0.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.45	0.54	0.22	0.49
d, Delay for Lane Group [s/veh]	7.36	7.91	8.50	9.85
Lane Group LOS	A	A	A	A
Critical Lane Group	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	1.36	1.77	0.62	1.41
50th-Percentile Queue Length [ft]	33.89	44.19	15.57	35.36
95th-Percentile Queue Length [veh]	2.44	3.18	1.12	2.55
95th-Percentile Queue Length [ft]	61.00	79.55	28.02	63.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.36	7.36	7.36	7.91	7.91	7.91	8.50	8.50	8.50	9.85	9.85	9.85
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
d_A, Approach Delay [s/veh]	7.36			7.91			8.50			9.85		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	8.29											
Intersection LOS	A											
Intersection V/C	0.530											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	40.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.005

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	16	117	18	230	21	219	40	2124	286	181	1966	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	3.20	0.00	2.70	0.00	3.60	0.90	0.60	3.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	124	0	0	0
Total Hourly Volume [veh/h]	16	117	18	230	21	219	40	2124	162	181	1966	76
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	29	5	58	5	55	10	531	41	45	492	19
Total Analysis Volume [veh/h]	16	117	18	230	21	219	40	2124	162	181	1966	76
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			2			0			11		
Bicycle Volume [bicycles/h]	0			4			2			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	84.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	0	10	10	0	10	10	0
Maximum Green [s]	0	30	0	0	30	0	25	35	0	25	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	0	41	0	0	41	0	42	88	0	21	67	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
g_i, Effective Green Time [s]	38	38	38	38	8	85	85	17	94	94
g / C, Green / Cycle	0.25	0.25	0.25	0.25	0.05	0.57	0.57	0.11	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.01	0.07	0.27	0.14	0.02	0.61	0.10	0.10	0.38	0.39
s, saturation flow rate [veh/h]	1413	1856	934	1528	1810	3492	1564	1799	3502	1799
c, Capacity [veh/h]	49	470	282	387	98	1984	888	201	2191	1126
d1, Uniform Delay [s]	74.90	45.06	62.18	48.77	67.16	18.17	8.38	62.88	6.27	6.29
k, delay calibration	0.11	0.11	0.50	0.15	0.11	0.50	0.50	0.34	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.87	0.33	31.32	1.78	2.68	42.19	0.45	31.59	1.30	2.56
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

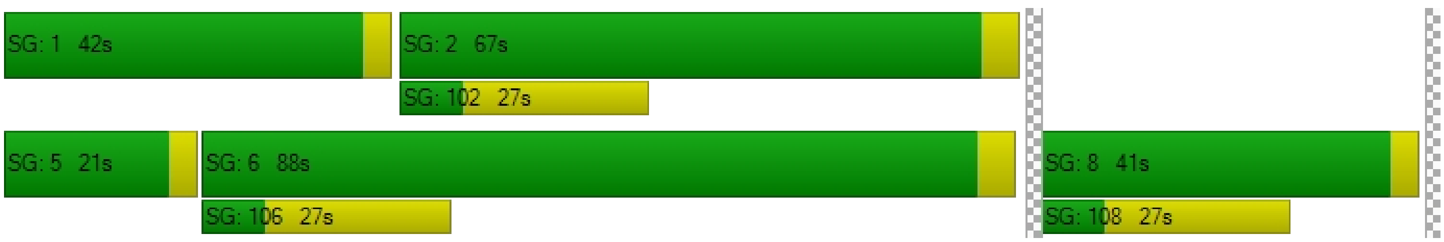
X, volume / capacity	0.33	0.29	0.89	0.57	0.41	1.07	0.18	0.90	0.61	0.62
d, Delay for Lane Group [s/veh]	78.77	45.39	93.50	50.54	69.84	60.36	8.83	94.47	7.56	8.85
Lane Group LOS	E	D	F	D	E	F	A	F	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.68	4.25	12.16	7.40	1.54	37.25	1.57	8.37	4.95	5.52
50th-Percentile Queue Length [ft]	17.08	106.22	303.89	185.06	38.42	931.32	39.30	209.16	123.67	138.11
95th-Percentile Queue Length [veh]	1.23	7.63	17.87	11.86	2.77	50.02	2.83	13.11	8.59	9.38
95th-Percentile Queue Length [ft]	30.74	190.74	446.84	296.61	69.16	1250.43	70.75	327.75	214.86	234.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	78.77	45.39	45.39	93.50	93.50	50.54	69.84	60.36	8.83	94.47	7.97	8.85
Movement LOS	E	D	D	F	F	D	E	F	A	F	A	A
d_A, Approach Delay [s/veh]	48.93			73.48			56.93			15.04		
Approach LOS	D			E			E			B		
d_I, Intersection Delay [s/veh]	40.19											
Intersection LOS	D											
Intersection V/C	1.005											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	59.4
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.969

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	281	139	137	147	310	28	132	910	45	79	1974	800
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	2.40	1.60	0.00	2.80	0.00	0.00	3.90	0.00	1.90	3.90	3.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	74	0	0	0	0	0	29	0	0	285
Total Hourly Volume [veh/h]	281	139	63	147	310	28	132	910	16	79	1974	515
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	35	16	37	78	7	33	228	4	20	494	129
Total Analysis Volume [veh/h]	281	139	63	147	310	28	132	910	16	79	1974	515
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			12			10			5		
Bicycle Volume [bicycles/h]	18			15			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	106.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	3	0	0	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	8	10	0	8	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	21	0	0	31	0	13	33	0	65	85	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	2.0	2.2	0.0	2.0	2.2	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	4.00	4.20	4.20	4.00	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	2.00	2.20	2.20	2.00	2.20	2.20
g_i, Effective Green Time [s]	18	18	18	27	27	9	81	81	9	81	81
g / C, Green / Cycle	0.12	0.12	0.12	0.18	0.18	0.06	0.54	0.54	0.06	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.12	0.12	0.04	0.08	0.19	0.07	0.26	0.01	0.04	0.57	0.34
s, saturation flow rate [veh/h]	1767	1824	1517	1810	1816	1810	3482	1578	1776	3482	1522
c, Capacity [veh/h]	208	215	179	331	333	109	1883	853	101	1872	818
d1, Uniform Delay [s]	66.08	66.08	60.88	54.47	61.26	69.00	11.96	9.67	68.40	21.24	13.53
k, delay calibration	0.44	0.44	0.11	0.11	0.47	0.50	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	56.24	55.33	1.18	0.93	52.01	155.11	0.89	0.04	12.32	36.96	3.65
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

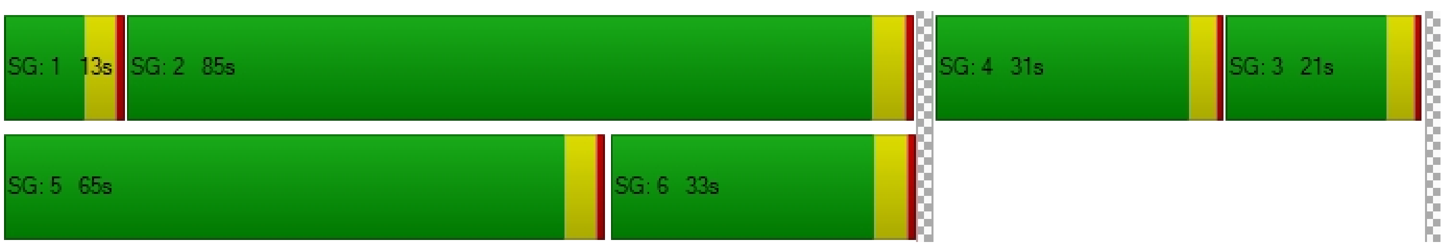
X, volume / capacity	0.99	0.99	0.35	0.44	1.02	1.22	0.48	0.02	0.78	1.05	0.63
d, Delay for Lane Group [s/veh]	122.31	121.41	62.05	55.40	113.27	224.11	12.85	9.71	80.72	58.20	17.19
Lane Group LOS	F	F	E	E	F	F	B	A	F	F	B
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	11.19	11.49	2.29	5.11	17.58	8.75	5.49	0.17	3.29	35.81	8.27
50th-Percentile Queue Length [ft]	279.72	287.32	57.15	127.63	439.56	218.70	137.15	4.15	82.32	895.22	206.77
95th-Percentile Queue Length [veh]	16.67	17.05	4.12	8.81	24.67	14.42	9.33	0.30	5.93	47.67	12.99
95th-Percentile Queue Length [ft]	416.86	426.31	102.88	220.27	616.85	360.44	233.18	7.47	148.17	1191.63	324.68

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	122.08	121.41	62.05	55.40	113.27	113.27	224.11	12.85	9.71	80.72	58.20	17.19
Movement LOS	F	F	E	E	F	F	F	B	A	F	F	B
d_A, Approach Delay [s/veh]	114.05			95.73			39.16			50.67		
Approach LOS	F			F			D			D		
d_I, Intersection Delay [s/veh]	59.44											
Intersection LOS	E											
Intersection V/C	0.969											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report

Intersection 31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	36.9
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.890

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	57	196	53	126	274	68	116	947	95	196	2139	133
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	8.80	1.00	1.90	0.90	2.80	3.20	4.50	5.20	4.10	1.60	4.30	9.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	58	0	0	50	0	0	69	0	0	69
Total Hourly Volume [veh/h]	57	196	0	126	274	18	116	947	26	196	2139	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	49	0	32	69	5	29	237	7	49	535	16
Total Analysis Volume [veh/h]	57	196	0	126	274	18	116	947	26	196	2139	64
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			4			25			11		
Bicycle Volume [bicycles/h]	19			38			0			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	136.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	7	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	0	4	4	0	4	10	0	4	10	0
Maximum Green [s]	16	25	0	16	25	0	18	20	0	18	20	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	10	33	0	14	37	0	12	78	0	25	91	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	1.5	0.0	1.0	1.5	0.0	1.5	2.2	0.0	1.5	2.2	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	3.50	3.50	3.00	3.50	3.50	3.50	4.20	4.20	3.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.50	1.50	1.00	1.50	1.50	1.50	2.20	2.20	1.50	2.20	2.20
g_i, Effective Green Time [s]	6	21	21	11	26	26	9	85	85	18	95	95
g / C, Green / Cycle	0.04	0.14	0.14	0.07	0.17	0.17	0.06	0.57	0.57	0.12	0.63	0.63
(v / s)_i Volume / Saturation Flow Rate	0.03	0.10	0.00	0.07	0.15	0.01	0.07	0.28	0.02	0.11	0.62	0.04
s, saturation flow rate [veh/h]	1663	1881	1585	1793	1848	1443	1732	3439	1546	1781	3468	1436
c, Capacity [veh/h]	71	267	225	132	319	249	99	1954	878	217	2195	909
d1, Uniform Delay [s]	71.06	61.58	0.00	69.14	60.21	51.93	67.77	1.82	1.72	61.88	10.62	4.38
k, delay calibration	0.22	0.11	0.11	0.40	0.20	0.11	0.50	0.50	0.50	0.28	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	32.76	4.02	0.00	59.56	11.90	0.12	145.28	0.86	0.06	26.84	14.05	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.74	0.00	0.96	0.86	0.07	1.18	0.48	0.03	0.90	0.97	0.07
d, Delay for Lane Group [s/veh]	103.82	65.60	0.00	128.70	72.11	52.05	213.05	2.68	1.78	88.72	24.67	4.53
Lane Group LOS	F	E	A	F	E	D	F	A	A	F	C	A
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	2.84	7.53	0.00	7.05	11.28	0.59	7.63	1.15	0.06	8.74	20.21	0.38
50th-Percentile Queue Length [ft]	71.07	188.32	0.00	176.24	282.03	14.70	190.73	28.79	1.60	218.53	505.26	9.54
95th-Percentile Queue Length [veh]	5.12	12.03	0.00	11.40	16.79	1.06	12.75	2.07	0.12	13.59	27.58	0.69
95th-Percentile Queue Length [ft]	127.92	300.85	0.00	285.10	419.74	26.46	318.77	51.82	2.88	339.75	689.58	17.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	103.82	65.60	0.00	128.70	72.11	52.05	213.05	2.68	1.78	88.72	24.67	4.53
Movement LOS	F	E	A	F	E	D	F	A	A	F	C	A
d_A, Approach Delay [s/veh]	74.21			88.30			25.07			29.37		
Approach LOS	E			F			C			C		
d_I, Intersection Delay [s/veh]	36.89											
Intersection LOS	D											
Intersection V/C	0.890											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	22.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.925

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	86	59	83	107	114	78	0	2115	101	0	1491	17
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.80	18.50	7.90	2.40	20.50	3.30	0.00	3.80	5.10	0.00	3.50	8.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	53	0	0	84
Total Hourly Volume [veh/h]	86	59	83	107	114	78	0	2115	48	0	1491	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	15	21	27	29	20	0	529	12	0	373	0
Total Analysis Volume [veh/h]	86	59	83	107	114	78	0	2115	48	0	1491	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	19			15			43			20		
Bicycle Volume [bicycles/h]	14			36			2			4		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	137.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	3	0	0	4	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	10	0	0	10	0
Maximum Green [s]	0	24	0	0	24	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.7	0.0	0.0	3.7	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	87	0	0	31	0	0	32	0	0	32	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.2	0.0	0.0	2.2	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	14	14	14	25	25	99	99	99	99
g / C, Green / Cycle	0.09	0.09	0.09	0.17	0.17	0.66	0.66	0.66	0.66
(v / s)_i Volume / Saturation Flow Rate	0.05	0.04	0.07	0.07	0.15	0.67	0.04	0.47	0.00
s, saturation flow rate [veh/h]	1569	1443	1109	1590	1267	3137	1338	3146	1346
c, Capacity [veh/h]	143	132	101	267	212	2069	883	2075	888
d1, Uniform Delay [s]	65.42	64.47	66.83	55.63	61.15	0.00	0.00	0.00	0.00
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.99	2.37	14.73	0.97	13.22	25.64	0.12	2.18	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

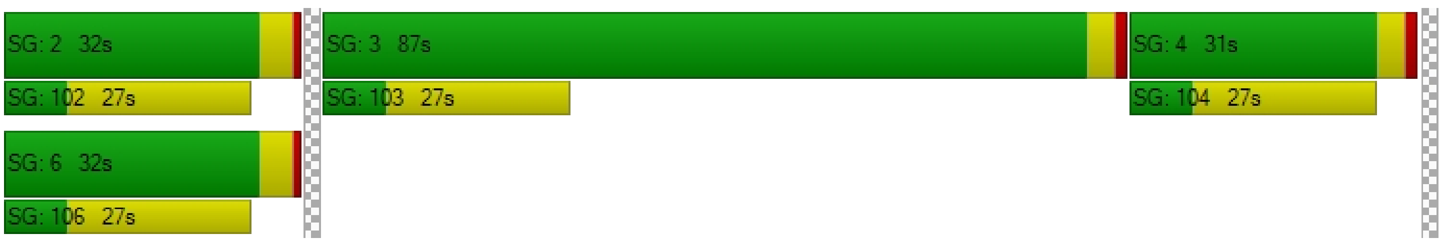
X, volume / capacity	0.60	0.45	0.82	0.40	0.90	1.02	0.05	0.72	0.00
d, Delay for Lane Group [s/veh]	69.40	66.84	81.56	56.60	74.37	25.64	0.12	2.18	0.00
Lane Group LOS	E	E	F	E	E	F	A	A	A
Critical Lane Group	No	No	Yes	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh]	3.34	2.24	3.55	3.74	8.02	45.55	0.03	0.63	0.00
50th-Percentile Queue Length [ft]	83.45	55.90	88.73	93.52	200.42	1138.83	0.72	15.69	0.00
95th-Percentile Queue Length [veh]	6.01	4.03	6.39	6.73	12.66	57.79	0.05	1.13	0.00
95th-Percentile Queue Length [ft]	150.20	100.63	159.71	168.34	316.50	1444.77	1.29	28.24	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.40	66.84	81.56	56.60	74.37	74.37	0.00	25.64	0.12	0.00	2.18	0.00
Movement LOS	E	E	F	E	E	E		F	A		A	A
d_A, Approach Delay [s/veh]	73.16			68.01			25.07			2.18		
Approach LOS	E			E			C			A		
d_I, Intersection Delay [s/veh]	22.60											
Intersection LOS	C											
Intersection V/C	0.925											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	88.7
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.057

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	24	351	61	683	351	72	128	1131	575	247	2174	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	1.20	1.70	2.20	1.40	6.80	10.20	3.10	2.50	3.10	3.50	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	58	0	0	377	0	0	14
Total Hourly Volume [veh/h]	24	351	61	683	351	14	128	1131	198	247	2174	10
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	88	15	171	88	4	32	283	50	62	544	3
Total Analysis Volume [veh/h]	24	351	61	683	351	14	128	1131	198	247	2174	10
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23			0			0			20		
Bicycle Volume [bicycles/h]	41			11			1			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	3	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	4	4	4	8	10	10	8	10	10
Maximum Green [s]	0	30	0	16	16	16	4	16	16	4	16	16
Amber [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.2	3.7	3.7	3.2	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	22	0	31	31	31	13	50	50	47	84	84
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	0	0	7	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	0	0	20	20	20	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.2	2.7	2.7	2.2	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.70	4.70	4.20	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.70	2.70	2.20	2.70	2.70
g_i, Effective Green Time [s]	18	18	27	27	27	9	65	65	23	79	79
g / C, Green / Cycle	0.12	0.12	0.18	0.18	0.18	0.06	0.43	0.43	0.15	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.12	0.13	0.20	0.19	0.01	0.08	0.32	0.13	0.14	0.62	0.01
s, saturation flow rate [veh/h]	1868	1572	3438	1874	1425	1642	3509	1556	1755	3495	1544
c, Capacity [veh/h]	224	189	618	337	256	96	1522	675	270	1849	817
d1, Uniform Delay [s]	65.99	65.99	61.52	61.52	50.97	69.13	25.43	19.94	54.82	8.87	4.19
k, delay calibration	0.45	0.48	0.12	0.48	0.11	0.50	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	65.84	87.71	53.98	59.43	0.09	203.00	3.32	1.10	11.86	85.15	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

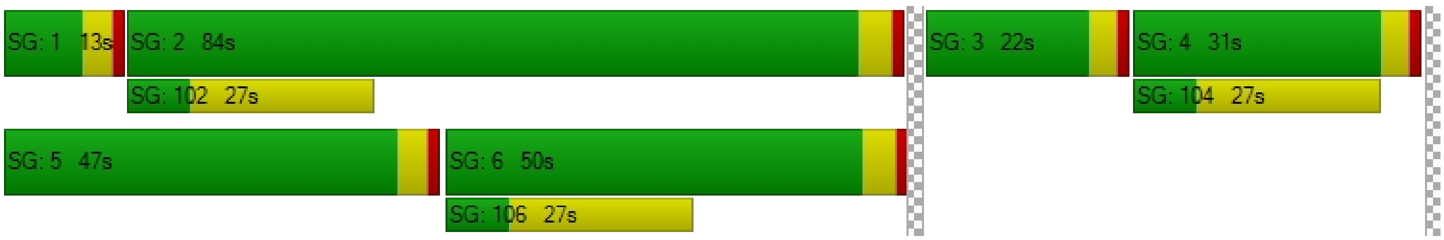
X, volume / capacity	1.03	1.08	1.11	1.04	0.05	1.33	0.74	0.29	0.92	1.18	0.01
d, Delay for Lane Group [s/veh]	131.83	153.70	115.50	120.95	51.06	272.13	28.75	21.04	66.68	94.03	4.21
Lane Group LOS	F	F	F	F	D	F	C	C	E	F	A
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	12.71	11.84	16.41	18.39	0.45	9.05	14.03	3.55	9.21	26.30	0.05
50th-Percentile Queue Length [ft]	317.65	296.06	410.24	459.85	11.22	226.14	350.80	88.68	230.18	657.56	1.20
95th-Percentile Queue Length [veh]	18.83	18.09	24.25	26.01	0.81	15.13	20.18	6.38	14.18	38.98	0.09
95th-Percentile Queue Length [ft]	470.80	452.19	606.32	650.16	20.19	378.33	504.38	159.62	354.59	974.55	2.15

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	131.83	140.75	153.70	115.50	120.95	51.06	272.13	28.75	21.04	66.68	94.03	4.21
Movement LOS	F	F	F	F	F	D	F	C	C	E	F	A
d_A, Approach Delay [s/veh]	142.07			116.46			49.08			90.88		
Approach LOS	F			F			D			F		
d_I, Intersection Delay [s/veh]	88.69											
Intersection LOS	F											
Intersection V/C	1.057											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	6.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.626

Intersection Setup

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Roble Avenue			Roble Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	73	9	76	6	3	10	84	2318	49	48	1976	48
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	10.00	0.00	2.90	0.00	2.30	2.60	2.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	9	0	0	0	0	0	0
Total Hourly Volume [veh/h]	73	9	76	6	3	1	84	2318	49	48	1976	48
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	2	19	2	1	0	21	580	12	12	494	12
Total Analysis Volume [veh/h]	73	9	76	6	3	1	84	2318	49	48	1976	48
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			0			2		
Bicycle Volume [bicycles/h]	16			0			3			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	19.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	8	8	4	8	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	8	8	0	8	0	4	10	10	4	10	10
Maximum Green [s]	30	30	30	0	30	0	20	40	40	20	40	40
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.7	3.7	3.0	3.7	3.7
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	36	36	36	0	36	0	82	32	32	82	32	32
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	7	7	0	7	0	0	7	7	0	7	7
Pedestrian Clearance [s]	20	20	20	0	20	0	0	20	20	0	20	20
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.7	2.7	2.0	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.70	4.70	4.00	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.70	2.70	2.00	2.70	2.70
g_i, Effective Green Time [s]	19	19	19	9	113	113	5	109	109
g / C, Green / Cycle	0.13	0.13	0.13	0.06	0.75	0.75	0.04	0.73	0.73
(v / s)_i Volume / Saturation Flow Rate	0.11	0.01	0.00	0.05	0.44	0.45	0.03	0.38	0.38
s, saturation flow rate [veh/h]	1414	1127	1461	1810	3516	1823	1769	3526	1825
c, Capacity [veh/h]	218	186	189	106	2639	1369	63	2566	1328
d1, Uniform Delay [s]	64.55	57.13	56.89	68.21	0.00	0.00	70.79	0.66	0.66
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.56	0.11	0.01	12.39	0.97	1.90	17.36	0.75	1.47
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

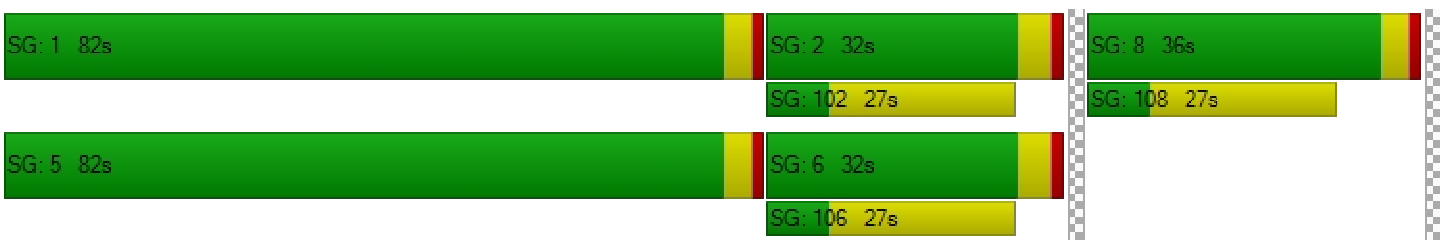
X, volume / capacity	0.73	0.05	0.01	0.79	0.59	0.59	0.77	0.52	0.52
d, Delay for Lane Group [s/veh]	69.11	57.23	56.90	80.60	0.97	1.90	88.15	1.41	2.13
Lane Group LOS	E	E	E	F	A	A	F	A	A
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	6.27	0.31	0.03	3.48	0.36	0.72	2.11	0.89	1.19
50th-Percentile Queue Length [ft]	156.73	7.84	0.87	86.90	8.92	18.04	52.71	22.30	29.73
95th-Percentile Queue Length [veh]	10.38	0.56	0.06	6.26	0.64	1.30	3.79	1.61	2.14
95th-Percentile Queue Length [ft]	259.39	14.11	1.56	156.41	16.05	32.47	94.87	40.13	53.51

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	69.11	69.11	69.11	57.23	57.23	56.90	80.60	1.28	1.90	88.15	1.65	2.13
Movement LOS	E	E	E	E	E	E	F	A	A	F	A	A
d_A, Approach Delay [s/veh]	69.11			57.20			4.01			3.66		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	6.16											
Intersection LOS	A											
Intersection V/C	0.626											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	15.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.773

Intersection Setup

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound				Northwestbound			Southeastbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	55.00	100.0	100.0	100.0	100.0	275.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				30.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Crosswalk	Yes			Yes				No			Yes		

volumes

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	185	0	285	0	0	0	0	348	1987	0	0	1974	77
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	0.00	0.70	0.00	0.00	0.00	0.00	2.20	4.80	0.00	0.00	3.60	2.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	183	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	185	0	102	0	0	0	0	348	1987	0	0	1974	77
Peak Hour Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	0	26	0	0	0	0	87	497	0	0	494	19
Total Analysis Volume [veh/h]	185	0	102	0	0	0	0	348	1987	0	0	1974	77
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			0				0			8		
Bicycle Volume [bicycles/h]	5			0				3			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	34.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Permi	Permi	Permi	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	4	0	0	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	10	0	0	0	0	10	0	10	10	0	0	10	0
Maximum Green [s]	25	0	0	0	0	25	0	30	45	0	0	45	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	42	0	0	0	0	42	0	66	108	0	0	42	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	25	0	0	0	0	25	0	0	20	0	0	0	0
I1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No					No		No	No			No	
Maximum Recall	No					No		No	No			No	
Pedestrian Recall	No					No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	L	C	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	25	25	25	32	118	83	83
g / C, Green / Cycle	0.17	0.17	0.17	0.21	0.78	0.55	0.55
(v / s)_i Volume / Saturation Flow Rate	0.13	0.06	0.00	0.20	0.40	0.39	0.38
s, saturation flow rate [veh/h]	1390	1574	1900	1771	4939	3492	1793
c, Capacity [veh/h]	266	268	347	375	3868	1926	989
d1, Uniform Delay [s]	61.48	55.22	0.00	52.72	0.00	13.20	12.97
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.25	0.89	0.00	10.23	0.49	2.25	3.97
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.70	0.38	0.00	0.93	0.51	0.71	0.69
d, Delay for Lane Group [s/veh]	64.74	56.11	0.00	62.95	0.49	15.45	16.94
Lane Group LOS	E	E	A	E	A	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	7.13	3.52	0.00	13.35	0.18	10.41	10.62
50th-Percentile Queue Length [ft]	178.13	88.12	0.00	333.82	4.39	260.16	265.54
95th-Percentile Queue Length [veh]	11.50	6.34	0.00	19.35	0.32	15.70	15.97
95th-Percentile Queue Length [ft]	287.57	158.62	0.00	483.65	7.91	392.42	399.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	64.74	0.00	56.11	0.00	0.00	0.00	0.00	62.95	0.49	0.00	0.00	15.91	16.94
Movement LOS	E		E	A	A	A	A	E	A			B	B
d_A, Approach Delay [s/veh]	61.67			0.00				9.80			15.95		
Approach LOS	E			A				A			B		
d_I, Intersection Delay [s/veh]	15.68												
Intersection LOS	B												
Intersection V/C	0.773												

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	5.3
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.671

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	30	0	54	1	0	0	167	1693	1	40	2742	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.60	0.00	0.00	0.00	0.00	0.00	0.80	3.70	0.00	6.70	2.60	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	54	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	30	0	0	1	0	0	167	1693	1	40	2742	20
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	0	0	0	0	0	42	423	0	10	686	5
Total Analysis Volume [veh/h]	30	0	0	1	0	0	167	1693	1	40	2742	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			6		
Bicycle Volume [bicycles/h]	0			0			5			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	77.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	11	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	30	0	30	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Split [s]	0	31	0	0	31	0	71	26	0	93	48	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	15	0	0	15	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	16	123	123	5	111	111
g / C, Green / Cycle	0.07	0.07	0.07	0.11	0.82	0.82	0.03	0.74	0.74
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.00	0.09	0.32	0.32	0.02	0.51	0.52
s, saturation flow rate [veh/h]	1665	1615	854	1795	3489	1832	1696	3526	1844
c, Capacity [veh/h]	162	111	107	194	2863	1503	52	2621	1371
d1, Uniform Delay [s]	66.10	0.00	69.03	63.02	0.00	0.00	71.36	0.18	0.18
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.54	0.00	0.03	10.51	0.40	0.76	20.70	1.52	2.91
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

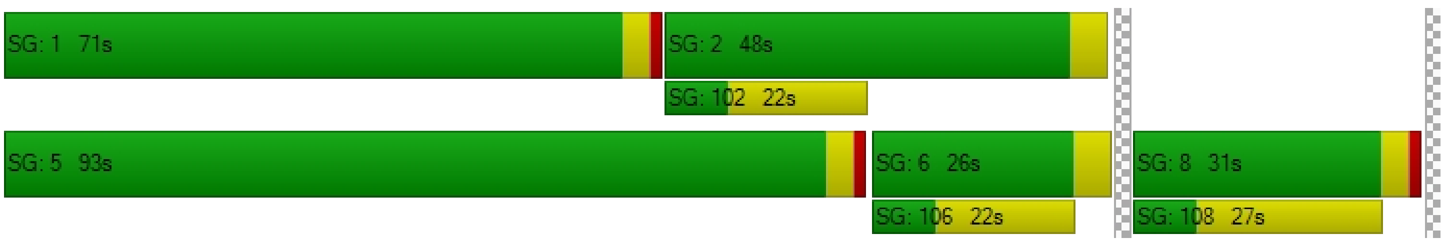
X, volume / capacity	0.19	0.00	0.01	0.86	0.39	0.39	0.77	0.69	0.69
d, Delay for Lane Group [s/veh]	66.65	0.00	69.07	73.53	0.40	0.76	92.06	1.70	3.10
Lane Group LOS	E	A	E	E	A	A	F	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.13	0.00	0.04	6.57	0.16	0.32	1.81	0.80	1.37
50th-Percentile Queue Length [ft]	28.17	0.00	0.97	164.26	3.96	7.90	45.24	19.98	34.17
95th-Percentile Queue Length [veh]	2.03	0.00	0.07	10.77	0.28	0.57	3.26	1.44	2.46
95th-Percentile Queue Length [ft]	50.70	0.00	1.75	269.35	7.12	14.22	81.43	35.96	61.51

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	66.65	66.65	0.00	69.07	69.07	69.07	73.53	0.52	0.76	92.06	2.18	3.10
Movement LOS	E	E	A	E	E	E	E	A	A	F	A	A
d_A, Approach Delay [s/veh]	66.65			69.07			7.07			3.47		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	5.31											
Intersection LOS	A											
Intersection V/C	0.671											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	9.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.548

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	410	399	74	426	309	69
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.93	1.92	2.00	1.94	1.90	1.74
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	410	399	74	426	309	69
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	103	100	19	107	77	17
Total Analysis Volume [veh/h]	410	399	74	426	309	69
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		21		23	
Bicycle Volume [bicycles/h]	11		91		16	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	0
Maximum Green [s]	30	30	15	40	25	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	30	30	0	30	0	0
Vehicle Extension [s]	2.0	2.0	2.0	2.0	2.0	0.0
Walk [s]	7	7	0	0	7	0
Pedestrian Clearance [s]	10	10	0	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	0.0
Minimum Recall	Yes		Yes	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	12	12	2	18	8	8
g / C, Green / Cycle	0.35	0.35	0.06	0.53	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.22	0.27	0.04	0.23	0.17	0.05
s, saturation flow rate [veh/h]	1864	1484	1774	1864	1776	1447
c, Capacity [veh/h]	654	520	106	986	414	338
d1, Uniform Delay [s]	9.34	9.96	15.93	4.96	12.29	10.66
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.37	0.90	3.05	0.11	1.01	0.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

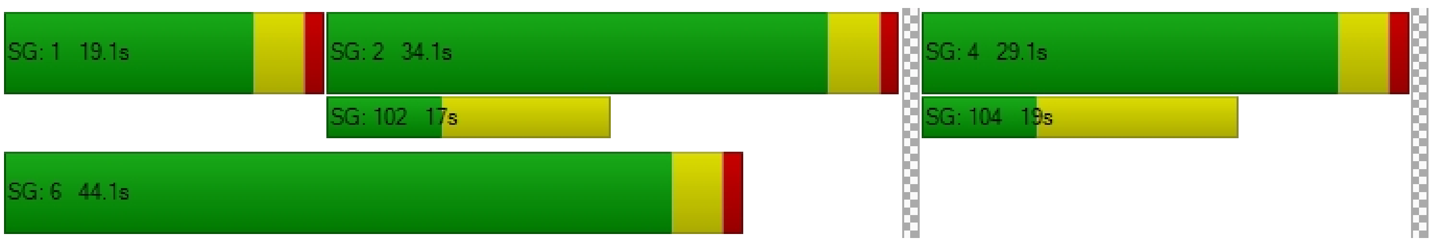
X, volume / capacity	0.63	0.77	0.70	0.43	0.75	0.20
d, Delay for Lane Group [s/veh]	9.71	10.86	18.97	5.07	13.30	10.77
Lane Group LOS	A	B	B	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.93	2.07	0.58	1.05	1.86	0.35
50th-Percentile Queue Length [ft]	48.33	51.70	14.46	26.18	46.61	8.72
95th-Percentile Queue Length [veh]	3.48	3.72	1.04	1.88	3.36	0.63
95th-Percentile Queue Length [ft]	87.00	93.06	26.02	47.12	83.89	15.69

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	9.71	10.86	18.97	5.07	13.30	10.77
Movement LOS	A	B	B	A	B	B
d_A, Approach Delay [s/veh]	10.28		7.13		12.84	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	9.92					
Intersection LOS	A					
Intersection V/C	0.548					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 39: Santa Cruz Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	44.8
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.734

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	231	1143	261	331	559	51	102	671	424	243	728	257
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.50	1.40	4.20	1.50	3.40	3.90	8.50	3.90	1.50	0.90	3.40	4.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	144	0	0	38	0	0	288	0	0	281
Total Hourly Volume [veh/h]	231	1143	117	331	559	13	102	671	136	243	728	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	58	286	29	83	140	3	26	168	34	61	182	0
Total Analysis Volume [veh/h]	231	1143	117	331	559	13	102	671	136	243	728	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			7			5			7		
Bicycle Volume [bicycles/h]	33			33			29			49		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	133
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	8	8	4	8	8	8	8	8	8	8	8
Maximum Green [s]	30	60	60	30	60	60	25	30	30	25	30	30
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.1	3.6	3.6	3.1	3.6	3.6
All red [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Split [s]	27	53	53	19	45	45	13	39	39	22	48	48
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	24	24	0	24	24	0	24	24	0	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	3.6	3.6	2.0	3.6	3.6	2.1	3.6	3.6	2.1	3.6	3.6
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	5.60	5.60	4.00	5.60	5.60	4.10	5.60	5.60	4.10	5.60	5.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.60	3.60	2.00	3.60	3.60	2.10	3.60	3.60	2.10	3.60	3.60
g_i, Effective Green Time [s]	12	58	58	15	61	61	8	29	29	12	33	33
g / C, Green / Cycle	0.09	0.44	0.44	0.11	0.46	0.46	0.06	0.22	0.22	0.09	0.25	0.25
(v / s)_i Volume / Saturation Flow Rate	0.07	0.32	0.08	0.10	0.16	0.01	0.03	0.19	0.09	0.07	0.21	0.00
s, saturation flow rate [veh/h]	3395	3568	1500	3462	3499	1504	3239	3482	1511	3483	3499	1543
c, Capacity [veh/h]	294	1558	655	382	1610	692	192	768	334	304	870	384
d1, Uniform Delay [s]	59.57	31.06	22.90	58.27	23.07	19.56	60.82	50.08	44.43	59.60	47.44	0.00
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.59	3.10	0.60	6.05	0.59	0.05	2.28	3.30	0.80	4.82	2.22	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

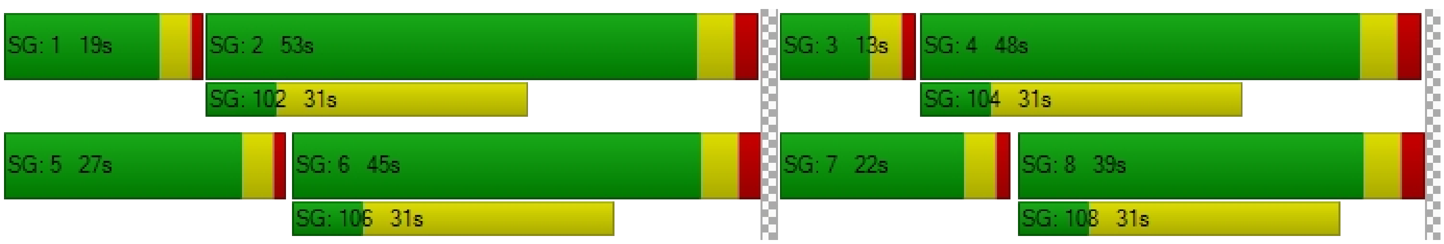
X, volume / capacity	0.78	0.73	0.18	0.87	0.35	0.02	0.53	0.87	0.41	0.80	0.84	0.00
d, Delay for Lane Group [s/veh]	64.16	34.16	23.49	64.32	23.67	19.61	63.10	53.38	45.23	64.42	49.66	0.00
Lane Group LOS	E	C	C	E	C	B	E	D	D	E	D	A
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	3.99	15.54	2.35	5.77	5.73	0.23	1.73	11.03	3.92	4.20	11.60	0.00
50th-Percentile Queue Length [ft]	99.67	388.50	58.81	144.29	143.14	5.75	43.21	275.83	97.88	105.12	290.11	0.00
95th-Percentile Queue Length [veh]	7.18	22.01	4.23	9.71	9.65	0.41	3.11	16.48	7.05	7.57	17.19	0.00
95th-Percentile Queue Length [ft]	179.41	550.13	105.86	242.79	241.25	10.35	77.77	412.02	176.18	189.19	429.78	0.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	64.16	34.16	23.49	64.32	23.67	19.61	63.10	53.38	45.23	64.42	49.66	0.00
Movement LOS	E	C	C	E	C	B	E	D	D	E	D	A
d_A, Approach Delay [s/veh]		37.97			38.51			53.25			53.35	
Approach LOS		D			D			D			D	
d_I, Intersection Delay [s/veh]	44.83											
Intersection LOS	D											
Intersection V/C	0.734											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	2,552.0
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	6.157

Intersection Setup

Name	University Avenue		University Avenue		Adams Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	50.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		Adams Drive	
Base Volume Input [veh/h]	50	1067	1449	140	209	35
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	14.30	4.70	2.60	4.30	5.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	1067	1449	140	209	35
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	267	362	35	52	9
Total Analysis Volume [veh/h]	50	1067	1449	140	209	35
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.14	0.01	0.01	0.00	6.16	0.10
d_M, Delay for Movement [s/veh]	16.77	0.00	0.00	0.00	2551.98	17.00
Movement LOS	C	A	A	A	F	C
95th-Percentile Queue Length [veh]	0.48	0.00	0.00	0.00	25.01	0.35
95th-Percentile Queue Length [ft]	12.11	0.00	0.00	0.00	625.37	8.67
d_A, Approach Delay [s/veh]	0.75		0.00		2188.36	
Approach LOS	A		A		F	
d_I, Intersection Delay [s/veh]	181.29					
Intersection LOS	F					

Intersection Level Of Service Report
Intersection 71: Chilco Street/Terminal Avenue

Control Type:	All-way stop	Delay (sec / veh):	10.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street		Chilco Street		Terminal Avenue	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Chilco Street		Chilco Street		Terminal Avenue	
Base Volume Input [veh/h]	48	206	101	62	230	90
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	206	101	62	230	90
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	52	25	16	58	23
Total Analysis Volume [veh/h]	48	206	101	62	230	90
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	1.62	0.85	2.26
95th-Percentile Queue Length [ft]	40.38	21.22	56.55
Approach Delay [s/veh]	10.82	9.32	11.80
Approach LOS	B	A	B
Intersection Delay [s/veh]	10.91		
Intersection LOS	B		

Intersection Level Of Service Report
Intersection 74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	28.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.508

Intersection Setup

Name	University Avenue		University Avenue		O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		O'Brien Drive	
Base Volume Input [veh/h]	130	1151	1284	142	16	25
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	5.10	2.90	3.50	18.80	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	130	1151	1284	142	16	25
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	288	321	36	4	6
Total Analysis Volume [veh/h]	130	1151	1284	142	16	25
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	7		5		1	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	48.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	8	8	0	6	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	24	96	120	0	10	0
Vehicle Extension [s]	2.0	4.0	4.0	0.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	2.0	2.0	0.0	2.0	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	111	118	118	4	4
g / C, Green / Cycle	0.03	0.86	0.91	0.91	0.03	0.03
(v / s)_i Volume / Saturation Flow Rate	0.11	0.37	0.43	0.45	0.01	0.02
s, saturation flow rate [veh/h]	1216	3098	1662	1597	1371	1369
c, Capacity [veh/h]	68	2657	1514	1455	37	37
d1, Uniform Delay [s]	62.05	2.10	0.90	0.93	62.17	62.59
k, delay calibration	0.50	0.50	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	462.53	0.52	1.05	1.18	2.85	7.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.92	0.43	0.47	0.49	0.43	0.67
d, Delay for Lane Group [s/veh]	524.58	2.61	1.95	2.11	65.02	70.02
Lane Group LOS	F	A	A	A	E	E
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	11.00	2.47	1.13	1.19	0.55	0.90
50th-Percentile Queue Length [ft]	274.95	61.66	28.30	29.71	13.78	22.44
95th-Percentile Queue Length [veh]	18.41	4.44	2.04	2.14	0.99	1.62
95th-Percentile Queue Length [ft]	460.27	110.99	50.94	53.47	24.81	40.40

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	524.58	2.61	2.02	2.11	65.02	70.02
Movement LOS	F	A	A	A	E	E
d_A, Approach Delay [s/veh]	55.59		2.03		68.07	
Approach LOS	E		A		E	
d_I, Intersection Delay [s/veh]	27.98					
Intersection LOS	C					
Intersection V/C	0.508					

Sequence

Ring 1	5	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 77: University Avenue/Donohoe Street

Control Type:	Signalized	Delay (sec / veh):	136.4
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.130

Intersection Setup

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	150.00	100.00	70.00	200.00	100.00	100.00	200.00	100.00	200.00	200.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	203	542	539	23	865	65	8	97	494	522	521	941
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	203	542	539	23	865	65	8	97	494	522	521	941
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	136	135	6	216	16	2	24	124	131	130	235
Total Analysis Volume [veh/h]	203	542	539	23	865	65	8	97	494	522	521	941
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			24			0			0		
Bicycle Volume [bicycles/h]	6			12			1			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	12	42	0	8	38	0	0	38	0	0	42	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	26	0	0	20	0	0	0	0	0	19	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	R	L	C	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	8	40	40	2	34	34	34	34	34	38	38	38	38
g / C, Green / Cycle	0.06	0.31	0.31	0.02	0.26	0.26	0.26	0.26	0.26	0.29	0.29	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.07	0.17	0.38	0.01	0.28	0.28	0.01	0.06	0.35	0.32	0.30	0.38	0.38
s, saturation flow rate [veh/h]	3101	3192	1402	1597	1676	1630	1597	1676	1407	1597	1674	1231	1336
c, Capacity [veh/h]	191	973	427	29	438	426	418	438	368	467	489	360	390
d1, Uniform Delay [s]	61.00	37.83	45.18	63.57	48.00	48.00	35.62	37.62	48.00	46.00	46.00	46.00	46.00
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.50	0.50	0.49	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	48.76	2.30	135.26	36.58	64.07	65.96	0.02	0.25	171.48	67.29	50.09	147.2	152.5
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

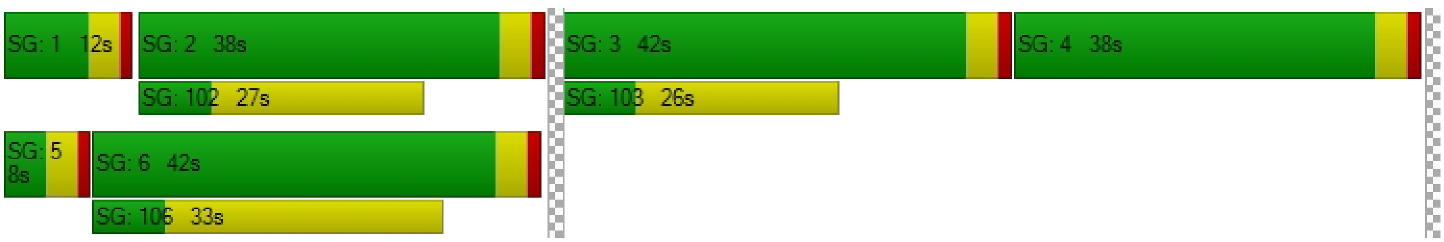
X, volume / capacity	1.06	0.56	1.26	0.79	1.07	1.08	0.02	0.22	1.34	1.09	1.04	1.28	1.30
d, Delay for Lane Group [s/veh]	109.76	40.13	180.44	100.15	112.07	113.96	35.64	37.87	219.48	113.2	96.09	193.2	198.5
Lane Group LOS	F	D	F	F	F	F	D	D	F	F	F	F	F
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	4.44	7.56	29.71	1.06	21.92	21.53	0.19	2.48	29.37	23.68	22.48	26.24	29.05
50th-Percentile Queue Length [ft]	111.10	188.95	742.63	26.39	548.12	538.37	4.83	61.98	734.31	591.8	562.1	655.8	726.1
95th-Percentile Queue Length [veh]	8.00	12.07	44.17	1.90	30.91	30.49	0.35	4.46	44.59	33.36	30.98	39.75	43.78
95th-Percentile Queue Length [ft]	199.99	301.67	1104.14	47.50	772.66	762.21	8.70	111.57	1114.64	834.0	774.5	993.7	1094.

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	109.76	40.13	180.44	100.15	112.93	113.96	35.64	37.87	219.48	112.43	101.34	196.12
Movement LOS	F	D	F	F	F	F	D	D	F	F	F	F
d_A, Approach Delay [s/veh]	110.04			112.69			187.61			149.28		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	136.36											
Intersection LOS	F											
Intersection V/C	1.130											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	20.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.643

Intersection Setup

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Valparaiso Ave			Valparaiso Ave			University Drive (North)			University Drive		
Base Volume Input [veh/h]	152	429	122	49	641	69	68	103	40	71	51	62
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.80	2.40	4.20	0.00	0.00	8.70	0.00	0.00	13.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	152	429	122	49	641	69	68	103	40	71	51	62
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	107	31	12	160	17	17	26	10	18	13	16
Total Analysis Volume [veh/h]	152	429	122	49	641	69	68	103	40	71	51	62
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	54			0			12			0		
Bicycle Volume [bicycles/h]	26			2			7			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	25	30	0	25	30	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	14	0	0	0	0	0	0	0	0	13	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	0.00	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	36	30	36	27	17	17	17
g / C, Green / Cycle	0.58	0.48	0.58	0.44	0.27	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.16	0.31	0.05	0.40	0.16	0.06	0.08
s, saturation flow rate [veh/h]	952	1770	959	1788	1317	1265	1411
c, Capacity [veh/h]	458	855	537	789	432	223	380
d1, Uniform Delay [s]	10.96	11.96	7.23	15.95	19.55	27.37	17.87
k, delay calibration	0.23	0.27	0.11	0.36	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.90	2.07	0.07	11.74	0.86	0.81	0.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

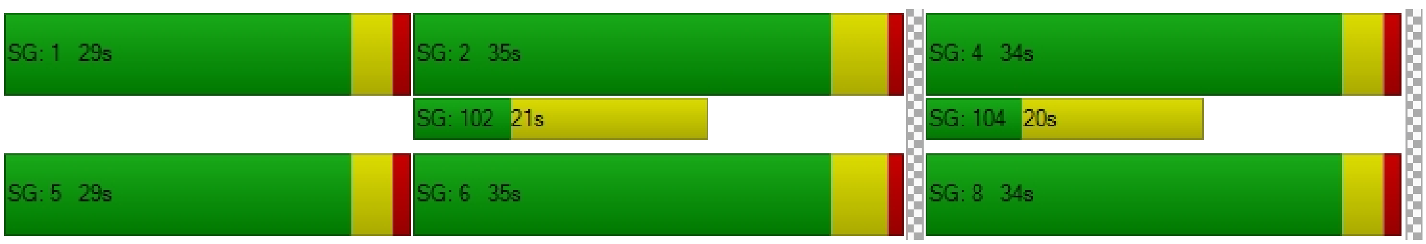
X, volume / capacity	0.33	0.64	0.09	0.90	0.49	0.32	0.30
d, Delay for Lane Group [s/veh]	11.87	14.03	7.30	27.69	20.41	28.18	18.31
Lane Group LOS	B	B	A	C	C	C	B
Critical Lane Group	Yes	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.78	5.10	0.21	10.19	2.63	1.03	1.26
50th-Percentile Queue Length [ft]	19.51	127.40	5.33	254.75	65.77	25.75	31.40
95th-Percentile Queue Length [veh]	1.40	8.80	0.38	15.43	4.74	1.85	2.26
95th-Percentile Queue Length [ft]	35.12	219.96	9.59	385.63	118.39	46.34	56.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.87	14.03	14.03	7.30	27.69	27.69	20.41	20.41	20.41	28.18	18.31	18.31
Movement LOS	B	B	B	A	C	C	C	C	C	C	B	B
d_A, Approach Delay [s/veh]		13.57			26.37			20.41			22.12	
Approach LOS		B			C			C			C	
d_I, Intersection Delay [s/veh]	20.43											
Intersection LOS	C											
Intersection V/C	0.643											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	12.6
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.699

Intersection Setup

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Addsion-Wesley			Addison-Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	23	2	41	2	2	7	103	1888	233	115	868	40
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	23	2	41	2	2	7	103	1888	233	115	868	40
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	1	10	1	1	2	26	472	58	29	217	10
Total Analysis Volume [veh/h]	23	2	41	2	2	7	103	1888	233	115	868	40
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			1			6		
Bicycle Volume [bicycles/h]	0			0			27			22		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	9.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	41	0	0	10	0	16	38	0	11	33	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	3.0	0.0	3.0	6.0	0.0	2.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	7	7	7	4	4	9	72	72	9	72	72
g / C, Green / Cycle	0.07	0.07	0.07	0.04	0.04	0.09	0.72	0.72	0.09	0.72	0.72
(v / s)_i Volume / Saturation Flow Rate	0.01	0.01	0.03	0.00	0.01	0.06	0.53	0.15	0.06	0.25	0.25
s, saturation flow rate [veh/h]	1774	1788	1543	1774	1638	1774	3547	1525	1774	1863	1828
c, Capacity [veh/h]	127	128	110	66	61	166	2557	1100	161	1338	1312
d1, Uniform Delay [s]	43.53	43.52	44.40	46.54	46.74	43.72	8.34	4.61	44.33	5.28	5.29
k, delay calibration	0.10	0.10	0.10	0.11	0.11	0.11	0.50	0.50	0.43	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.32	0.31	1.98	0.19	1.11	3.74	1.95	0.44	20.96	0.70	0.72
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

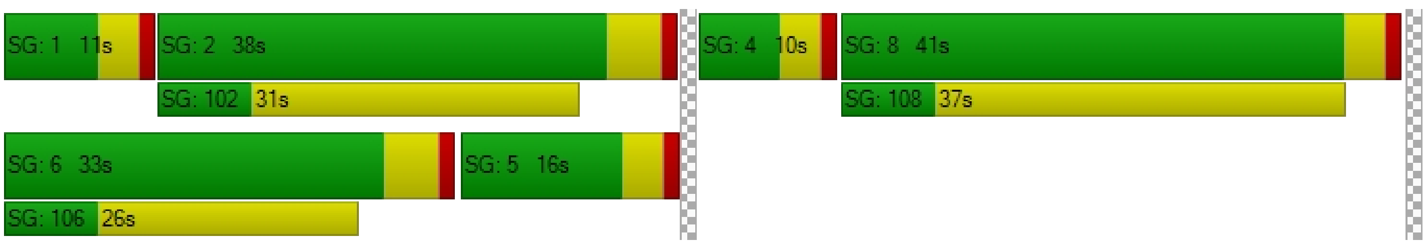
X, volume / capacity	0.10	0.10	0.37	0.03	0.15	0.62	0.74	0.21	0.72	0.34	0.34
d, Delay for Lane Group [s/veh]	43.84	43.84	46.37	46.72	47.85	47.47	10.30	5.05	65.29	5.98	6.00
Lane Group LOS	D	D	D	D	D	D	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.30	0.30	1.04	0.05	0.24	2.57	9.54	1.34	3.64	2.96	2.93
50th-Percentile Queue Length [ft]	7.57	7.58	25.92	1.29	5.93	64.16	238.61	33.50	90.93	74.07	73.14
95th-Percentile Queue Length [veh]	0.55	0.55	1.87	0.09	0.43	4.62	14.61	2.41	6.55	5.33	5.27
95th-Percentile Queue Length [ft]	13.63	13.65	46.66	2.33	10.68	115.49	365.28	60.30	163.68	133.32	131.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.84	43.84	46.37	46.72	47.85	47.85	47.47	10.30	5.05	65.29	5.99	6.00
Movement LOS	D	D	D	D	D	D	D	B	A	E	A	A
d_A, Approach Delay [s/veh]	45.41			47.65			11.47			12.66		
Approach LOS	D			D			B			B		
d_I, Intersection Delay [s/veh]	12.63											
Intersection LOS	B											
Intersection V/C	0.699											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	40.6
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.728

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	40.00		35.00		40.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	663	556	65	172	852	517
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	4.00	3.10	1.70	2.70	0.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	663	556	65	172	852	517
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	166	139	16	43	213	129
Total Analysis Volume [veh/h]	663	556	65	172	852	517
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	43		21		15	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal group	0	4	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	5	5	0	5	0
Maximum Green [s]	0	40	30	0	50	0
Amber [s]	0.0	3.6	3.1	0.0	3.9	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	54	72	0	10	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.6	2.1	0.0	2.9	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60	4.10	4.10	4.90	4.90
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60	2.10	2.10	2.90	2.90
g_i, Effective Green Time [s]	36	36	36	18	18	68	68
g / C, Green / Cycle	0.27	0.27	0.27	0.13	0.13	0.50	0.50
(v / s)_i Volume / Saturation Flow Rate	0.23	0.23	0.23	0.04	0.11	0.24	0.33
s, saturation flow rate [veh/h]	1790	1774	1662	1755	1513	3522	1582
c, Capacity [veh/h]	478	474	444	232	200	1763	791
d1, Uniform Delay [s]	47.60	47.58	47.56	53.14	57.74	22.38	25.20
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.16	5.15	5.41	0.65	10.24	0.95	4.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

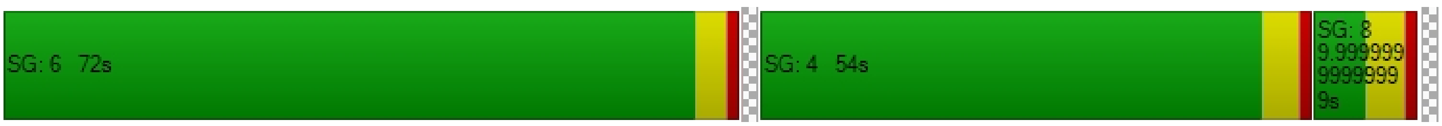
X, volume / capacity	0.87	0.87	0.87	0.28	0.86	0.48	0.65
d, Delay for Lane Group [s/veh]	52.76	52.74	52.96	53.79	67.98	23.33	29.37
Lane Group LOS	D	D	D	D	E	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	13.95	13.81	12.94	2.04	6.33	8.96	12.84
50th-Percentile Queue Length [ft]	348.84	345.31	323.58	51.12	158.20	223.90	321.01
95th-Percentile Queue Length [veh]	20.08	19.91	18.84	3.68	10.45	13.86	18.72
95th-Percentile Queue Length [ft]	502.00	497.69	471.08	92.02	261.33	346.60	467.93

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.75	52.90	53.79	67.98	23.33	29.37
Movement LOS	D	D	D	E	C	C
d_A, Approach Delay [s/veh]	52.82		64.09		25.61	
Approach LOS	D		E		C	
d_I, Intersection Delay [s/veh]	40.58					
Intersection LOS	D					
Intersection V/C	0.728					

Sequence

Ring 1	-	6	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 110: Marsh Road and US 101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	14.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.792

Intersection Setup

Name	Marsh Road		Marsh Road			
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Marsh Road		Marsh Road			
Base Volume Input [veh/h]	1475	0	0	1285	1024	619
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	0.00	0.00	5.20	1.90	4.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1475	0	0	1285	1024	619
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	369	0	0	321	256	155
Total Analysis Volume [veh/h]	1475	0	0	1285	1024	619
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	40.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	45	0	0	45	35	34
Vehicle Extension [s]	3.0	0.0	0.0	3.0	2.0	2.0
Walk [s]	7	0	0	0	5	0
Pedestrian Clearance [s]	12	0	0	0	15	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	Yes			Yes	No	No
Maximum Recall	No			No	No	No
Pedestrian Recall	No			No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	47	47	29	78
g / C, Green / Cycle	0.59	0.59	0.36	0.97
(v / s)_i Volume / Saturation Flow Rate	0.43	0.37	0.30	0.40
s, saturation flow rate [veh/h]	3462	3439	3449	1548
c, Capacity [veh/h]	2039	2025	1245	1467
d1, Uniform Delay [s]	11.75	10.77	23.20	0.18
k, delay calibration	0.50	0.50	0.04	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.27	1.53	0.54	0.89
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

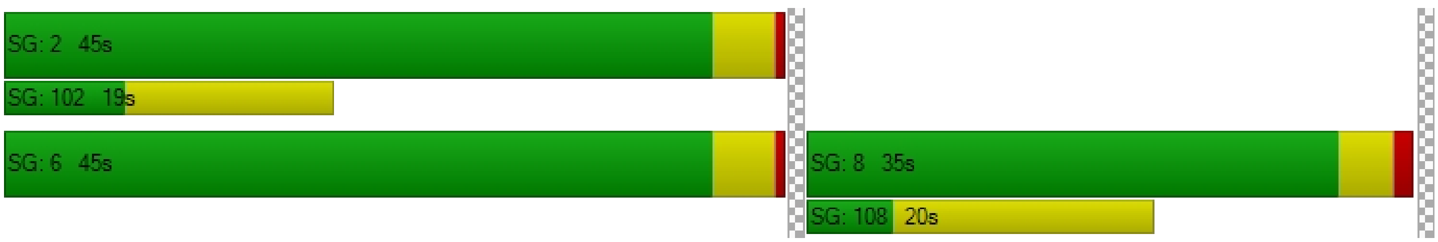
X, volume / capacity	0.72	0.63	0.82	0.42
d, Delay for Lane Group [s/veh]	14.02	12.30	23.73	1.08
Lane Group LOS	B	B	C	A
Critical Lane Group	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	8.68	6.84	8.32	0.36
50th-Percentile Queue Length [ft]	216.89	171.08	207.92	9.09
95th-Percentile Queue Length [veh]	13.51	11.13	13.05	0.65
95th-Percentile Queue Length [ft]	337.66	278.33	326.16	16.37

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	14.02	0.00	0.00	12.30	23.73	1.08
Movement LOS	B			B	C	A
d_A, Approach Delay [s/veh]	14.02		12.30		15.20	
Approach LOS	B		B		B	
d_I, Intersection Delay [s/veh]	13.96					
Intersection LOS	B					
Intersection V/C	0.792					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 111: University Avenue / Woodland Avenue

Control Type:	Signalized	Delay (sec / veh):	54.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.806

Intersection Setup

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	1	0	0	0
Pocket Length [ft]	170.00	100.00	100.00	220.00	100.00	100.00	100.00	100.00	40.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Base Volume Input [veh/h]	42	776	23	211	972	533	23	106	379	395	85	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	776	23	211	972	533	23	106	379	395	85	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	194	6	53	243	133	6	27	95	99	21	11
Total Analysis Volume [veh/h]	42	776	23	211	972	533	23	106	379	395	85	44
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	51			0			1			13		
Bicycle Volume [bicycles/h]	5			1			4			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	7	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	8	39	0	22	53	0	0	38	0	0	31	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	15	0	0	0	0	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	4	43	43	18	57	57	34	34	19	19
g / C, Green / Cycle	0.03	0.33	0.33	0.14	0.44	0.44	0.26	0.26	0.15	0.15
(v / s)_i Volume / Saturation Flow Rate	0.03	0.24	0.24	0.13	0.30	0.38	0.08	0.27	0.13	0.09
s, saturation flow rate [veh/h]	1597	1676	1656	1597	3192	1395	1662	1403	3101	1507
c, Capacity [veh/h]	49	550	543	221	1390	608	435	367	462	225
d1, Uniform Delay [s]	62.71	38.61	38.63	55.59	29.77	33.51	38.43	48.00	53.94	51.48
k, delay calibration	0.10	0.50	0.50	0.37	0.50	0.50	0.11	0.48	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	30.68	8.30	8.45	41.66	2.94	16.35	0.38	54.79	4.63	2.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.85	0.73	0.73	0.95	0.70	0.88	0.30	1.03	0.85	0.57
d, Delay for Lane Group [s/veh]	93.40	46.91	47.08	97.25	32.71	49.86	38.81	102.79	58.57	53.79
Lane Group LOS	F	D	D	F	C	D	D	F	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.80	12.55	12.45	9.42	12.78	17.84	3.37	17.40	6.60	4.07
50th-Percentile Queue Length [ft]	45.10	313.70	311.28	235.53	319.56	445.94	84.29	435.06	165.09	101.87
95th-Percentile Queue Length [veh]	3.25	18.36	18.24	14.46	18.65	24.76	6.07	24.72	10.82	7.33
95th-Percentile Queue Length [ft]	81.18	458.93	455.95	361.38	466.14	619.10	151.73	618.09	270.45	183.37

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	93.40	46.99	47.08	97.25	32.71	49.86	38.81	38.81	102.79	58.57	53.79	53.79
Movement LOS	F	D	D	F	C	D	D	D	F	E	D	D
d_A, Approach Delay [s/veh]	49.31			45.98			86.54			57.40		
Approach LOS	D			D			F			E		
d_I, Intersection Delay [s/veh]	54.17											
Intersection LOS	D											
Intersection V/C	0.806											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 131: Chilco Street/Hamilton Avenue

Control Type:	All-way stop	Delay (sec / veh):	8.7
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Streeet			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	+			+			+			+		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Streeet			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	13	88	10	50	79	15	37	41	16	22	51	131
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	13	88	10	50	79	15	37	41	16	22	51	131
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	22	3	13	20	4	9	10	4	6	13	33
Total Analysis Volume [veh/h]	13	88	10	50	79	15	37	41	16	22	51	131
Pedestrian Volume [ped/h]	3			3			9			5		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.52	0.70	0.43	0.96
95th-Percentile Queue Length [ft]	12.91	17.57	10.66	24.05
Approach Delay [s/veh]	8.62	8.91	8.47	8.72
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.71			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	13.5
Analysis Method:	HCM 2000	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.732

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	35.00		35.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	1794	749	38	88	217
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.20	1.90	2.60	0.00	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1794	749	38	88	217
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	449	187	10	22	54
Total Analysis Volume [veh/h]	0	1794	749	38	88	217
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27		0		5	
Bicycle Volume [bicycles/h]	31		28		9	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	89
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal group	0	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	4	0
Maximum Green [s]	0	64	64	0	32	0
Amber [s]	0.0	3.6	3.6	0.0	3.1	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	68	68	0	21	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.6	2.6	0.0	2.1	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.10	2.10
g_i, Effective Green Time [s]	63	63	17	17
g / C, Green / Cycle	0.71	0.71	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.56	0.25	0.05	0.15
Total Saturation Flow Adjustment	0.85	0.83	0.86	0.76
s, saturation flow rate [veh/h]	3217	3172	1625	1446
c, Capacity [veh/h]	2292	2260	308	275
d1, Uniform Delay [s]	8.32	4.90	30.88	34.36
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.75	0.43	2.31	20.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.78	0.35	0.29	0.79
d, Delay for Lane Group [s/veh]	11.08	5.32	33.19	54.67
Lane Group LOS	B	A	C	D
Critical Lane Group	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	19.27	4.59	2.06	6.55
50th-Percentile Queue Length [ft]	481.86	114.68	51.51	163.81
95th-Percentile Queue Length [veh]	31.25	9.17	4.66	12.25
95th-Percentile Queue Length [ft]	781.18	229.31	116.54	306.28

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	11.08	5.32	5.32	33.19	54.67
Movement LOS		B	A	A	C	D
d_A, Approach Delay [s/veh]	11.08		5.32		48.47	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	13.46					
Intersection LOS	B					
Intersection V/C	0.732					

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	38.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	8.632

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	10	0	33	93	7	60	211	1594	117	73	760	50
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	10	0	33	93	7	60	211	1594	117	73	760	50
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	8	23	2	15	53	399	29	18	190	13
Total Analysis Volume [veh/h]	10	0	33	93	7	60	211	1594	117	73	760	50
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			10			7			0		
Bicycle Volume [bicycles/h]	1			7			23			14		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	62.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	0	12	0	0	12	0	4	10	0	6	10	0
Maximum Green [s]	0	25	0	0	25	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	28	0	0	28	0	25	55	0	17	47	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	34	34	34	34	16	53	53	7	45	45
g / C, Green / Cycle	0.34	0.34	0.34	0.34	0.16	0.53	0.53	0.07	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	7.34	0.02	8.12	0.04	0.12	0.46	0.47	0.04	0.22	0.22
s, saturation flow rate [veh/h]	1	1563	12	1547	1774	1863	1808	1774	1863	1811
c, Capacity [veh/h]	72	526	74	520	277	990	960	128	834	810
d1, Uniform Delay [s]	50.00	22.50	48.72	22.92	40.40	20.32	20.84	44.87	19.56	19.60
k, delay calibration	0.50	0.11	0.50	0.11	0.16	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.94	0.05	227.05	0.10	6.26	10.00	12.19	3.90	2.07	2.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.14	0.06	1.36	0.12	0.76	0.86	0.89	0.57	0.49	0.49
d, Delay for Lane Group [s/veh]	53.94	22.55	275.77	23.01	46.66	30.32	33.03	48.77	21.63	21.75
Lane Group LOS	D	C	F	C	D	C	C	D	C	C
Critical Lane Group	No	No	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.33	0.54	6.49	1.00	5.30	18.11	18.99	1.88	7.03	6.90
50th-Percentile Queue Length [ft]	8.26	13.46	162.32	24.95	132.40	452.77	474.70	47.03	175.67	172.62
95th-Percentile Queue Length [veh]	0.59	0.97	11.69	1.80	9.07	25.09	26.13	3.39	11.37	11.21
95th-Percentile Queue Length [ft]	14.87	24.24	292.17	44.90	226.75	627.26	653.35	84.66	284.36	280.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	53.94	53.94	22.55	275.77	275.77	23.01	46.66	31.58	33.03	48.77	21.68	21.75
Movement LOS	D	D	C	F	F	C	D	C	C	D	C	C
d_A, Approach Delay [s/veh]	29.85			180.99			33.32			23.93		
Approach LOS	C			F			C			C		
d_I, Intersection Delay [s/veh]	38.37											
Intersection LOS	D											
Intersection V/C	8.632											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	6.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.539

Intersection Setup

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Branner Drive			Branner Drive			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	0	7	3	0	2	9	417	3	4	217	5
Total Analysis Volume [veh/h]	7	1	29	12	1	8	37	1666	12	17	867	21
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			6			0			11		
Bicycle Volume [bicycles/h]	2			0			32			53		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	92.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	15	0	0	15	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	39	0	0	39	0	9	53	0	8	52	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	2.9	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	11	11	5	79	79	4	78	78
g / C, Green / Cycle	0.11	0.11	0.05	0.79	0.79	0.04	0.78	0.78
(v / s)_i Volume / Saturation Flow Rate	0.02	0.01	0.02	0.45	0.45	0.01	0.24	0.24
s, saturation flow rate [veh/h]	1539	1525	1774	1863	1857	1774	1863	1842
c, Capacity [veh/h]	215	227	83	1476	1472	63	1456	1440
d1, Uniform Delay [s]	40.39	39.92	46.41	3.92	3.93	46.92	3.13	3.13
k, delay calibration	0.10	0.10	0.04	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.36	0.17	1.42	1.59	1.61	0.83	0.54	0.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

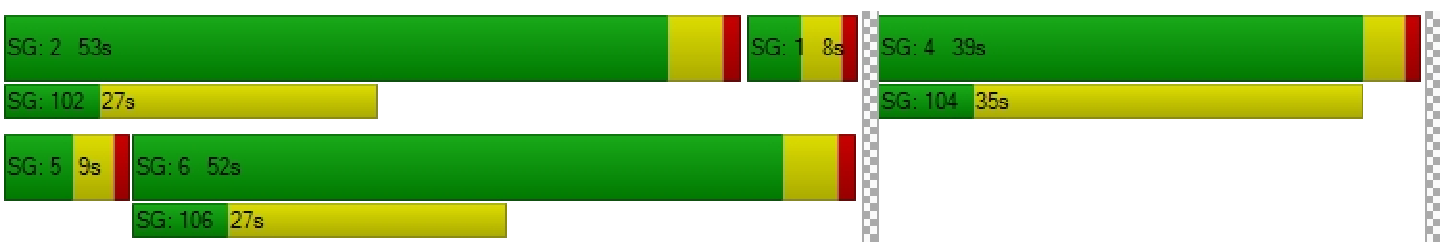
X, volume / capacity	0.17	0.09	0.45	0.57	0.57	0.27	0.31	0.31
d, Delay for Lane Group [s/veh]	40.75	40.09	47.83	5.51	5.53	47.76	3.68	3.69
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	0.86	0.48	0.91	4.34	4.35	0.42	1.81	1.80
50th-Percentile Queue Length [ft]	21.39	11.96	22.68	108.55	108.69	10.43	45.27	45.00
95th-Percentile Queue Length [veh]	1.54	0.86	1.63	7.76	7.77	0.75	3.26	3.24
95th-Percentile Queue Length [ft]	38.50	21.53	40.83	193.99	194.18	18.77	81.48	80.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.75	40.75	40.75	40.09	40.09	40.09	47.83	5.52	5.53	47.76	3.68	3.69
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	40.75			40.09			6.44			4.51		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	6.52											
Intersection LOS	A											
Intersection V/C	0.539											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	43.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.202

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Sharon Park Drive			Sharon Park Drive		
Base Volume Input [veh/h]	145	1496	17	27	743	138	2	0	9	227	3	184
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	145	1496	17	27	743	138	2	0	9	227	3	184
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	374	4	7	186	35	1	0	2	57	1	46
Total Analysis Volume [veh/h]	145	1496	17	27	743	138	2	0	9	227	3	184
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			0			4			3		
Bicycle Volume [bicycles/h]	0			32			20			61		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	99.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	6	10	0	0	6	0	0	6	0
Maximum Green [s]	30	60	0	30	60	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	13	43	0	10	40	0	0	47	0	0	47	0
Vehicle Extension [s]	3.0	7.0	0.0	3.0	7.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	11	44	44	5	38	38	45	45	45
g / C, Green / Cycle	0.11	0.44	0.44	0.05	0.38	0.38	0.45	0.45	0.45
(v / s)_i Volume / Saturation Flow Rate	0.08	0.41	0.41	0.02	0.24	0.25	0.03	0.66	0.12
s, saturation flow rate [veh/h]	1774	1863	1855	1774	1863	1727	318	349	1502
c, Capacity [veh/h]	195	819	815	92	710	658	185	228	674
d1, Uniform Delay [s]	43.13	26.47	26.50	45.66	25.29	25.46	21.77	34.64	17.31
k, delay calibration	0.43	0.50	0.50	0.11	0.50	0.50	0.11	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	19.53	17.75	18.06	1.76	4.34	4.94	0.13	61.71	0.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

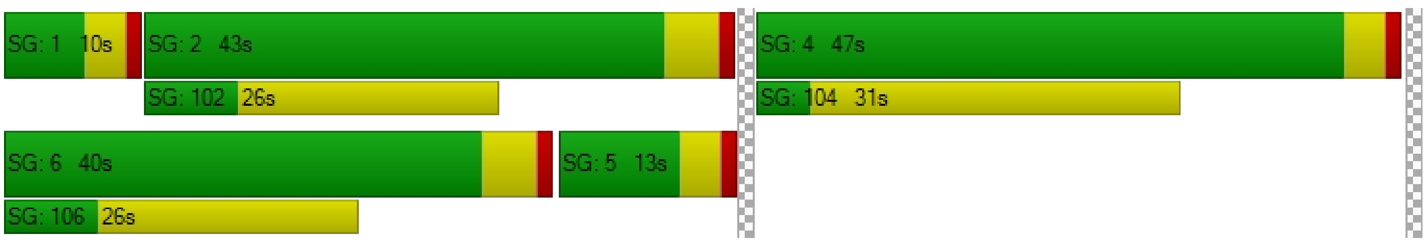
X, volume / capacity	0.74	0.92	0.93	0.29	0.64	0.65	0.06	1.01	0.27
d, Delay for Lane Group [s/veh]	62.66	44.22	44.56	47.42	29.63	30.41	21.90	96.35	17.53
Lane Group LOS	E	D	D	D	C	C	C	F	B
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	4.44	19.66	19.71	0.68	9.28	8.93	0.15	9.64	2.69
50th-Percentile Queue Length [ft]	110.89	491.62	492.73	17.05	232.09	223.35	3.67	241.02	67.26
95th-Percentile Queue Length [veh]	7.89	26.94	26.99	1.23	14.28	13.84	0.26	14.81	4.84
95th-Percentile Queue Length [ft]	197.23	673.44	674.74	30.68	357.02	345.90	6.61	370.36	121.06

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.66	44.39	44.56	47.42	29.94	30.41	21.90	21.90	21.90	96.35	96.35	17.53
Movement LOS	E	D	D	D	C	C	C	C	C	F	F	B
d_A, Approach Delay [s/veh]	45.99			30.53			21.90			61.32		
Approach LOS	D			C			C			E		
d_I, Intersection Delay [s/veh]	43.33											
Intersection LOS	D											
Intersection V/C	1.202											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	50.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.992

Intersection Setup

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Base Volume Input [veh/h]	199	49	1684	6	35	8	9	122	385	2677	407	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	7.00	0.00	4.60	0.00	0.00	16.70	0.00	18.20	9.10	4.70	4.90	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	49	1684	6	35	8	9	122	385	2677	407	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	12	421	2	9	2	2	31	96	669	102	3
Total Analysis Volume [veh/h]	199	49	1684	6	35	8	9	122	385	2677	407	12
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			9			0			0		
Bicycle Volume [bicycles/h]	1			0			14			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	160
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	125.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	3	3	6	4	6	4	1	4	8	2	8
Auxiliary Signal Groups		3	2,3									
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	6	6	0	4	0	4	12	4	0	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	4.7	3.6	3.6	0.0	3.6	0.0	3.6	3.6	3.6	0.0	4.7	0.0
All red [s]	1.0	1.0	1.0	0.0	0.5	0.0	0.5	0.0	0.5	0.0	1.0	0.0
Split [s]	82	11	11	0	32	0	32	35	32	0	82	0
Vehicle Extension [s]	4.5	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	4.5	0.0
Walk [s]	5	0	0	0	5	0	5	5	5	0	5	0
Pedestrian Clearance [s]	16	0	0	0	22	0	22	26	22	0	16	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No		No			No			Yes	
Maximum Recall		No	No		No			No			No	
Pedestrian Recall		No	No		Yes			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	36	119	6	6	29	29	29	81	81
g / C, Green / Cycle	0.23	0.75	0.04	0.04	0.18	0.18	0.18	0.51	0.51
(v / s)_i Volume / Saturation Flow Rate	0.14	0.42	0.01	0.01	0.08	0.16	0.13	0.53	0.23
s, saturation flow rate [veh/h]	1827	4015	1878	1630	1602	1205	1435	5035	1802
c, Capacity [veh/h]	414	2899	69	60	289	218	259	2547	911
d1, Uniform Delay [s]	55.34	10.64	75.25	75.30	58.50	63.93	62.04	39.52	25.44
k, delay calibration	0.16	0.50	0.04	0.04	0.04	0.33	0.21	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.01	0.86	1.24	1.52	0.41	27.37	7.87	33.05	1.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.60	0.58	0.37	0.39	0.45	0.88	0.74	1.05	0.46
d, Delay for Lane Group [s/veh]	57.34	11.50	76.49	76.82	58.91	91.30	69.92	72.57	27.11
Lane Group LOS	E	B	E	E	E	F	E	F	C
Critical Lane Group	No	Yes	No	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	9.27	9.38	1.06	0.97	4.82	9.34	8.02	40.53	10.82
50th-Percentile Queue Length [ft]	231.79	234.62	26.61	24.21	120.43	233.41	200.55	1013.31	270.58
95th-Percentile Queue Length [veh]	14.27	14.41	1.92	1.74	8.42	14.35	12.67	53.09	16.22
95th-Percentile Queue Length [ft]	356.63	360.22	47.90	43.59	210.42	358.68	316.67	1327.36	405.47

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	57.34	57.34	11.50	76.49	76.63	76.82	58.91	58.91	80.61	72.57	27.11	27.11
Movement LOS	E	E	B	E	E	E	E	E	F	F	C	C
d_A, Approach Delay [s/veh]	17.38			76.65			75.10			66.42		
Approach LOS	B			E			E			E		
d_I, Intersection Delay [s/veh]	50.37											
Intersection LOS	D											
Intersection V/C	0.992											

Sequence

Ring 1	-	2	1	4	3	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	9.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.638

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		Elder Ave	
Base Volume Input [veh/h]	66	656	489	136	102	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	3.20	5.40	1.00	1.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	656	489	136	102	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	164	122	34	26	19
Total Analysis Volume [veh/h]	66	656	489	136	102	75
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		20		20	
Bicycle Volume [bicycles/h]	24		13		11	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	4	10	10	0	4	0
Maximum Green [s]	20	60	40	0	20	0
Amber [s]	3.1	3.5	3.5	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	4.0	4.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	13	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.5	2.5	0.0	2.1	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.50	4.50	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.50	2.50	2.10	2.10
g_i, Effective Green Time [s]	2	25	18	4	4
g / C, Green / Cycle	0.05	0.66	0.50	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.04	0.39	0.40	0.06	0.06
s, saturation flow rate [veh/h]	1629	1678	1576	1612	1350
c, Capacity [veh/h]	88	1110	784	173	145
d1, Uniform Delay [s]	17.34	3.49	7.78	15.82	15.70
k, delay calibration	0.11	0.15	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	12.14	0.72	2.70	3.20	2.87
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

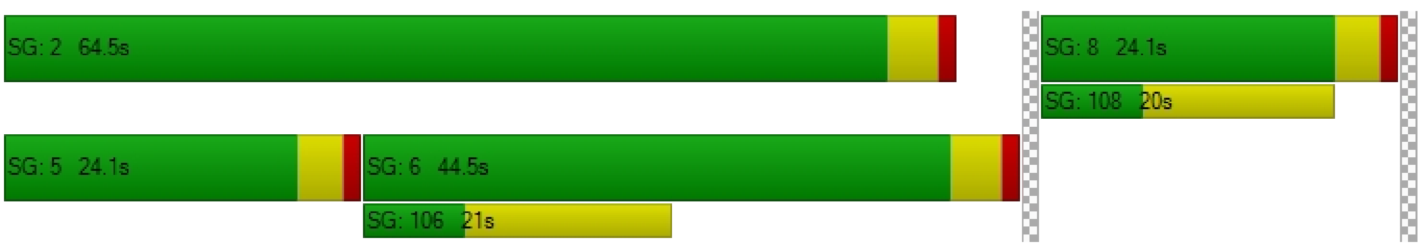
X, volume / capacity	0.75	0.59	0.80	0.59	0.52
d, Delay for Lane Group [s/veh]	29.49	4.21	10.48	19.03	18.56
Lane Group LOS	C	A	B	B	B
Critical Lane Group	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.78	1.11	2.97	0.84	0.62
50th-Percentile Queue Length [ft]	19.58	27.85	74.13	21.03	15.41
95th-Percentile Queue Length [veh]	1.41	2.01	5.34	1.51	1.11
95th-Percentile Queue Length [ft]	35.25	50.13	133.43	37.85	27.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.49	4.21	10.48	10.48	19.03	18.56
Movement LOS	C	A	B	B	B	B
d_A, Approach Delay [s/veh]	6.52		10.48		18.83	
Approach LOS	A		B		B	
d_I, Intersection Delay [s/veh]	9.58					
Intersection LOS	A					
Intersection V/C	0.638					

Sequence

Ring 1	-	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	29.8
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.891

Intersection Setup

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	300.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		45.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chilco Street		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	205	58	514	2726	1268	535
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	23.10	6.30	3.80	5.10	5.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	205	58	514	2726	1268	535
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	15	129	682	317	134
Total Analysis Volume [veh/h]	205	58	514	2726	1268	535
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	2		2		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	4	4	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	Lead	-	-	-
Minimum Green [s]	10	10	4	10	10	0
Maximum Green [s]	36	36	20	50	50	0
Amber [s]	3.0	3.0	3.0	5.0	5.0	0.0
All red [s]	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	2.0	2.0	2.0	3.0	3.0	0.0
Walk [s]	5	5	0	5	5	0
Pedestrian Clearance [s]	38	38	0	38	38	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	1.5	1.5	1.0	3.5	3.5	0.0
Minimum Recall	No		Yes	No	Yes	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.00	5.50	5.50	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.00	3.50	3.50	3.50
g_i, Effective Green Time [s]	10	10	20	60	37	37
g / C, Green / Cycle	0.13	0.13	0.25	0.76	0.47	0.47
(v / s)_i Volume / Saturation Flow Rate	0.07	0.05	0.34	0.61	0.29	0.39
s, saturation flow rate [veh/h]	3059	1162	1532	4488	4432	1380
c, Capacity [veh/h]	386	147	386	3412	2085	649
d1, Uniform Delay [s]	32.45	31.87	29.65	5.80	15.58	18.16
k, delay calibration	0.04	0.04	0.50	0.11	0.11	0.17
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.42	0.64	165.40	0.45	0.29	4.11
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

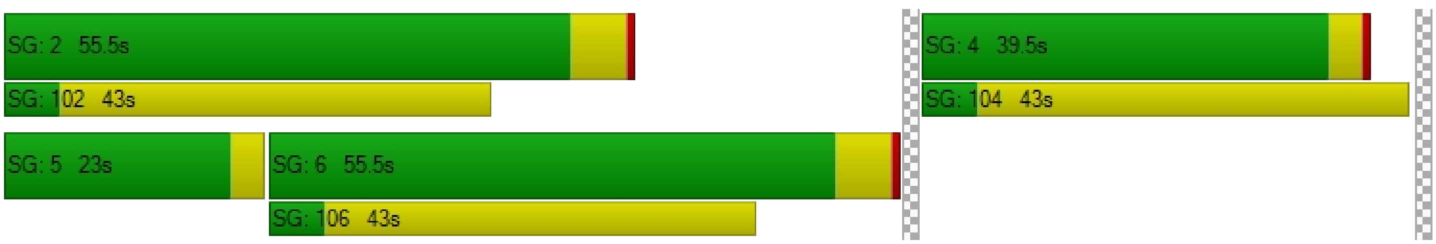
X, volume / capacity	0.53	0.40	1.33	0.80	0.61	0.82
d, Delay for Lane Group [s/veh]	32.88	32.51	195.04	6.25	15.87	22.27
Lane Group LOS	C	C	F	A	B	C
Critical Lane Group	Yes	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	1.82	1.02	24.41	4.10	4.71	7.62
50th-Percentile Queue Length [ft]	45.46	25.60	610.30	102.40	117.87	190.38
95th-Percentile Queue Length [veh]	3.27	1.84	37.58	7.37	8.28	12.14
95th-Percentile Queue Length [ft]	81.83	46.08	939.40	184.32	206.89	303.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	32.88	32.51	195.04	6.25	15.87	22.27
Movement LOS	C	C	F	A	B	C
d_A, Approach Delay [s/veh]	32.80		36.20		17.77	
Approach LOS	C		D		B	
d_I, Intersection Delay [s/veh]	29.77					
Intersection LOS	C					
Intersection V/C	0.891					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	8.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.807

Intersection Setup

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	1	1	0
Pocket Length [ft]	100.00	300.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	298	27	1736	102	100	2914
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	12.30	8.30	5.30	7.10	0.00	3.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	298	27	1736	102	100	2914
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	75	7	434	26	25	729
Total Analysis Volume [veh/h]	298	27	1736	102	100	2914
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4		0		18	
Bicycle Volume [bicycles/h]	1		1		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Protected	Permissive	Permissive	Protected	Permissive
Signal group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	0	10	0	7	10
Maximum Green [s]	31	0	40	0	21	40
Amber [s]	3.0	0.0	5.0	0.0	3.0	5.0
All red [s]	0.5	0.0	0.5	0.0	0.0	0.5
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	2.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	35	0	35	0	0	35
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	1.5	0.0	3.5	0.0	1.0	3.5
Minimum Recall	No		Yes		No	Yes
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	20.0	0.0	0.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	3.00	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	1.00	3.50
g_i, Effective Green Time [s]	8	31	31	6	40
g / C, Green / Cycle	0.14	0.55	0.55	0.10	0.70
(v / s)_i Volume / Saturation Flow Rate	0.10	0.35	0.07	0.06	0.58
s, saturation flow rate [veh/h]	3129	4915	1471	1810	4991
c, Capacity [veh/h]	440	2703	809	178	3499
d1, Uniform Delay [s]	23.20	8.91	6.19	24.46	6.11
k, delay calibration	0.11	0.11	0.11	0.04	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.83	0.26	0.07	1.03	0.55
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

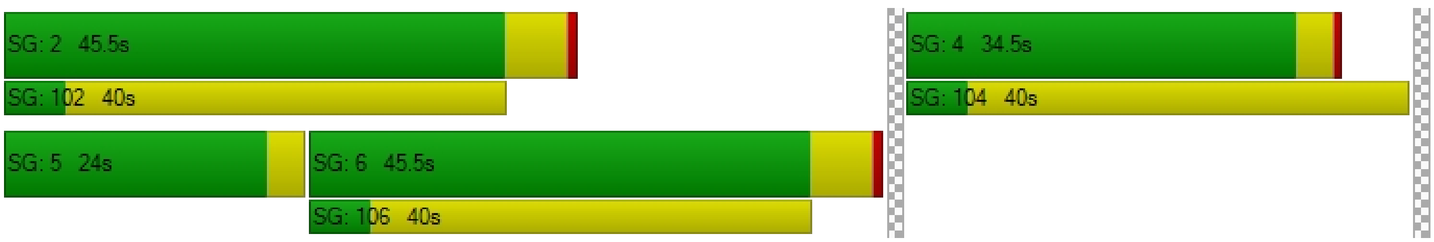
X, volume / capacity	0.68	0.64	0.13	0.56	0.83
d, Delay for Lane Group [s/veh]	25.03	9.16	6.26	25.49	6.66
Lane Group LOS	C	A	A	C	A
Critical Lane Group	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	1.91	3.22	0.40	1.18	2.85
50th-Percentile Queue Length [ft]	47.63	80.55	10.06	29.45	71.37
95th-Percentile Queue Length [veh]	3.43	5.80	0.72	2.12	5.14
95th-Percentile Queue Length [ft]	85.74	144.98	18.11	53.01	128.46

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.03	0.00	9.16	6.26	25.49	6.66
Movement LOS	C		A	A	C	A
d_A, Approach Delay [s/veh]	25.03		9.00		7.28	
Approach LOS	C		A		A	
d_I, Intersection Delay [s/veh]	8.92					
Intersection LOS	A					
Intersection V/C	0.807					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 204: Chilco Street/Newbridge Street

Control Type:	All-way stop	Delay (sec / veh):	8.6
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	4	3	23	1	2	1	30	1	3	32	21
Total Analysis Volume [veh/h]	2	15	12	93	5	9	4	118	2	13	127	85
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.12	0.51	0.55	1.06
95th-Percentile Queue Length [ft]	2.90	12.63	13.73	26.40
Approach Delay [s/veh]	7.81	8.70	8.35	8.70
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.56			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 206: Chilco Street/Ivy Drive

Control Type:	All-way stop	Delay (sec / veh):	8.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Streeet			Ivy Drive			Ivy Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right2	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Streeet			Ivy Drive			Ivy Drive		
Base Volume Input [veh/h]	42	44	12	41	54	20	17	56	25	9	64	63
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	42	44	12	41	54	20	17	56	25	9	64	63
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	11	11	3	10	14	5	4	14	6	2	16	16
Total Analysis Volume [veh/h]	42	44	12	41	54	20	17	56	25	9	64	63
Pedestrian Volume [ped/h]	29			100			28			66		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.43	0.51	0.41	0.58
95th-Percentile Queue Length [ft]	10.74	12.70	10.37	14.43
Approach Delay [s/veh]	8.29	8.33	8.10	8.13
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	8.21			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	160.9
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Base Volume Input [veh/h]	134	147	196	766	115	99	32	10	17	42	24	84
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	10.10	6.80	2.30	3.40	0.00	40.00	40.00	29.40	14.30	37.50	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	134	147	196	766	115	99	32	10	17	42	24	84
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	37	49	192	29	25	8	3	4	11	6	21
Total Analysis Volume [veh/h]	134	147	196	766	115	99	32	10	17	42	24	84
Pedestrian Volume [ped/h]	0			1			0			1		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	6.55	49.53	0.26	0.19	1.20
95th-Percentile Queue Length [ft]	163.76	1238.27	6.47	4.73	30.07
Approach Delay [s/veh]	22.92	259.62	11.86		12.85
Approach LOS	C	F	B		B
Intersection Delay [s/veh]	160.85				
Intersection LOS	F				

Intersection Level Of Service Report
Intersection 209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	9.7
Analysis Method:	HCM 2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name				Constitution Drive			Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	1	0	0	1	53	0	2	17	1	23	0	38
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.90	0.00	0.00	5.90	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	0	0	1	53	0	2	17	1	23	0	38
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	0	13	0	1	4	0	6	0	10
Total Analysis Volume [veh/h]	1	0	0	1	53	0	2	17	1	23	0	38
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.04
d_M, Delay for Movement [s/veh]	9.20	9.42	8.38	7.23	0.00	0.00	7.30	0.00	0.00	9.17	9.66	8.77
Movement LOS	A	A	A	A	A	A	A	A	A	A	A	A
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.10	0.10	0.10	0.04	0.04	0.04	0.20	0.20	0.20
95th-Percentile Queue Length [ft]	0.09	0.09	0.09	2.60	2.60	2.60	0.97	0.97	0.97	4.98	4.98	4.98
d_A, Approach Delay [s/veh]	9.20			0.13			0.73			8.92		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	4.23											
Intersection LOS	A											

Intersection Level Of Service Report
Intersection 213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	10.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.016

Intersection Setup

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Chrysler Drive						Independence Drive		
Base Volume Input [veh/h]	8	67	5	1	47	70	29	11	91	45	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	9.10	20.00	100.00	33.30	0.00	10.30	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	8	67	5	1	47	70	29	11	91	45	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	17	1	0	12	18	7	3	23	11	0	0
Total Analysis Volume [veh/h]	8	67	5	1	47	70	29	11	91	45	0	1
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.02	0.09	0.07	0.00	0.00
d_M, Delay for Movement [s/veh]	7.44	0.00	0.00	8.33	0.00	0.00	10.34	10.88	9.27	10.85	10.40	9.06
Movement LOS	A	A	A	A	A	A	B	B	A	B	B	A
95th-Percentile Queue Length [veh]	0.17	0.17	0.17	0.37	0.37	0.37	0.50	0.50	0.50	0.22	0.22	0.22
95th-Percentile Queue Length [ft]	4.27	4.27	4.27	9.16	9.16	9.16	12.62	12.62	12.62	5.55	5.55	5.55
d_A, Approach Delay [s/veh]	0.74			0.07			9.65			10.81		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	4.88											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	13.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Approach	Southbound			Northeastbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Chrysler Drive			Jefferson Drive					
Base Volume Input [veh/h]	153	81	0	0	102	14	7	0	46	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	10.30	2.00	2.00	26.10	7.10	0.00	0.00	18.20	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	153	81	0	0	102	14	7	0	46	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	38	20	0	0	26	4	2	0	12	0	0	0
Total Analysis Volume [veh/h]	153	81	0	0	102	14	7	0	46	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.05	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	7.74	0.00	0.00	0.00	0.00	0.00	13.38	13.78	9.31	0.00	0.00	0.00
Movement LOS	A	A			A	A	B	B	A			
95th-Percentile Queue Length [veh]	0.57	0.57	0.00	0.00	0.00	0.00	0.21	0.21	0.21	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	14.17	14.17	0.00	0.00	0.00	0.00	5.34	5.34	5.34	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	5.06			0.00			9.85			0.00		
Approach LOS	A			A			A			A		
d_I, Intersection Delay [s/veh]	4.23											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 215: Chrysler Dr/Constitution Dr

Control Type:	Signalized	Delay (sec / veh):	32.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.414

Intersection Setup

Name	Chrysler Drive			Constitution Drive			Constitution Drive			Chrysler Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Constitution Drive			Constitution Drive			Chrysler Drive		
Base Volume Input [veh/h]	78	74	34	65	227	90	119	65	162	1	56	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	13.00	8.50	8.30	21.10	0.80	3.10	5.30	40.00	9.80	0.00	17.90	100.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	78	74	34	65	227	90	119	65	162	1	56	88
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	20	19	9	16	57	23	30	16	41	0	14	22
Total Analysis Volume [veh/h]	78	74	34	65	227	90	119	65	162	1	56	88
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			5			5			5		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fixed time
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split
Signal group	0	6	0	3	8	0	7	4	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	5	0	0	5	0	0	5	0	0	5	0
Maximum Green [s]	0	26	0	0	26	0	0	26	0	0	26	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	36	0	0	59	0	0	59	0	0	25	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	5	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	2.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	55	55	55	55	21	21
g / C, Green / Cycle	0.27	0.46	0.46	0.46	0.46	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.12	0.07	0.20	0.13	0.21	0.04	0.08
s, saturation flow rate [veh/h]	1496	869	1613	920	1082	1449	1106
c, Capacity [veh/h]	399	319	739	344	496	254	194
d1, Uniform Delay [s]	36.85	31.97	21.91	32.89	22.28	42.51	44.37
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.88	1.44	1.82	2.73	3.03	2.05	7.53
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

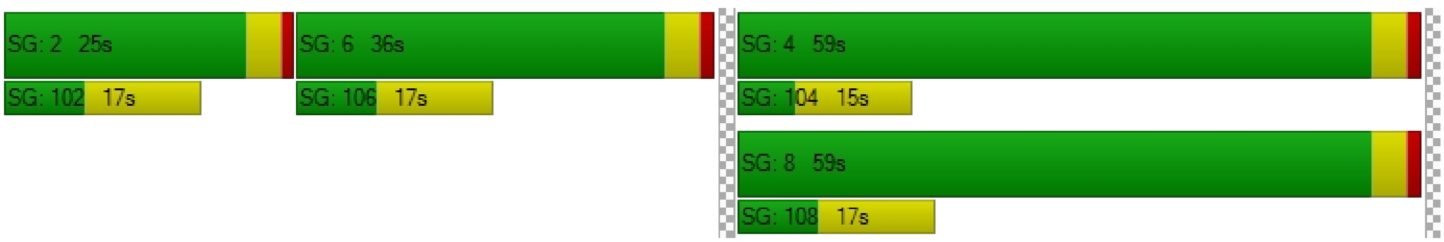
X, volume / capacity	0.47	0.20	0.43	0.35	0.46	0.22	0.45
d, Delay for Lane Group [s/veh]	40.72	33.41	23.73	35.62	25.30	44.56	51.89
Lane Group LOS	D	C	C	D	C	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	5.01	1.57	6.36	3.01	4.77	1.60	2.76
50th-Percentile Queue Length [ft]	125.23	39.23	158.97	75.37	119.37	40.12	68.95
95th-Percentile Queue Length [veh]	8.68	2.82	10.49	5.43	8.36	2.89	4.96
95th-Percentile Queue Length [ft]	216.99	70.61	262.36	135.67	208.96	72.21	124.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.72	40.72	40.72	33.41	23.73	23.73	35.62	25.30	25.30	44.56	44.56	51.89
Movement LOS	D	D	D	C	C	C	D	C	C	D	D	D
d_A, Approach Delay [s/veh]	40.72			25.37			28.85			49.01		
Approach LOS	D			C			C			D		
d_I, Intersection Delay [s/veh]	32.44											
Intersection LOS	C											
Intersection V/C	0.414											

Sequence

Ring 1	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 233: Sand Hill Road and Sand Hill Circle

Control Type:	Signalized	Delay (sec / veh):	14.4
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.580

Intersection Setup

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			Yes		

volumes

Name	Hwy 280 NB Off-Ramp						Sand Hill Road					
Base Volume Input [veh/h]	4	293	0	0	51	40	0	0	0	0	806	32
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	26.60	2.00	2.00	5.90	7.50	2.00	2.00	2.00	3.00	3.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4	293	0	0	51	40	0	0	0	0	806	32
Peak Hour Factor	0.8700	0.8700	1.0000	1.0000	0.8700	0.8700	1.0000	1.0000	1.0000	0.8700	0.8700	0.8700
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	84	0	0	15	11	0	0	0	0	232	9
Total Analysis Volume [veh/h]	5	337	0	0	59	46	0	0	0	0	926	37
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Split	Split	Split
Signal group	0	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	55	0	0	55	0	0	0	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	55	0	0	55	0	0	0	0	0	30	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	14	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
Minimum Recall		No			No						No	
Maximum Recall		No			No						No	
Pedestrian Recall		No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R		C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		1.00	1.00
g_i, Effective Green Time [s]	23	23	23		57	57
g / C, Green / Cycle	0.27	0.27	0.27		0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.23	0.03	0.03		0.28	0.28
s, saturation flow rate [veh/h]	1491	1794	1483		1845	1652
c, Capacity [veh/h]	448	487	402		1236	1106
d1, Uniform Delay [s]	29.24	23.34	23.29		6.39	6.40
k, delay calibration	0.08	0.08	0.08		0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	2.05	0.08	0.09		1.01	1.13
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00

Lane Group Results

X, volume / capacity	0.76	0.12	0.11		0.41	0.41
d, Delay for Lane Group [s/veh]	31.29	23.42	23.39		7.41	7.53
Lane Group LOS	C	C	C		A	A
Critical Lane Group	Yes	No	No		No	Yes
50th-Percentile Queue Length [veh]	6.61	0.89	0.69		3.77	3.43
50th-Percentile Queue Length [ft]	165.17	22.15	17.28		94.37	85.64
95th-Percentile Queue Length [veh]	10.82	1.59	1.24		6.79	6.17
95th-Percentile Queue Length [ft]	270.56	39.87	31.10		169.87	154.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.29	31.29	0.00	0.00	23.42	23.39	0.00	0.00	0.00	7.41	7.46	7.53
Movement LOS	C	C			C	C				A	A	A
d_A, Approach Delay [s/veh]	31.29			23.41			0.00			7.47		
Approach LOS	C			C			A			A		
d_I, Intersection Delay [s/veh]	14.43											
Intersection LOS	B											
Intersection V/C	0.580											

Sequence

Ring 1	-	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	86.1
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.933

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Hwy 280 NB Off-Ramp			Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	0	163	695	48	0	0	156	1696	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.70	3.60	4.20	2.00	2.00	2.60	1.50	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	163	695	48	0	0	156	1696	0	0	0	0
Peak Hour Factor	1.0000	0.9500	0.9500	0.9500	1.0000	1.0000	0.9500	0.9500	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	43	183	13	0	0	41	446	0	0	0	0
Total Analysis Volume [veh/h]	0	172	732	51	0	0	164	1785	0	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			40			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Protecte	Permiss	Overlap	Permiss	Permiss	Protecte	Protecte	Permiss
Signal group	0	8	5	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups			5,8				1,5,6					
Lead / Lag	-	-	-	Lead	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	6	5	6	0	0	4	8	0	0	0	0
Maximum Green [s]	0	14	30	25	0	0	16	30	0	0	0	0
Amber [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0
All red [s]	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Split [s]	0	14	30	25	0	0	16	30	0	0	0	0
Vehicle Extension [s]	0.0	2.5	3.0	2.0	0.0	0.0	2.0	4.0	0.0	0.0	0.0	0.0
Walk [s]	0	10	0	0	0	0	0	10	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	0	0	0	10	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0
Minimum Recall		No	No	No			No	Yes				
Maximum Recall		No	No	No			No	No				
Pedestrian Recall		No	No	No			No	No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	L	C	
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.25	2.50	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.50	0.50	
g_i, Effective Green Time [s]	16	24	6	55	32	
g / C, Green / Cycle	0.24	0.36	0.09	0.82	0.48	
(v / s)_i Volume / Saturation Flow Rate	0.09	0.47	0.03	0.09	0.50	
s, saturation flow rate [veh/h]	1850	1559	1737	1764	3564	
c, Capacity [veh/h]	445	512	151	1373	1710	
d1, Uniform Delay [s]	21.21	22.39	28.65	1.04	17.34	
k, delay calibration	0.08	0.50	0.04	0.04	0.19	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.41	204.55	0.49	0.01	26.59	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

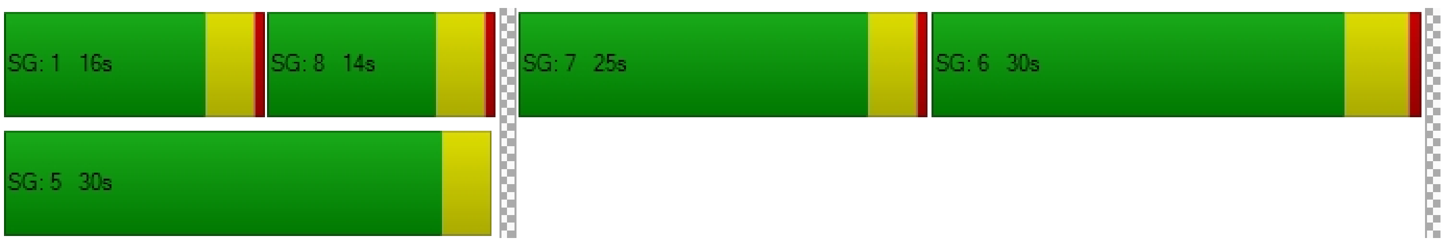
X, volume / capacity	0.39	1.43	0.34	0.12	1.04	
d, Delay for Lane Group [s/veh]	21.62	226.95	29.14	1.06	43.93	
Lane Group LOS	C	F	C	A	F	
Critical Lane Group	No	Yes	Yes	Yes	Yes	
50th-Percentile Queue Length [veh]	2.08	36.01	0.73	0.01	16.62	
50th-Percentile Queue Length [ft]	52.03	900.29	18.33	0.14	415.55	
95th-Percentile Queue Length [veh]	3.75	55.85	1.32	0.01	24.05	
95th-Percentile Queue Length [ft]	93.65	1396.37	33.00	0.24	601.14	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	21.62	226.95	29.14	0.00	0.00	1.06	43.93	0.00	0.00	0.00	0.00
Movement LOS		C	F	C			A	F				
d_A, Approach Delay [s/veh]	187.88			29.14			40.33			0.00		
Approach LOS	F			C			D			A		
d_I, Intersection Delay [s/veh]	86.06											
Intersection LOS	F											
Intersection V/C	0.933											

Sequence

Ring 1	8	1	6	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 243: University Avenue/US 101 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	52.9
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.940

Intersection Setup

Name	University Avenue		University Avenue		US 101 SB Ramps	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	0	1
Pocket Length [ft]	100.00	160.00	230.00	100.00	100.00	220.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		US 101 SB Ramps	
Base Volume Input [veh/h]	1042	507	841	1474	717	546
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1042	507	841	1474	717	546
Peak Hour Factor	0.9500	0.9500	0.9500	0.9500	0.9500	0.9500
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	274	133	221	388	189	144
Total Analysis Volume [veh/h]	1097	534	885	1552	755	575
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	7		5		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	4.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Protected	Permissive	Protected	Permissive
Signal group	6	7	5	2	7	0
Auxiliary Signal Groups		6,7				
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	10	6	4	10	6	0
Maximum Green [s]	30	30	30	30	30	0
Amber [s]	4.0	3.0	3.0	4.0	3.0	0.0
All red [s]	0.5	0.5	0.5	0.5	0.5	0.0
Split [s]	48	43	39	87	43	0
Vehicle Extension [s]	3.0	2.0	2.0	3.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.5	1.5	1.5	2.5	1.5	0.0
Minimum Recall	Yes	No	No	Yes	No	
Maximum Recall	No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R
L, Total Lost Time per Cycle [s]	4.50	3.50	3.50	4.50	3.50	3.50	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.50	0.00	1.50	2.50	1.50	1.50	1.50
g_i, Effective Green Time [s]	44	88	36	83	40	40	40
g / C, Green / Cycle	0.33	0.67	0.27	0.63	0.30	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.34	0.22	0.29	0.49	0.28	0.29	0.31
s, saturation flow rate [veh/h]	3192	2462	3101	3192	1597	1541	1425
c, Capacity [veh/h]	1068	1657	847	2026	485	468	433
d1, Uniform Delay [s]	43.25	8.87	47.25	16.89	43.61	44.22	45.25
k, delay calibration	0.50	0.04	0.04	0.50	0.39	0.42	0.49
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	34.65	0.04	23.82	2.83	20.19	26.91	48.93
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.03	0.32	1.05	0.77	0.91	0.95	1.02
d, Delay for Lane Group [s/veh]	77.90	8.91	71.07	19.73	63.80	71.13	94.18
Lane Group LOS	F	A	F	B	E	E	F
Critical Lane Group	Yes	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	22.11	3.05	16.41	16.37	16.38	17.35	19.73
50th-Percentile Queue Length [ft]	552.78	76.28	410.24	409.25	409.48	433.76	493.16
95th-Percentile Queue Length [veh]	30.37	5.49	23.68	23.01	23.02	24.18	27.43
95th-Percentile Queue Length [ft]	759.28	137.31	591.94	575.13	575.41	604.54	685.77

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.90	8.91	71.07	19.73	66.82	88.90
Movement LOS	F	A	F	B	E	F
d_A, Approach Delay [s/veh]	55.32		38.37		76.37	
Approach LOS	E		D		E	
d_I, Intersection Delay [s/veh]	52.85					
Intersection LOS	D					
Intersection V/C	0.940					

Sequence

Ring 1	2	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 245: University Avenue/Runnymede Street

Control Type:	Signalized	Delay (sec / veh):	15.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.723

Intersection Setup

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	120.00	100.00	100.00	130.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Base Volume Input [veh/h]	14	1336	72	167	848	89	19	85	1	46	291	37
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	14	1336	72	167	848	89	19	85	1	46	291	37
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	334	18	42	212	22	5	21	0	12	73	9
Total Analysis Volume [veh/h]	14	1336	72	167	848	89	19	85	1	46	291	37
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	14			5			6			8		
Bicycle Volume [bicycles/h]	1			7			0			1		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	65
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	54.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	44	0	0	44	0	0	21	0	0	21	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	5	0	0	5	0	0	5	0	0	5	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	40	40	40	40	40	40	17	17
g / C, Green / Cycle	0.62	0.62	0.62	0.62	0.62	0.62	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.03	0.42	0.43	0.49	0.28	0.29	0.08	0.24
s, saturation flow rate [veh/h]	536	1676	1641	343	1676	1611	1390	1590
c, Capacity [veh/h]	344	1036	1014	215	1036	995	425	474
d1, Uniform Delay [s]	10.64	8.22	8.26	26.28	6.62	6.64	19.04	23.23
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.35
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.22	3.67	3.83	23.40	1.47	1.55	0.30	9.02
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.04	0.68	0.69	0.78	0.46	0.46	0.25	0.79
d, Delay for Lane Group [s/veh]	10.86	11.89	12.09	49.68	8.09	8.19	19.34	32.26
Lane Group LOS	B	B	B	D	A	A	B	C
Critical Lane Group	No	No	No	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.13	5.98	5.96	3.93	3.09	3.02	1.21	6.31
50th-Percentile Queue Length [ft]	3.16	149.57	149.03	98.35	77.24	75.40	30.29	157.73
95th-Percentile Queue Length [veh]	0.23	9.99	9.97	7.08	5.56	5.43	2.18	10.43
95th-Percentile Queue Length [ft]	5.68	249.85	249.14	177.03	139.04	135.73	54.53	260.72

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	10.86	11.98	12.09	49.68	8.14	8.19	19.34	19.34	19.34	32.26	32.26	32.26
Movement LOS	B	B	B	D	A	A	B	B	B	C	C	C
d_A, Approach Delay [s/veh]		11.98			14.42			19.34			32.26	
Approach LOS		B			B			B			C	
d_I, Intersection Delay [s/veh]	15.66											
Intersection LOS	B											
Intersection V/C	0.723											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 246: University Avenue/Bell Street

Control Type:	Signalized	Delay (sec / veh):	13.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	60.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Base Volume Input [veh/h]	38	1397	56	16	888	16	13	84	39	90	115	12
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	38	1397	56	16	888	16	13	84	39	90	115	12
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	349	14	4	222	4	3	21	10	23	29	3
Total Analysis Volume [veh/h]	38	1397	56	16	888	16	13	84	39	90	115	12
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			5			7			1		
Bicycle Volume [bicycles/h]	4			11			2			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	78.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0	0.0	3.5	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	82	0	0	82	0	0	48	0	0	48	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	98	98	98	98	98	98	24	24
g / C, Green / Cycle	0.76	0.76	0.76	0.76	0.76	0.76	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.07	0.44	0.44	0.05	0.27	0.27	0.09	0.16
s, saturation flow rate [veh/h]	553	1676	1650	328	1676	1664	1560	1341
c, Capacity [veh/h]	384	1269	1249	210	1269	1259	314	283
d1, Uniform Delay [s]	11.45	6.80	6.83	19.15	5.26	5.27	47.65	52.13
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.51	1.90	1.96	0.71	0.79	0.79	0.95	4.38
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

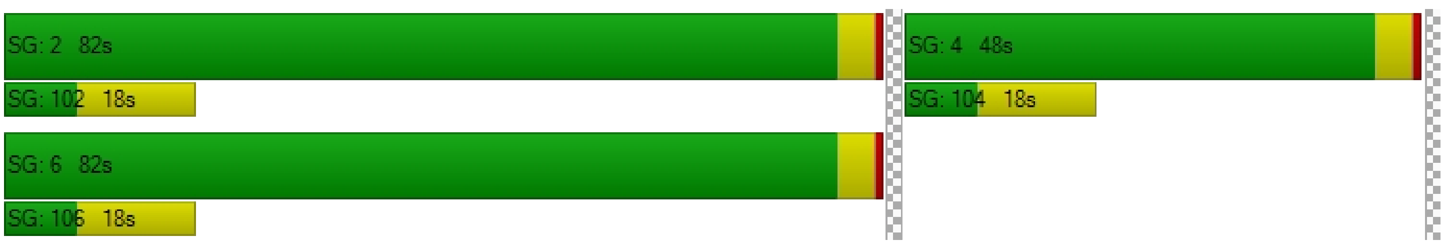
X, volume / capacity	0.10	0.58	0.58	0.08	0.36	0.36	0.43	0.77
d, Delay for Lane Group [s/veh]	11.96	8.70	8.79	19.86	6.05	6.06	48.59	56.50
Lane Group LOS	B	A	A	B	A	A	D	E
Critical Lane Group	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.53	8.26	8.23	0.31	3.93	3.91	4.06	7.27
50th-Percentile Queue Length [ft]	13.32	206.56	205.81	7.85	98.15	97.64	101.38	181.63
95th-Percentile Queue Length [veh]	0.96	12.98	12.94	0.56	7.07	7.03	7.30	11.69
95th-Percentile Queue Length [ft]	23.98	324.41	323.45	14.12	176.66	175.75	182.48	292.14

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.96	8.75	8.79	19.86	6.06	6.06	48.59	48.59	48.59	56.50	56.50	56.50
Movement LOS	B	A	A	B	A	A	D	D	D	E	E	E
d_A, Approach Delay [s/veh]	8.83			6.30			48.59			56.50		
Approach LOS	A			A			D			E		
d_I, Intersection Delay [s/veh]	13.69											
Intersection LOS	B											
Intersection V/C	0.600											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 247: University Avenue/Bay Road

Control Type:	Signalized	Delay (sec / veh):	41.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.661

Intersection Setup

Name	University Avenue			University Avenue						BayRoad		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	170.00	100.00	170.00	170.00	100.00	170.00
Speed [mph]	35.00			35.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue						BayRoad		
Base Volume Input [veh/h]	146	1129	117	99	970	34	95	192	96	56	175	76
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	146	1129	117	99	970	34	95	192	96	56	175	76
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	37	282	29	25	243	9	24	48	24	14	44	19
Total Analysis Volume [veh/h]	146	1129	117	99	970	34	95	192	96	56	175	76
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	78			19			8			26		
Bicycle Volume [bicycles/h]	9			8			3			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	15	49	0	12	46	0	0	30	0	0	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	23	0	0	17	0	0	27	0	0	26	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	73	73	8	70	70	17	17	17	16	16	16
g / C, Green / Cycle	0.08	0.56	0.56	0.06	0.54	0.54	0.13	0.13	0.13	0.12	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.09	0.38	0.38	0.06	0.30	0.30	0.06	0.11	0.07	0.04	0.10	0.07
s, saturation flow rate [veh/h]	1597	1676	1615	1597	1676	1650	1597	1676	1342	1597	1676	1153
c, Capacity [veh/h]	135	936	902	98	897	883	214	225	180	195	205	141
d1, Uniform Delay [s]	59.50	20.34	20.47	61.00	20.09	20.13	51.81	55.03	52.48	51.88	55.90	53.60
k, delay calibration	0.43	0.50	0.50	0.35	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	95.22	3.88	4.15	77.76	2.55	2.61	1.44	8.88	2.44	0.80	9.60	3.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.08	0.67	0.68	1.01	0.56	0.57	0.44	0.85	0.53	0.29	0.85	0.54
d, Delay for Lane Group [s/veh]	154.72	24.23	24.63	138.76	22.64	22.75	53.25	63.91	54.92	52.68	65.50	56.77
Lane Group LOS	F	C	C	F	C	C	D	E	D	D	E	E
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	7.99	14.00	13.76	5.34	10.50	10.41	2.95	6.71	3.06	1.72	6.18	2.47
50th-Percentile Queue Length [ft]	199.82	349.91	344.04	133.62	262.55	260.28	73.82	167.75	76.42	42.89	154.43	61.72
95th-Percentile Queue Length [veh]	12.99	20.13	19.85	9.16	15.82	15.70	5.32	10.96	5.50	3.09	10.25	4.44
95th-Percentile Queue Length [ft]	324.64	503.30	496.14	228.94	395.42	392.57	132.88	273.95	137.56	77.20	256.33	111.09

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	154.72	24.40	24.63	138.76	22.69	22.75	53.25	63.91	54.92	52.68	65.50	56.77
Movement LOS	F	C	C	F	C	C	D	E	D	D	E	E
d_A, Approach Delay [s/veh]	38.09			33.11			59.01			61.00		
Approach LOS	D			C			E			E		
d_I, Intersection Delay [s/veh]	41.09											
Intersection LOS	D											
Intersection V/C	0.661											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 249: Donohoe Street/US 101 NB Off-ramp/Capitol Avenue

Control Type:	Signalized	Delay (sec / veh):	45.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.521

Intersection Setup

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	942	0	380	0	0	0	0	444	0	0	1042	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	942	0	380	0	0	0	0	444	0	0	1042	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9330	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	236	0	95	0	0	0	0	111	0	0	261	0
Total Analysis Volume [veh/h]	942	0	380	0	0	0	0	444	0	0	1042	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			25			0			1		
Bicycle Volume [bicycles/h]	1			0			2			4		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Protecte	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	0	5	0	0	6	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	4	0	4	0	0	4	0	5	0	0	5	0
Maximum Green [s]	30	0	30	0	0	30	0	30	0	0	30	0
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	70	0	70	0	0	8	0	52	0	0	52	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	26	0	0	26	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No		No			No		No			No	
Maximum Recall	No		No			Yes		No			No	
Pedestrian Recall	No		No			No		No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	R	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	44	44	37	37	37	37
g / C, Green / Cycle	0.34	0.34	0.28	0.29	0.29	0.29
(v / s)_i Volume / Saturation Flow Rate	0.30	0.27	0.00	0.14	0.22	0.21
s, saturation flow rate [veh/h]	3101	1407	1425	3192	3192	1676
c, Capacity [veh/h]	1051	477	403	912	912	479
d1, Uniform Delay [s]	40.80	38.92	0.00	38.52	42.39	41.83
k, delay calibration	0.11	0.12	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.01	3.45	0.00	1.86	5.98	9.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.80	0.00	0.49	0.76	0.73
d, Delay for Lane Group [s/veh]	43.81	42.36	0.00	40.38	48.37	51.06
Lane Group LOS	D	D	A	D	D	D
Critical Lane Group	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	14.64	11.38	0.00	6.15	10.94	11.27
50th-Percentile Queue Length [ft]	365.96	284.59	0.00	153.73	273.46	281.87
95th-Percentile Queue Length [veh]	20.91	16.92	0.00	10.22	16.36	16.78
95th-Percentile Queue Length [ft]	522.82	422.92	0.00	255.40	409.06	419.54

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	43.81	0.00	42.36	0.00	0.00	0.00	0.00	40.38	0.00	0.00	49.26	51.06
Movement LOS	D		D			A		D			D	D
d_A, Approach Delay [s/veh]	43.39			0.00			40.38			49.26		
Approach LOS	D			A			D			D		
d_I, Intersection Delay [s/veh]	45.10											
Intersection LOS	D											
Intersection V/C	0.521											

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

General Plan & Facebook Expansion

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Report File: J:\...\Cumulative 2040 Proposed General Plan Conditions AM.pdf

Scenario 1: Proposed General Plan Conditions AM

5/19/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	847	1749	1091	320	4007

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	28	1184	14	439	1422	296	16	4	77	251	13	5	3749

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	99	767	90	28	1103	449	472	50	209	29	17	27	3340

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	1	803	82	289	933	33	193	132	12	45	19	173	2715

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
5	Middlefield Rd/Marsh Rd	509	310	374	391	225	455	2264

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	93	572	446	364	420	75	1970

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringswood Ave	5	3	12	136	44	251	55	559	84	216	653	62	2080

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
13	Middlefield Rd/Lytton Ave	119	39	71	4	120	6	129	273	7	5	464	337	1574

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14	Middlefield Rd/University Ave	25	240	25	113	497	143	34	240	65	110	352	67	1911

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	1162	113	1450	3960	888	359	7932

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	500	714	445	16	59	142	263	814	212	732	3641	24	7562

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	170	1531	97	88	810	57	78	22	50	26	24	23	2976

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	150	1781	842	9	17	147	2946

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1839	329	54	969	311	92	3594

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	163	2050	180	52	1151	10	67	306	509	332	146	51	5017

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	67	1278	1161	445	363	60	3374

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	30	1184	18	41	1058	102	40	3	10	74	18	108	2686

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	23	914	3	1	805	120	207	6	55	4	4	5	2147

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	3	745	40	27	835	4	64	121	29	88	126	113	2195

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	31	224	155	458	75	391	80	368	256	320	356	15	2729

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	16	671	73	22	518	12	169	138	16	136	188	65	2024

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	12	277	91	32	369	65	30	107	16	72	200	52	1323

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	16	117	18	230	21	219	40	2124	286	181	1966	76	5294

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	281	139	137	147	310	28	132	910	45	79	1974	800	4982

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	57	196	53	126	274	68	116	947	95	196	2139	133	4400

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	86	59	83	107	114	78	2115	101	1491	17	4251

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	24	351	61	683	351	72	128	1131	575	247	2174	24	5821

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	73	9	76	6	3	10	84	2318	49	48	1976	48	4700

ID	Intersection Name	Northeastbound		Southwestbound				Northwestbound		Southeastbound		Total Volume
		Left	Right	U-T	Left	Thru	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	185	285	0	0	0	0	348	1987	1974	77	4856

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	30	0	54	1	0	0	167	1693	1	40	2742	20	4748

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	410	399	74	426	309	69	1687

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Santa Cruz Ave/Sand Hill Rd	231	1143	261	331	559	51	102	671	424	243	728	257	5001

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
58	University Avenue and Adams Drive	50	1067	1449	140	209	35	2950

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
71	Chilco Street/Terminal Avenue	48	206	101	62	230	90	737

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	130	1151	1284	142	16	25	2748

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
77	University Avenue/Donohoe Street	203	542	539	23	865	65	8	97	494	522	521	941	4820

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	152	429	122	49	641	69	68	103	40	71	51	62	1857

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	23	2	41	2	2	7	103	1888	233	115	868	40	3324

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	663	556	65	172	852	517	2825

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road and US 101 NB Ramps	1475	1285	1024	619	4403

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
111	University Avenue / Woodland Avenue	42	776	23	211	972	533	23	106	379	395	85	44	3589

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
131	Chilco Street/Hamilton Avenue	13	88	10	50	79	15	37	41	16	22	51	131	553

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	1794	749	38	88	217	2886

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	10	0	33	93	7	60	211	1594	117	73	760	50	3008

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	7	1	29	12	1	8	37	1666	12	17	867	21	2678

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	145	1496	17	27	743	138	2	0	9	227	3	184	2991

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	199	49	1684	6	35	8	9	122	385	2677	407	12	5593

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	66	656	489	136	102	75	1524

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	205	58	514	2726	1268	535	5306

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	298	27	1736	102	100	2914	5177

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
199	Bayfront Expwy/Bldg 21	56	120	1236	90	809	2787	5098

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
201	Bayfront Expwy/Bldg 20	44	76	1213	79	704	3552	5668

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
204	Chilco Street/Newbridge Street	2	15	12	93	5	9	4	118	2	13	127	85	485

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
206	Chilco Street/Ivy Drive	42	44	12	41	54	20	17	56	25	9	64	63	447

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	134	147	196	766	115	99	32	10	17	42	24	84	1666

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	1	0	0	1	53	0	2	17	1	23	0	38	136

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	8	67	5	1	47	70	29	11	91	45	0	1	375

ID	Intersection Name	Southbound		Northeastbound		Northwestbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
214	Chrysler Dr/Jefferson Dr	153	81	102	14	7	0	46	403

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	78	74	34	65	227	90	119	65	162	1	56	88	1059

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Road and Sand Hill Circle	4	293	51	40	0	806	32	1226

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	163	695	48	156	1696	2758

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
243	University Avenue/US 101 SB Ramps	1042	507	841	1474	717	546	5127

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
245	University Avenue/Runnymede Street	14	1336	72	167	848	89	19	85	1	46	291	37	3005

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
246	University Avenue/Bell Street	38	1397	56	16	888	16	13	84	39	90	115	12	2764

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
247	University Avenue/Bay Road	146	1129	117	99	970	34	95	192	96	56	175	76	3185

ID	Intersection Name	Northbound		Southbound	Eastbound	Westbound		Total Volume
		Left	Right	Right	Thru	Thru	Right	
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	942	380	0	444	1042	0	2808

2040 plus Project – PM Peak Hour

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General Plan & Facebook Expansion

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5/19/2016

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Marsh Rd (SR 84)/US 101 SB Offramp	Signalized	HCM 2010	SWB Thru	0.800	18.5	B
2	Marsh Rd/Rolison Rd-Scott Dr	Signalized	HCM 2010	NEB Left	0.610	22.4	C
3	Marsh Rd/Florence St-Bohannon Dr	Signalized	HCM 2010	SB Left	0.670	35.2	D
4	Marsh Rd/Bay Rd	Signalized	HCM 2010	SB Left	0.519	21.7	C
5	Middlefield Rd/Marsh Rd	Signalized	HCM 2010	EB Left	0.767	36.5	D
9	Middlefield Rd/Ravenswood Ave	Signalized	HCM 2010	SEB Thru	1.412	52.1	D
10	Middlefield Rd/Ringwood Ave	Signalized	HCM 2010	SEB Left	0.727	42.2	D
13	Middlefield Rd/Lytton Ave	Signalized	HCM 2010	SWB Thru	0.744	41.3	D
14	Middlefield Rd/University Ave	Signalized	HCM 2010	SEB Left	0.545	35.1	D
15	Bayfront Expy (SR 84)/University Ave (SR 109)	Signalized	HCM 2010	NWB Right	1.477	198.0	F
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	Signalized	HCM 2010	SB Left	1.094	113.4	F
17	Willow Rd (SR 114)/Hamilton Ave	Signalized	HCM 2010	EB Left	0.810	103.3	F
18	Willow Rd (SR 114)/Ivy Dr	Signalized	HCM 2010	NB Left	0.864	24.9	C
19	Willow Rd (SR 114)/O'Brien Dr	Signalized	HCM 2010	SB Left	0.794	13.2	B
20	Willow Rd (SR 114)/Newbridge St	Signalized	HCM 2010	NB Left	1.008	58.8	E
21	Willow Rd/Bay Rd	Signalized	HCM 2010	NEB Left	0.810	13.8	B
22	Willow Rd/Durham St-VA Med Entrance	Signalized	HCM 2010	NB Left	0.771	25.5	C
23	Willow Rd/Coleman Ave	Signalized	HCM 2010	EB Left	0.563	8.5	A
24	Willow Rd/Gilbert Ave	Signalized	HCM 2010	WB Left	0.527	13.9	B
25	Middlefield Rd-Willow Rd	Signalized	HCM 2010	NEB Right	0.585	68.9	E
26	Ravenswood Ave/Laurel St	Signalized	HCM 2010	SEB Thru	0.731	24.7	C
28	Oak Grove Ave/Laurel St	Signalized	HCM 2010	NWB Thru	0.611	8.1	A

29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	Signalized	HCM 2010	SWB Left	12.363	37.4	D
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	Signalized	HCM 2010	SWB Thru	0.852	47.3	D
31	El Camino Real (SR 82)/Oak Grove Ave	Signalized	HCM 2010	SEB Left	0.740	26.5	C
32	El Camino Real (SR 82)/Santa Cruz Ave	Signalized	HCM 2010	NEB Right	0.920	33.0	C
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	Signalized	HCM 2010	SEB Left	1.000	82.8	F
34	El Camino Real (SR 82)/Roble Ave	Signalized	HCM 2010	NWB Left	0.638	9.1	A
35	El Camino Real (SR 82)/Middle Ave	Signalized	HCM 2010	NEB Left	0.788	17.3	B
36	El Camino Real (SR 82)/Cambridge Ave	Signalized	HCM 2010	SEB Left	0.625	8.5	A
38	Santa Cruz Ave/University Dr (S)	Signalized	HCM 2010	SWB Left	0.615	11.8	B
39	Sand Hill Rd/Santa Cruz Ave	Signalized	HCM 2010	NWB Left	0.781	46.0	D
58	University Avenue and Adams Drive	Two-way stop	HCM 2010	EB Thru	0.000	3,546.1	F
71	Chilco Street/Terminal Avenue	All-way stop	HCM 2010	SEB Thru		16.5	C
74	University Ave/O'Brien Dr	Signalized	HCM 2010	NB Left	0.903	18.7	B
77	University Avenue/Donohoe Street	Signalized	HCM 2010	SB Left	1.120	149.0	F
88	Valparaiso Ave/ University Dr	Signalized	HCM 2010	SEB Left	0.751	25.6	C
103	Addison Wesley/Sand Hill Rd	Signalized	HCM 2010	EB Left	0.690	15.9	B
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	Signalized	HCM 2010	NEB Thru	0.771	48.3	D
110	Marsh Road/101 NB Ramps	Signalized	HCM 2010	NWB Left	0.896	13.1	B
111	University Avenue/Woodland Avenue	Signalized	HCM 2010	SWB Left	0.798	53.8	D
131	Chilco Street/Hamilton Avenue	All-way stop	HCM 2010	SB Thru		48.7	E
132	Oak Ave/Sand Hill Rd	Signalized	HCM 2000	SEB Right	0.578	6.5	A
156	Saga Ln/Sand Hill Rd	Signalized	HCM 2010	NB Left	50.579	42.1	D
157	Branner Dr/Sand Hill Rd	Signalized	HCM 2010	WB Left	0.467	5.5	A

162	Sharon Park Dr/ Sand Hill Rd	Signalized	HCM 2010	NWB Right	1.449	47.9	D
163	Bayfront Expy/Marsh Rd	Signalized	HCM 2010	NB Left	0.848	29.0	C
181	Santa Cruz Ave/Elder Ave	Signalized	HCM 2010	NEB Left	0.643	7.9	A
195	Bayfront Expy/Chilco St	Signalized	HCM 2010	NB Right	1.035	47.5	D
196	Bayfront Expy/Chrysler Drive	Signalized	HCM 2010	WB Left	0.859	18.0	B
199	Bafront Expwy/Bldg 21	Signalized	HCM 2010	EB Thru	1.093	138.2	F
201	Bayfront Expwy/Bldg 20	Signalized	HCM 2010	EB Thru	1.224	216.6	F
204	Chilco Street/Newbridge Street	All-way stop	HCM 2010	SB Left		9.2	A
206	Chilco Street/Ivy Drive	All-way stop	HCM 2010	SB Thru		11.3	B
207	Chilco St/Constitution Dr	All-way stop	HCM 2010	NWB Right		206.1	F
209	Jefferson Dr/Constitution Dr	Two-way stop	HCM 2010	NEB Left	0.221	22.3	C
213	Chrysler Dr/Independence Dr	Two-way stop	HCM 2010	SEB Thru	0.004	13.3	B
214	Chrysler Dr/Jefferson Dr	Two-way stop	HCM 2010	NWB Left	0.004	14.9	B
215	Chrysler Dr/Constitution Dr	Signalized	HCM 2010	EB Left	0.858	68.0	E
233	Sand Hill Circle/Sand Hill Road	Signalized	HCM 2010	WB Right	1.191	84.9	F
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	Signalized	HCM 2010	SB Left	0.407	10.3	B
243	University Avenue/US 101 SB Ramps	Signalized	HCM 2010	WB Right	1.048	87.1	F
245	University Avenue/Runnymede Street	Signalized	HCM 2010	WB Right	0.757	25.7	C
246	University Avenue/Bell Street	Signalized	HCM 2010	NB Left	0.808	32.7	C
247	University Avenue/Bay Road	Signalized	HCM 2010	NWB Right	1.148	143.4	F
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	Signalized	HCM 2010	NB Right	0.791	31.9	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. for all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Marsh Rd (SR 84)/US 101 SB Offramp

Control Type:	Signalized	Delay (sec / veh):	18.5
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.800

Intersection Setup

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	420.00
Speed [mph]	35.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Marsh Road (SR 84)		US 101 SB Offramp	
Base Volume Input [veh/h]	0	984	944	279	1567	401
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.70	2.15	3.60	0.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	984	944	279	1567	401
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	246	236	70	392	100
Total Analysis Volume [veh/h]	0	984	944	279	1567	401
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	0	6	2	0	4	5
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	6	4
Maximum Green [s]	0	32	32	0	60	10
Amber [s]	0.0	3.6	3.6	0.0	3.1	3.1
All red [s]	0.0	0.5	0.5	0.0	1.0	0.0
Split [s]	0	28	28	0	52	26
Vehicle Extension [s]	0.0	2.0	2.0	0.0	2.0	1.5
Walk [s]	0	7	0	0	5	0
Pedestrian Clearance [s]	0	16	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	2.1	0.0	0.0	1.1
Minimum Recall		Yes	Yes		No	No
Maximum Recall		No	No		No	No
Pedestrian Recall		No	No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	4.10	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	2.10	0.00	0.00
g_i, Effective Green Time [s]	34	32	42	42
g / C, Green / Cycle	0.43	0.40	0.52	0.52
(v / s)_i Volume / Saturation Flow Rate	0.25	0.27	0.46	0.25
s, saturation flow rate [veh/h]	4000	3522	3392	1607
c, Capacity [veh/h]	1721	1424	1763	835
d1, Uniform Delay [s]	17.25	19.44	17.18	12.32
k, delay calibration	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.39	2.45	0.65	0.16
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

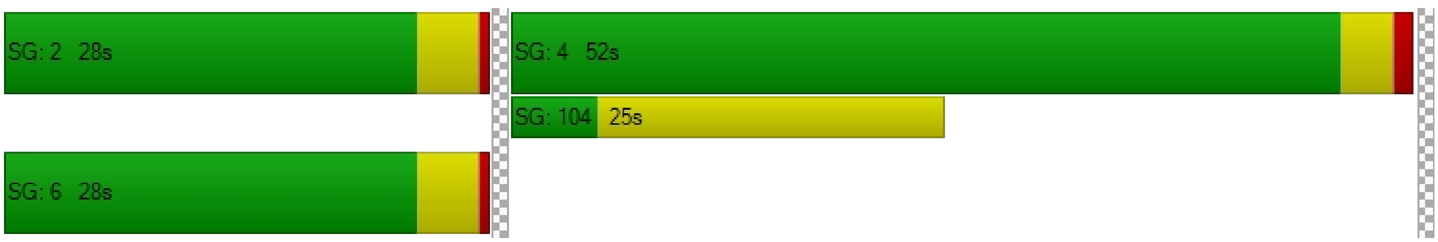
X, volume / capacity	0.57	0.66	0.89	0.48
d, Delay for Lane Group [s/veh]	18.63	21.89	17.83	12.48
Lane Group LOS	B	C	B	B
Critical Lane Group	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	6.56	7.02	11.53	4.21
50th-Percentile Queue Length [ft]	164.09	175.47	288.27	105.25
95th-Percentile Queue Length [veh]	10.76	11.36	17.10	7.57
95th-Percentile Queue Length [ft]	269.12	284.09	427.49	189.37

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	18.63	21.89	0.00	17.83	12.48
Movement LOS		B	C		B	B
d_A, Approach Delay [s/veh]	18.63		21.89		16.74	
Approach LOS	B		C		B	
d_I, Intersection Delay [s/veh]	18.46					
Intersection LOS	B					
Intersection V/C	0.800					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 2: Marsh Rd/Rolison Rd-Scott Dr

Control Type:	Signalized	Delay (sec / veh):	22.4
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	2	0	0	1	0	1	0	0	0
Pocket Length [ft]	155.00	100.00	100.00	350.00	100.00	100.00	60.00	100.00	35.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Scott Drive			Rolison Drive		
Base Volume Input [veh/h]	29	1083	4	66	1014	203	27	9	467	257	15	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	3.40	2.40	0.00	4.50	1.50	2.50	3.70	0.00	1.70	1.30	7.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	326	0	0	0
Total Hourly Volume [veh/h]	29	1083	4	66	1014	203	27	9	141	257	15	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	271	1	17	254	51	7	2	35	64	4	0
Total Analysis Volume [veh/h]	29	1083	4	66	1014	203	27	9	141	257	15	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			0			0			0		
Bicycle Volume [bicycles/h]	0			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	77.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	0	1	6	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	4	10	0	0	6	0	0	4	0
Maximum Green [s]	15	40	0	15	40	0	0	20	0	0	20	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.2	0.0	0.0	3.2	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	9	46	0	8	45	0	0	41	0	0	45	0
Vehicle Extension [s]	2.5	3.5	0.0	2.0	3.5	0.0	0.0	2.5	0.0	0.0	2.5	0.0
Walk [s]	0	7	0	0	7	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	21	0	0	21	0	0	28	0	0	24	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	5	90	90	6	91	91	11	11	24	24
g / C, Green / Cycle	0.04	0.65	0.65	0.04	0.65	0.65	0.08	0.08	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.20	0.20	0.02	0.33	0.34	0.02	0.05	0.14	0.01
s, saturation flow rate [veh/h]	1750	3533	1852	3363	1872	1751	1831	2811	1786	1744
c, Capacity [veh/h]	62	2281	1196	146	1224	1145	149	229	307	300
d1, Uniform Delay [s]	66.12	10.99	10.99	65.22	12.57	12.66	60.16	62.09	55.96	48.35
k, delay calibration	0.08	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.02	0.36	0.68	0.81	1.52	1.67	0.62	2.00	4.51	0.05
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

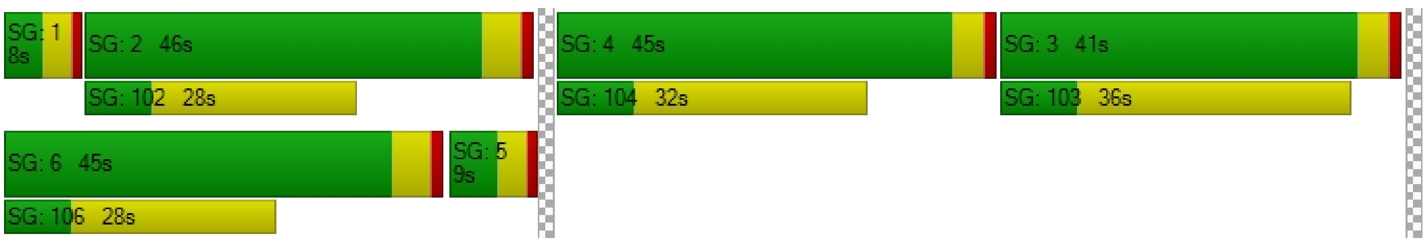
X, volume / capacity	0.47	0.31	0.31	0.45	0.51	0.52	0.24	0.62	0.84	0.05
d, Delay for Lane Group [s/veh]	70.14	11.35	11.67	66.03	14.09	14.33	60.77	64.09	60.47	48.40
Lane Group LOS	E	B	B	E	B	B	E	E	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.08	4.87	5.22	1.16	10.21	9.79	1.24	2.52	9.24	0.48
50th-Percentile Queue Length [ft]	27.08	121.82	130.43	29.08	255.28	244.76	30.97	62.90	231.00	12.02
95th-Percentile Queue Length [veh]	1.95	8.49	8.96	2.09	15.45	14.92	2.23	4.53	14.23	0.87
95th-Percentile Queue Length [ft]	48.74	212.32	224.08	52.35	386.30	373.04	55.74	113.22	355.63	21.64

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.14	11.46	11.67	66.03	14.18	14.33	60.77	60.77	64.09	60.47	48.40	48.40
Movement LOS	E	B	B	E	B	B	E	E	E	E	D	D
d_A, Approach Delay [s/veh]	12.98			16.87			63.42			59.76		
Approach LOS	B			B			E			E		
d_I, Intersection Delay [s/veh]	22.35											
Intersection LOS	C											
Intersection V/C	0.610											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 3: Marsh Rd/Florence St-Bohannon Dr

Control Type:	Signalized	Delay (sec / veh):	35.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.670

Intersection Setup

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	145.00	100.00	100.00	135.00	100.00	100.00	155.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Marsh Road			Marsh Road			Florence Street			Bohannon Avenue		
Base Volume Input [veh/h]	185	720	84	30	697	377	475	15	130	138	58	102
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.70	3.20	6.00	6.70	2.20	4.00	2.50	0.00	0.80	4.10	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	174	0	0	0
Total Hourly Volume [veh/h]	185	720	84	30	697	377	475	15	0	138	58	102
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	180	21	8	174	94	119	4	0	35	15	26
Total Analysis Volume [veh/h]	185	720	84	30	697	377	475	15	0	138	58	102
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	16			1			7			3		
Bicycle Volume [bicycles/h]	3			1			1			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	31.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	3	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	8	8	8	0	8	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.2	3.0	3.2	0.0	3.2	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	34	53	53	9	28	28	37	41	37	0	37	0
Vehicle Extension [s]	2.0	5.0	5.0	2.0	5.0	5.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	0	7	7	0	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	0	12	12	0	16	16	25	25	25	0	25	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	18	86	86	5	72	72	24	24	24	18	18
g / C, Green / Cycle	0.13	0.61	0.61	0.04	0.52	0.52	0.17	0.17	0.17	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.10	0.22	0.22	0.02	0.31	0.31	0.14	0.14	0.00	0.08	0.10
s, saturation flow rate [veh/h]	1762	1841	1764	1696	1859	1607	1765	1815	1602	1738	1683
c, Capacity [veh/h]	231	1130	1082	61	963	833	296	304	269	218	212
d1, Uniform Delay [s]	58.98	13.44	13.46	66.18	23.41	23.66	56.13	56.13	0.00	58.08	59.08
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.08	0.08	0.08	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.43	0.90	0.95	2.28	2.67	3.26	4.12	4.01	0.00	2.24	4.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

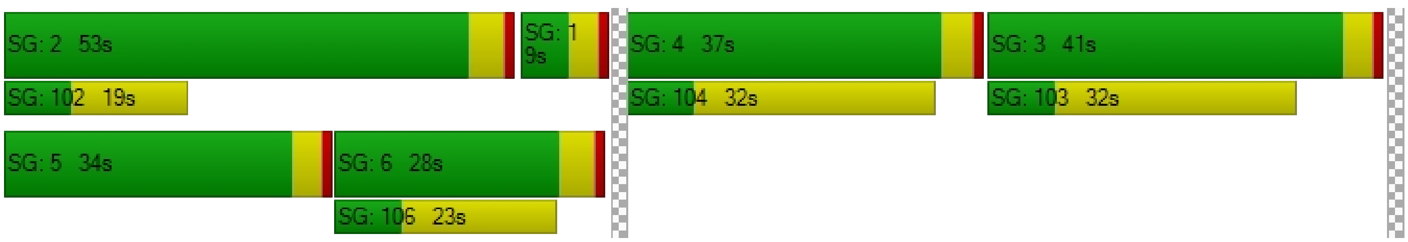
X, volume / capacity	0.80	0.36	0.36	0.49	0.59	0.61	0.82	0.82	0.00	0.63	0.76
d, Delay for Lane Group [s/veh]	61.41	14.34	14.41	68.45	26.08	26.92	60.25	60.14	0.00	60.31	63.17
Lane Group LOS	E	B	B	E	C	C	E	E	A	E	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	6.49	6.57	6.35	1.09	13.57	12.25	8.65	8.88	0.00	4.83	5.78
50th-Percentile Queue Length [ft]	162.29	164.17	158.81	27.20	339.13	306.35	216.21	222.02	0.00	120.76	144.44
95th-Percentile Queue Length [veh]	10.67	10.77	10.49	1.96	19.61	17.99	13.47	13.77	0.00	8.44	9.72
95th-Percentile Queue Length [ft]	266.75	269.24	262.15	48.96	490.14	449.87	336.78	344.21	0.00	210.88	242.99

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	61.41	14.37	14.41	68.45	26.23	26.92	60.20	60.14	0.00	60.31	63.17	63.17
Movement LOS	E	B	B	E	C	C	E	E	A	E	E	E
d_A, Approach Delay [s/veh]	23.17			27.61			60.20			61.85		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	35.17											
Intersection LOS	D											
Intersection V/C	0.670											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 4: Marsh Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	21.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.519

Intersection Setup

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	260.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			No		

volumes

Name	Marsh Road			Marsh Road			Bay Road			Bay Road		
Base Volume Input [veh/h]	2	681	108	194	841	54	78	50	10	86	19	147
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.30	0.90	1.00	1.00	0.00	2.20	6.90	0.00	1.20	0.00	2.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	681	108	194	841	54	78	50	10	86	19	147
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	170	27	49	210	14	20	13	3	22	5	37
Total Analysis Volume [veh/h]	2	681	108	194	841	54	78	50	10	86	19	147
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			7			7			0		
Bicycle Volume [bicycles/h]	1			7			7			11		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	140
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	33.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	6	2	5	2	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	6	6	6	4	6	6	6	6	6	0	6	0
Maximum Green [s]	40	60	40	25	40	60	31	31	31	0	31	0
Amber [s]	3.6	3.6	3.6	3.1	3.6	3.6	3.6	3.6	3.6	0.0	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	89	54	89	35	89	54	51	51	51	0	51	0
Vehicle Extension [s]	3.0	3.0	3.0	2.0	3.0	3.0	2.5	2.5	2.5	0.0	2.5	0.0
Walk [s]	7	0	7	0	7	0	7	7	7	0	7	0
Pedestrian Clearance [s]	12	0	12	0	12	0	20	20	20	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		Yes		No	Yes			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	87	87	19	108	108	28	28
g / C, Green / Cycle	0.62	0.62	0.14	0.77	0.77	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.23	0.23	0.11	0.24	0.24	0.14	0.17
s, saturation flow rate [veh/h]	1854	1596	1792	1881	1834	973	1521
c, Capacity [veh/h]	1179	992	243	1452	1415	235	338
d1, Uniform Delay [s]	12.97	13.01	58.63	4.80	4.81	52.03	53.55
k, delay calibration	0.50	0.50	0.04	0.50	0.50	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.85	1.06	2.29	0.56	0.58	1.74	2.43
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

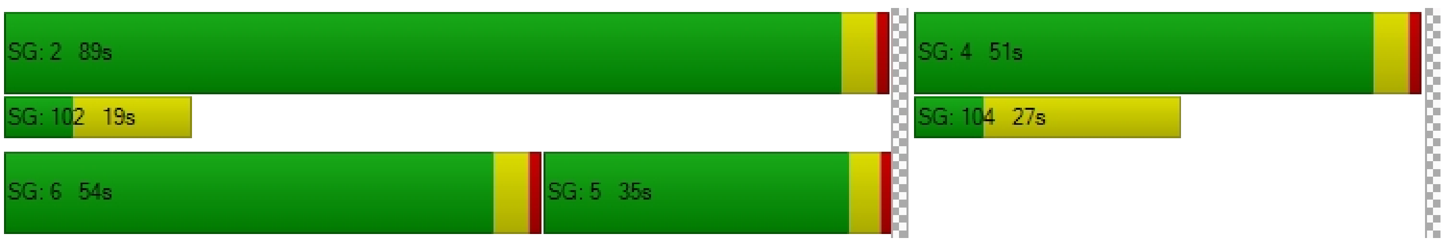
X, volume / capacity	0.36	0.37	0.80	0.31	0.31	0.59	0.74
d, Delay for Lane Group [s/veh]	13.83	14.08	60.93	5.37	5.39	53.77	55.99
Lane Group LOS	B	B	E	A	A	D	E
Critical Lane Group	No	Yes	Yes	No	No	No	Yes
50th-Percentile Queue Length [veh]	6.64	5.83	6.79	3.66	3.60	4.72	8.75
50th-Percentile Queue Length [ft]	166.10	145.87	169.75	91.56	89.93	118.07	218.69
95th-Percentile Queue Length [veh]	10.87	9.80	11.06	6.59	6.47	8.29	13.60
95th-Percentile Queue Length [ft]	271.78	244.90	276.58	164.81	161.87	207.17	339.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.83	13.92	14.08	60.93	5.38	5.39	53.77	53.77	53.77	55.99	55.99	55.99
Movement LOS	B	B	B	E	A	A	D	D	D	E	E	E
d_A, Approach Delay [s/veh]	13.94			15.27			53.77			55.99		
Approach LOS	B			B			D			E		
d_I, Intersection Delay [s/veh]	21.67											
Intersection LOS	C											
Intersection V/C	0.519											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 5: Middlefield Rd/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	36.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.767

Intersection Setup

Name	Marsh Road		Middlefield Road		Middlefield Road	
Approach	Southbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	225.00	150.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Marsh Road		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	426	399	324	288	502	393
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	426	399	324	288	502	393
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	107	100	81	72	126	98
Total Analysis Volume [veh/h]	426	399	324	288	502	393
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	6		10		28	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	130
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	40.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Protected	Overlap	Protected	Permissive	Permissive	Permissive
Signal group	3	1	1	2	2	4
Auxiliary Signal Groups		1,3				4,6
Lead / Lag	Lead	-	Lag	-	-	-
Minimum Green [s]	6	5	5	24	24	0
Maximum Green [s]	30	30	30	50	50	0
Amber [s]	3.0	3.0	3.0	3.2	3.2	0.0
All red [s]	2.0	1.0	1.0	1.0	1.0	0.0
Split [s]	45	56	56	29	29	0
Vehicle Extension [s]	2.5	2.0	2.0	2.0	2.0	0.0
Walk [s]	0	0	0	8	8	0
Pedestrian Clearance [s]	0	0	0	12	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	3.0	2.0	2.0	2.2	2.2	0.0
Minimum Recall	No	No	No	No	No	
Maximum Recall	No	No	No	Yes	Yes	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	6.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	5.00	5.00	4.00	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	0.00	2.00	2.20	2.20	2.20
g_i, Effective Green Time [s]	34	64	26	56	56	56
g / C, Green / Cycle	0.26	0.50	0.20	0.43	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.24	0.26	0.18	0.15	0.27	0.25
s, saturation flow rate [veh/h]	1774	1545	1774	1863	1863	1542
c, Capacity [veh/h]	464	765	360	808	808	669
d1, Uniform Delay [s]	46.58	22.31	50.52	24.62	28.49	27.93
k, delay calibration	0.08	0.15	0.04	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.94	0.78	3.41	1.23	3.57	3.76
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.92	0.52	0.90	0.36	0.62	0.59
d, Delay for Lane Group [s/veh]	52.52	23.09	53.92	25.84	32.06	31.69
Lane Group LOS	D	C	D	C	C	C
Critical Lane Group	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	14.08	8.41	10.60	6.26	12.87	9.96
50th-Percentile Queue Length [ft]	352.06	210.14	265.06	156.49	321.84	249.08
95th-Percentile Queue Length [veh]	20.24	13.16	15.94	10.36	18.76	15.14
95th-Percentile Queue Length [ft]	505.92	329.01	398.56	259.07	468.94	378.49

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.52	23.09	53.92	25.84	32.06	31.69
Movement LOS	D	C	D	C	C	C
d_A, Approach Delay [s/veh]	38.29		40.71		31.90	
Approach LOS	D		D		C	
d_I, Intersection Delay [s/veh]	36.47					
Intersection LOS	D					
Intersection V/C	0.767					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 9: Middlefield Rd/Ravenswood Ave

Control Type:	Signalized	Delay (sec / veh):	52.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.412

Intersection Setup

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Approach	Northeastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	0	0	0
Pocket Length [ft]	100.00	120.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		35.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		No	

volumes

Name	Ravenswood Avenue		Middlefield Road		Middlefield Road	
Base Volume Input [veh/h]	205	629	528	777	494	83
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.10	1.30	0.60	1.40	6.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	1000	0	0	0	0
Total Hourly Volume [veh/h]	205	0	528	777	494	83
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	51	0	132	194	124	21
Total Analysis Volume [veh/h]	205	0	528	777	494	83
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	6		13		0	
Bicycle Volume [bicycles/h]	9		26		13	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	58.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	3	2	1	6	2	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	Lead	-	-	-
Minimum Green [s]	4	10	4	5	10	0
Maximum Green [s]	50	35	35	70	35	0
Amber [s]	3.2	3.6	3.0	3.6	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	50	35	35	70	35	0
Vehicle Extension [s]	2.5	3.6	3.0	3.0	3.6	0.0
Walk [s]	7	7	0	7	7	0
Pedestrian Clearance [s]	10	12	0	12	12	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	2.6	0.0	0.0
Minimum Recall	No		No	No	No	
Maximum Recall	No		No	No	Yes	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	4.60	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	2.60	0.00
g_i, Effective Green Time [s]	18	18	37	74	38
g / C, Green / Cycle	0.15	0.15	0.31	0.62	0.31
(v / s)_i Volume / Saturation Flow Rate	0.12	0.00	0.30	0.41	0.32
s, saturation flow rate [veh/h]	1774	1582	1786	1889	1813
c, Capacity [veh/h]	267	238	550	1164	568
d1, Uniform Delay [s]	48.98	0.00	40.78	15.02	41.22
k, delay calibration	0.08	0.08	0.50	0.25	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.48	0.00	29.55	1.53	41.97
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

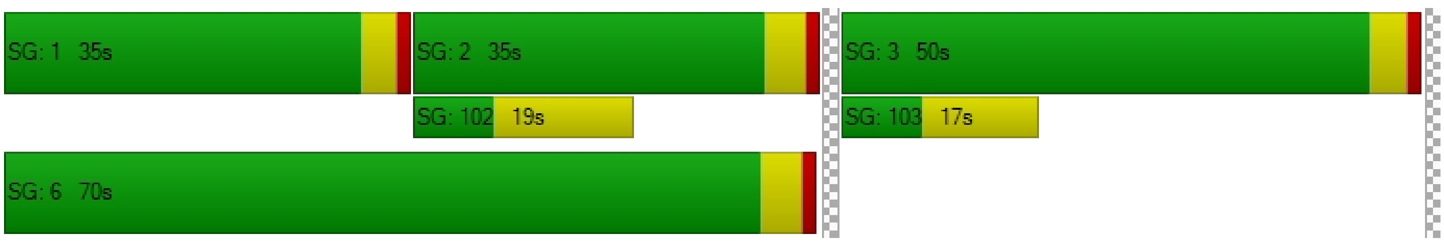
X, volume / capacity	0.77	0.00	0.96	0.67	1.02
d, Delay for Lane Group [s/veh]	52.46	0.00	70.33	16.56	83.19
Lane Group LOS	D	A	E	B	F
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	6.16	0.00	19.47	13.27	22.96
50th-Percentile Queue Length [ft]	153.94	0.00	486.75	331.73	574.12
95th-Percentile Queue Length [veh]	10.23	0.00	26.71	19.24	31.17
95th-Percentile Queue Length [ft]	255.68	0.00	667.66	481.08	779.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.46	0.00	70.33	16.56	83.19	83.19
Movement LOS	D	A	E	B	F	F
d_A, Approach Delay [s/veh]	52.46		38.31		83.19	
Approach LOS	D		D		F	
d_I, Intersection Delay [s/veh]	52.11					
Intersection LOS	D					
Intersection V/C	1.412					

Sequence

Ring 1	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 10: Middlefield Rd/Ringwood Ave

Control Type:	Signalized	Delay (sec / veh):	42.2
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.727

Intersection Setup

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1	1	0	1	1	0	0
Pocket Length [ft]	30.00	100.00	100.00	100.00	100.00	250.00	175.00	100.00	100.00	125.00	100.00	100.00
Speed [mph]	20.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	D Street			Ringwood Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	83	100	55	76	1	327	11	816	102	472	708	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	0.00	0.00	0.00	0.00	2.20	0.00	1.70	0.00	2.10	1.80	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	8	0	0	57	0	0	0
Total Hourly Volume [veh/h]	83	100	55	76	1	319	11	816	45	472	708	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	21	25	14	19	0	80	3	204	11	118	177	2
Total Analysis Volume [veh/h]	83	100	55	76	1	319	11	816	45	472	708	6
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	8			14			5			0		
Bicycle Volume [bicycles/h]	14			14			17			16		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	58.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	2	8	2	6	8	6	1	6	8	5	2	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	10	6	10	10	6	10	4	10	6	4	10	0
Maximum Green [s]	30	25	30	30	25	30	15	30	25	30	30	0
Amber [s]	3.6	3.2	3.6	3.6	3.2	3.6	3.0	3.6	3.2	3.5	3.6	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	35	35	35	50	35	50	50	50	35	35	35	0
Vehicle Extension [s]	3.0	2.9	3.0	3.6	2.9	3.6	3.0	3.6	2.9	3.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	0	7	7	0	7	0
Pedestrian Clearance [s]	12	12	12	12	12	12	0	12	12	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.6	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.6	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	Yes		No	Yes	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	4.50	4.60	4.60
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.60	2.60
g_i, Effective Green Time [s]	27	27	27	27	3	54	54	31	81	81
g / C, Green / Cycle	0.23	0.23	0.23	0.23	0.03	0.45	0.45	0.25	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.06	0.09	0.10	0.21	0.01	0.23	0.03	0.27	0.19	0.19
s, saturation flow rate [veh/h]	1415	1765	757	1540	1810	3557	1536	1772	1866	1860
c, Capacity [veh/h]	156	400	231	349	51	1594	688	450	1256	1252
d1, Uniform Delay [s]	55.36	39.32	47.55	45.24	56.99	23.71	18.82	44.75	7.93	7.93
k, delay calibration	0.10	0.10	0.10	0.50	0.11	0.50	0.50	0.48	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.66	0.58	0.80	30.31	2.06	1.18	0.18	54.42	0.57	0.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

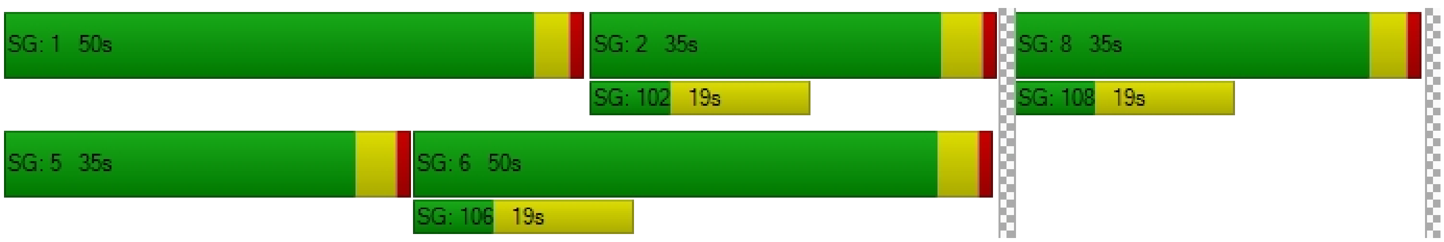
X, volume / capacity	0.53	0.39	0.33	0.91	0.21	0.51	0.07	1.05	0.28	0.28
d, Delay for Lane Group [s/veh]	58.02	39.90	48.35	75.55	59.05	24.89	19.01	99.17	8.50	8.50
Lane Group LOS	E	D	D	E	E	C	B	F	A	A
Critical Lane Group	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	2.64	4.03	2.17	12.15	0.35	8.35	0.74	19.95	3.63	3.62
50th-Percentile Queue Length [ft]	66.00	100.78	54.37	303.77	8.84	208.79	18.58	498.66	90.73	90.50
95th-Percentile Queue Length [veh]	4.75	7.26	3.91	17.87	0.64	13.09	1.34	28.05	6.53	6.52
95th-Percentile Queue Length [ft]	118.81	181.41	97.87	446.69	15.91	327.27	33.45	701.33	163.31	162.91

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	58.02	39.90	39.90	48.35	48.35	75.55	59.05	24.89	19.01	99.17	8.50	8.50
Movement LOS	E	D	D	D	D	E	E	C	B	F	A	A
d_A, Approach Delay [s/veh]	46.22			70.26			25.02			44.59		
Approach LOS	D			E			C			D		
d_I, Intersection Delay [s/veh]	42.17											
Intersection LOS	D											
Intersection V/C	0.727											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 13: Middlefield Rd/Lytton Ave

Control Type:	Signalized	Delay (sec / veh):	41.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.744

Intersection Setup

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Lytton Avenue			Lytton Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	241	181	69	2	67	8	84	445	16	16	512	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.50	5.60	0.00	0.60	0.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	241	181	69	2	67	8	84	445	16	16	512	179
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	60	45	17	1	17	2	21	111	4	4	128	45
Total Analysis Volume [veh/h]	241	181	69	2	67	8	84	445	16	16	512	179
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			10			11		
Bicycle Volume [bicycles/h]	19			2			5			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	65.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	4	0	0	1	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	4	0	0	12	0	0	12	0
Maximum Green [s]	0	26	0	0	17	0	0	31	0	0	22	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	25	0	0	18	0	0	20	0	0	37	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	6	0	0	5	0	0	6	0	0	6	0
Pedestrian Clearance [s]	0	10	0	0	9	0	0	10	0	0	8	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	27	27	6	26	26	26	26
g / C, Green / Cycle	0.27	0.27	0.06	0.26	0.26	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.14	0.25	0.04	0.16	0.14	0.21	0.18
s, saturation flow rate [veh/h]	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	472	472	100	461	461	463	463
d1, Uniform Delay [s]	30.94	35.40	46.50	32.86	32.33	35.10	33.60
k, delay calibration	0.08	0.20	0.08	0.50	0.50	0.29	0.24
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.64	12.16	8.95	6.09	4.92	9.91	4.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

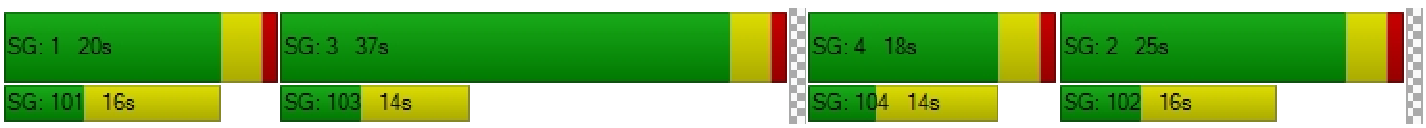
X, volume / capacity	0.51	0.91	0.77	0.62	0.56	0.83	0.70
d, Delay for Lane Group [s/veh]	31.58	47.56	55.46	38.94	37.25	45.02	37.69
Lane Group LOS	C	D	E	D	D	D	D
Critical Lane Group	No	Yes	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	5.01	11.67	2.14	6.87	6.10	10.08	7.57
50th-Percentile Queue Length [ft]	125.22	291.75	53.61	171.85	152.59	252.07	189.33
95th-Percentile Queue Length [veh]	8.68	17.27	3.86	11.17	10.16	15.29	12.09
95th-Percentile Queue Length [ft]	216.98	431.81	96.50	279.34	253.88	382.26	302.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	31.58	47.56	47.56	55.46	55.46	55.46	38.94	38.01	37.25	45.02	42.97	37.69
Movement LOS	C	D	D	E	E	E	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	41.83			55.46			38.13			41.68		
Approach LOS	D			E			D			D		
d_I, Intersection Delay [s/veh]	41.29											
Intersection LOS	D											
Intersection V/C	0.744											

Sequence

Ring 1	1	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 14: Middlefield Rd/University Ave

Control Type:	Signalized	Delay (sec / veh):	35.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.545

Intersection Setup

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	66	338	35	81	374	86	27	319	87	101	370	55
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	66	338	35	81	374	86	27	319	87	101	370	55
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	85	9	20	94	22	7	80	22	25	93	14
Total Analysis Volume [veh/h]	66	338	35	81	374	86	27	319	87	101	370	55
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			4			23			17		
Bicycle Volume [bicycles/h]	13			11			2			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	54.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	0	2	0	0	2	0	0	3	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	8	0	0	8	0	0	8	0	0	8	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	43	0	0	43	0	0	26	0	0	31	0
Vehicle Extension [s]	0.0	2.5	0.0	0.0	2.5	0.0	0.0	5.0	0.0	0.0	5.0	0.0
Walk [s]	0	8	0	0	8	0	0	8	0	0	8	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	12	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	0.0	0.0	40.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	24	24	24	24	24	44	44	20	20
g / C, Green / Cycle	0.24	0.24	0.24	0.24	0.24	0.44	0.44	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.04	0.21	0.05	0.13	0.13	0.13	0.11	0.15	0.14
s, saturation flow rate [veh/h]	1750	1750	1750	1750	1750	1800	1800	1800	1800
c, Capacity [veh/h]	262	421	111	421	421	796	796	355	355
d1, Uniform Delay [s]	29.97	36.65	30.24	33.34	33.07	17.84	17.50	38.11	37.40
k, delay calibration	0.08	0.10	0.08	0.08	0.08	0.50	0.50	0.25	0.23
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.37	5.80	6.67	0.87	0.78	0.93	0.76	8.35	5.29
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.25	0.89	0.73	0.56	0.53	0.29	0.25	0.78	0.70
d, Delay for Lane Group [s/veh]	30.34	42.45	36.92	34.21	33.85	18.77	18.26	46.46	42.69
Lane Group LOS	C	D	D	C	C	B	B	D	D
Critical Lane Group	No	Yes	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.29	9.42	1.75	5.07	4.77	3.61	3.07	7.27	6.19
50th-Percentile Queue Length [ft]	32.30	235.54	43.83	126.86	119.22	90.37	76.78	181.76	154.67
95th-Percentile Queue Length [veh]	2.33	14.46	3.16	8.77	8.35	6.51	5.53	11.69	10.27
95th-Percentile Queue Length [ft]	58.14	361.38	78.89	219.21	208.75	162.67	138.21	292.31	256.65

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	30.34	42.45	42.45	36.92	34.08	33.85	18.77	18.58	18.26	46.46	44.49	42.69
Movement LOS	C	D	D	D	C	C	B	B	B	D	D	D
d_A, Approach Delay [s/veh]		40.63			34.47			18.53			44.68	
Approach LOS		D			C			B			D	
d_I, Intersection Delay [s/veh]	35.07											
Intersection LOS	D											
Intersection V/C	0.545											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 15: Bayfront Expy (SR 84)/University Ave (SR 109)

Control Type:	Signalized	Delay (sec / veh):	198.0
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.477

Intersection Setup

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	1	2
Pocket Length [ft]	100.00	430.00	830.00	100.00	175.00	1000.00
Speed [mph]	55.00		55.00		35.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Bayfront Expressway (SR84)		Bayfront Expressway (SR84)		University Avenue (SR109)	
Base Volume Input [veh/h]	4202	574	504	813	111	2326
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	16.10	4.90	3.80	9.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	4202	574	504	813	111	2326
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1051	144	126	203	28	582
Total Analysis Volume [veh/h]	4202	574	504	813	111	2326
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		8	
Bicycle Volume [bicycles/h]	1		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Overlap
Signal group	6	2	5	2	4	4
Auxiliary Signal Groups						4,5
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	4	5	5	5	8	8
Maximum Green [s]	85	135	50	135	15	15
Amber [s]	5.0	5.4	3.0	5.4	3.0	3.0
All red [s]	1.0	0.5	0.5	0.5	1.0	1.0
Split [s]	80	97	17	97	53	53
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	5	0	0	0	5	5
Pedestrian Clearance [s]	35	0	0	0	29	29
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	4.0	5.8	1.5	5.8	2.0	2.0
Minimum Recall	No		No	No	No	No
Maximum Recall	No		No	No	No	No
Pedestrian Recall	No		No	No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	0.0	6.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	6.00	6.00	3.50	7.80	4.00	3.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	4.00	4.00	1.50	5.80	2.00	0.00
g_i, Effective Green Time [s]	85	85	50	137	15	56
g / C, Green / Cycle	0.57	0.57	0.33	0.91	0.10	0.37
(v / s)_i Volume / Saturation Flow Rate	0.83	0.42	0.15	0.16	0.03	0.55
s, saturation flow rate [veh/h]	5054	1374	3350	4986	3224	4224
c, Capacity [veh/h]	2860	777	1116	4539	323	1566
d1, Uniform Delay [s]	32.56	24.28	39.26	0.72	62.89	47.19
k, delay calibration	0.11	0.27	0.11	0.11	0.11	0.14
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	211.52	3.40	0.29	0.02	0.63	219.23
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.47	0.74	0.45	0.18	0.34	1.49
d, Delay for Lane Group [s/veh]	244.07	27.68	39.55	0.74	63.51	266.42
Lane Group LOS	F	C	D	A	E	F
Critical Lane Group	Yes	No	No	No	Yes	Yes
50th-Percentile Queue Length [veh]	86.88	14.59	7.09	0.01	2.00	50.98
50th-Percentile Queue Length [ft]	2171.96	364.71	177.32	0.20	50.12	1274.47
95th-Percentile Queue Length [veh]	131.78	20.85	11.46	0.01	3.61	78.10
95th-Percentile Queue Length [ft]	3294.48	521.31	286.52	0.35	90.21	1952.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	244.07	27.68	39.55	0.74	63.51	266.42
Movement LOS	F	C	D	A	E	F
d_A, Approach Delay [s/veh]	218.07		15.59		257.18	
Approach LOS	F		B		F	
d_I, Intersection Delay [s/veh]	197.98					
Intersection LOS	F					
Intersection V/C	1.477					

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 16: Bayfront Expy (SR 84)/Willow Rd (SR 114)

Control Type:	Signalized	Delay (sec / veh):	113.4
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.094

Intersection Setup

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	3	0	0	1	0	1	2	0	1	2	0	0
Pocket Length [ft]	265.00	100.00	100.00	45.00	100.00	80.00	165.00	100.00	140.00	1000.00	100.00	100.00
Speed [mph]	40.00			20.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			No		

volumes

Name	Willow Road (SR 114)			Willow Road			Ba Ex			Ba Ex		
Base Volume Input [veh/h]	28	54	1645	316	591	165	43	2938	935	359	880	10
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.20	10.90	3.30	4.30	1.00	1.70	37.10	2.50	12.00	6.40	5.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	70	0	0	45	0	0	1
Total Hourly Volume [veh/h]	28	54	1645	316	591	95	43	2938	890	359	880	9
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	14	411	79	148	24	11	735	223	90	220	2
Total Analysis Volume [veh/h]	28	54	1645	316	591	95	43	2938	890	359	880	9
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			0			7			0		
Bicycle Volume [bicycles/h]	0			7			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	7	7	4	8	4	1	6	2	5	2	6
Auxiliary Signal Groups			5,7									
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	5	5	0	4	0	4	4	5	5	5	4
Maximum Green [s]	18	15	15	0	18	0	16	65	20	65	20	65
Amber [s]	3.0	3.9	3.9	0.0	3.0	0.0	3.5	5.0	5.0	3.6	5.0	5.0
All red [s]	1.5	0.5	0.5	0.0	1.5	0.0	0.0	1.0	1.0	1.0	1.0	1.0
Split [s]	39	26	26	0	39	0	63	69	22	16	22	69
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	5	0	0	0	5	0	0	5	0	0	0	5
Pedestrian Clearance [s]	29	0	0	0	29	0	0	35	0	0	0	35
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.5	2.4	2.4	0.0	2.5	0.0	1.5	4.0	4.0	2.6	4.0	4.0
Minimum Recall		No	No		No		No	No		No	No	
Maximum Recall		No	No		No		No	No		No	No	
Pedestrian Recall		No	No		No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	20.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.40	4.40	4.40	4.60	4.50	4.50	4.50	3.50	6.00	6.00	4.60	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.40	2.40	2.40	0.00	2.50	2.50	2.50	1.50	4.00	4.00	2.60	4.00	4.00
g_i, Effective Green Time [s]	15	15	15	74	18	18	18	4	65	65	46	108	108
g / C, Green / Cycle	0.10	0.10	0.10	0.50	0.12	0.12	0.12	0.03	0.43	0.43	0.31	0.72	0.72
(v / s)_i Volume / Saturation Flow Rate	0.02	0.02	0.02	0.40	0.18	0.17	0.06	0.02	0.50	0.62	0.11	0.15	0.01
s, saturation flow rate [veh/h]	1737	1713	1559	4151	1735	3582	1522	2563	5846	1442	3303	5846	1615
c, Capacity [veh/h]	174	172	156	2059	209	431	183	68	2533	625	1015	4217	1165
d1, Uniform Delay [s]	61.72	61.76	61.73	31.55	65.97	65.97	61.89	72.28	42.50	42.50	40.38	6.86	5.86
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.19	0.11	0.11	0.11	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.43	0.46	0.48	3.35	253.70	172.20	2.26	9.24	73.06	200.25	0.21	0.02	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

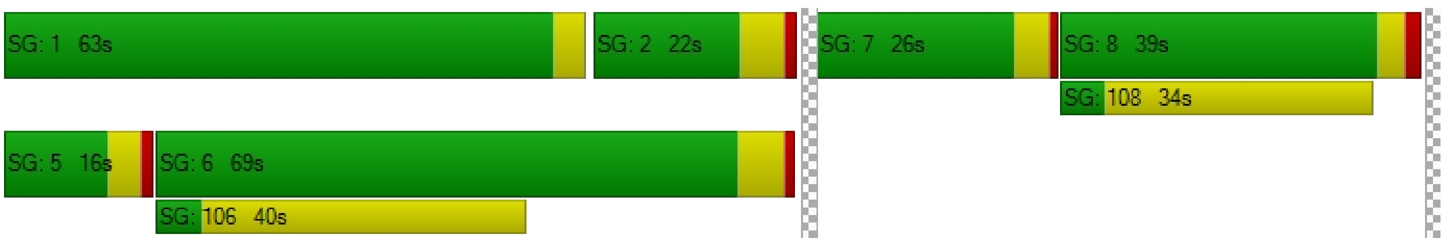
X, volume / capacity	0.16	0.17	0.16	0.80	1.51	1.37	0.52	0.63	1.16	1.42	0.35	0.21	0.01
d, Delay for Lane Group [s/veh]	62.15	62.22	62.21	34.90	319.67	238.17	64.15	81.52	115.56	242.76	40.59	6.88	5.86
Lane Group LOS	E	E	E	C	F	F	E	F	F	F	D	A	A
Critical Lane Group	No	No	No	Yes	Yes	No	No	No	No	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.99	1.02	0.90	16.68	22.85	18.71	3.58	0.91	48.02	57.61	5.26	3.01	0.08
50th-Percentile Queue Length [ft]	24.82	25.50	22.45	417.0	571.35	467.72	89.57	22.80	1200.38	1440.13	131.54	75.34	1.99
95th-Percentile Queue Length [veh]	1.79	1.84	1.62	23.38	35.62	29.09	6.45	1.64	66.12	86.95	9.02	5.42	0.14
95th-Percentile Queue Length [ft]	44.68	45.90	40.41	584.4	890.38	727.21	161.23	41.04	1652.94	2173.76	225.58	135.61	3.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.15	62.21	34.90	319.67	238.17	64.15	81.52	115.56	242.76	40.59	6.88	5.86
Movement LOS	E	E	C	F	F	E	F	F	F	D	A	A
d_A, Approach Delay [s/veh]	36.20			247.37			144.43			16.57		
Approach LOS	D			F			F			B		
d_I, Intersection Delay [s/veh]	113.42											
Intersection LOS	F											
Intersection V/C	1.094											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 17: Willow Rd (SR 114)/Hamilton Ave

Control Type:	Signalized	Delay (sec / veh):	103.3
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	190.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			30.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	50	1299	3	17	1829	39	367	34	88	139	17	61
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	3.50	33.30	7.70	3.50	0.00	0.60	26.70	5.10	0.70	5.90	1.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	50	1299	3	17	1829	39	367	34	88	139	17	61
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	325	1	4	457	10	92	9	22	35	4	15
Total Analysis Volume [veh/h]	50	1299	3	17	1829	39	367	34	88	139	17	61
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			1			5			3		
Bicycle Volume [bicycles/h]	4			12			3			3		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	20.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	1	6	2	5	2	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	10	10	4	10	10	4	4	4	4	4	4
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	3.2	3.2	3.2
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	11	71	86	26	86	71	48	48	48	48	48	48
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Walk [s]	0	7	5	7	5	7	5	5	5	5	5	5
Pedestrian Clearance [s]	0	19	10	15	10	19	25	25	25	25	25	25
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	1.0	1.0	1.2	1.2	1.2
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	20.0	20.0	20.0	6.0	6.0	6.0	6.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	1.00	2.00	2.00	0.00	1.20
g_i, Effective Green Time [s]	5	109	109	2	106	106	24	23
g / C, Green / Cycle	0.04	0.76	0.76	0.01	0.73	0.73	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.03	0.35	0.35	0.01	0.51	0.51	0.45	0.15
s, saturation flow rate [veh/h]	1774	1836	1834	1680	1836	1820	1088	1459
c, Capacity [veh/h]	64	1386	1385	23	1345	1333	200	275
d1, Uniform Delay [s]	69.30	6.73	6.73	71.25	10.55	10.63	58.75	59.86
k, delay calibration	0.04	0.50	0.50	0.04	0.50	0.50	0.50	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.38	1.14	1.15	15.79	2.98	3.08	662.78	1.92
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

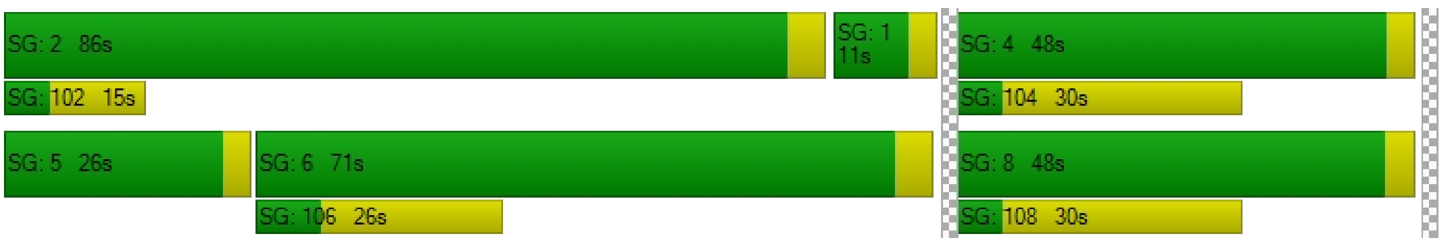
X, volume / capacity	0.78	0.47	0.47	0.74	0.69	0.70	2.44	0.79
d, Delay for Lane Group [s/veh]	76.68	7.87	7.88	87.04	13.52	13.72	721.54	61.77
Lane Group LOS	E	A	A	F	B	B	F	E
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.96	7.03	7.03	0.73	16.13	16.26	44.17	8.07
50th-Percentile Queue Length [ft]	48.93	175.71	175.63	18.34	403.13	406.62	1104.21	201.66
95th-Percentile Queue Length [veh]	3.52	11.38	11.37	1.32	22.71	22.88	70.52	12.72
95th-Percentile Queue Length [ft]	88.07	284.41	284.30	33.00	567.77	571.97	1763.11	318.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	76.68	7.87	7.88	87.04	13.62	13.72	721.54	721.54	721.54	61.77	61.77	61.77
Movement LOS	E	A	A	F	B	B	F	F	F	E	E	E
d_A, Approach Delay [s/veh]	10.42			14.28			721.54			61.77		
Approach LOS	B			B			F			E		
d_I, Intersection Delay [s/veh]	103.28											
Intersection LOS	F											
Intersection V/C	0.810											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 18: Willow Rd (SR 114)/Ivy Dr

Control Type:	Signalized	Delay (sec / veh):	24.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.864

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		Ivy Drive	
Base Volume Input [veh/h]	68	1339	2037	0	64	274
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	3.30	2.80	0.00	0.00	2.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	68	1339	2037	0	64	274
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	335	509	0	16	69
Total Analysis Volume [veh/h]	68	1339	2037	0	64	274
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12		23		13	
Bicycle Volume [bicycles/h]	7		6		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	10.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	15	10	10	11	11
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	4.0	3.0	3.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	9	92	83	83	53	53
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	5	5
Pedestrian Clearance [s]	0	0	22	22	24	24
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	1.0	2.0	2.0	2.0	1.0	1.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	C
L, Total Lost Time per Cycle [s]	3.00	4.00	4.00	4.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	2.00	2.00	2.00	1.00
g_i, Effective Green Time [s]	6	106	97	97	32
g / C, Green / Cycle	0.04	0.73	0.67	0.67	0.22
(v / s)_i Volume / Saturation Flow Rate	0.04	0.38	0.55	0.55	0.21
s, saturation flow rate [veh/h]	1783	3502	1848	1848	1615
c, Capacity [veh/h]	74	2556	1234	1234	358
d1, Uniform Delay [s]	69.27	8.57	17.83	17.83	55.51
k, delay calibration	0.31	0.50	0.50	0.50	0.13
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	63.17	0.77	6.37	6.37	13.82
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

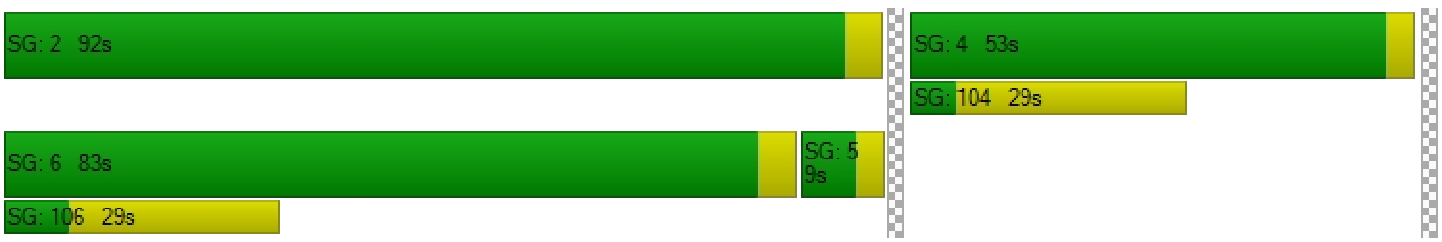
X, volume / capacity	0.92	0.52	0.83	0.83	0.94
d, Delay for Lane Group [s/veh]	132.43	9.34	24.20	24.20	69.33
Lane Group LOS	F	A	C	C	E
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	3.79	8.47	25.01	25.01	13.53
50th-Percentile Queue Length [ft]	94.70	211.69	625.14	625.14	338.35
95th-Percentile Queue Length [veh]	6.82	13.24	33.21	33.21	19.57
95th-Percentile Queue Length [ft]	170.46	331.00	830.17	830.17	489.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	132.43	9.34	24.20	24.20	69.33	69.33
Movement LOS	F	A	C	C	E	E
d_A, Approach Delay [s/veh]	15.29		24.20		69.33	
Approach LOS	B		C		E	
d_I, Intersection Delay [s/veh]	24.92					
Intersection LOS	C					
Intersection V/C	0.864					

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 19: Willow Rd (SR 114)/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	13.2
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.794

Intersection Setup

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	1	0
Pocket Length [ft]	100.00	60.00	100.00	100.00	50.00	100.00
Speed [mph]	40.00		40.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road (SR 114)		Willow Road (SR 114)		O'Brien Drive	
Base Volume Input [veh/h]	1368	217	76	2235	281	57
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.90	6.50	2.80	2.70	1.80	6.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1368	217	76	2235	281	57
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	342	54	19	559	70	14
Total Analysis Volume [veh/h]	1368	217	76	2235	281	57
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		3	
Bicycle Volume [bicycles/h]	6		9		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	10.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Protected	Permissive
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lag	-	Lead	-
Minimum Green [s]	10	10	5	15	8	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	4.0	4.0	3.0	4.0	3.2	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	67	67	46	113	32	0
Vehicle Extension [s]	4.0	4.0	2.0	4.0	2.0	0.0
Walk [s]	7	7	0	0	0	0
Pedestrian Clearance [s]	17	17	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.0	2.0	1.0	2.0	1.2	0.0
Minimum Recall	Yes		No	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	6.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	3.00	4.00	3.20	3.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	1.00	2.00	1.20	1.20
g_i, Effective Green Time [s]	110	110	8	121	17	17
g / C, Green / Cycle	0.76	0.76	0.05	0.84	0.11	0.11
(v / s)_i Volume / Saturation Flow Rate	0.39	0.15	0.04	0.63	0.10	0.10
s, saturation flow rate [veh/h]	3516	1479	1760	3522	1778	1625
c, Capacity [veh/h]	2679	1127	95	2947	202	185
d1, Uniform Delay [s]	6.72	4.81	67.76	5.29	63.17	63.19
k, delay calibration	0.50	0.50	0.04	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.70	0.38	5.74	1.88	4.53	5.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

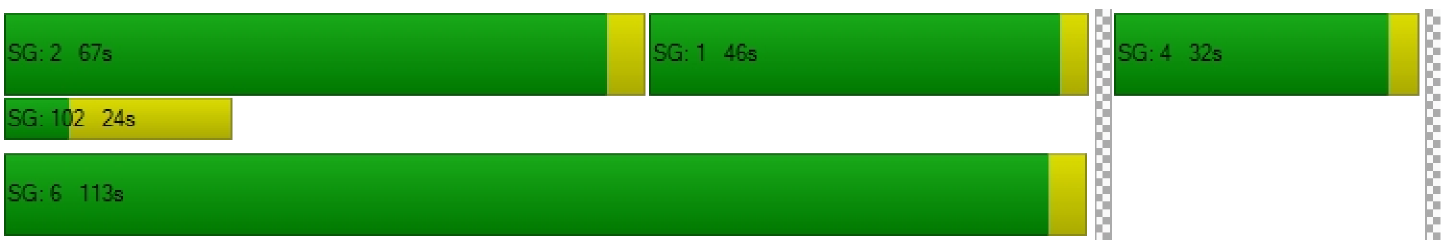
X, volume / capacity	0.51	0.19	0.80	0.76	0.87	0.88
d, Delay for Lane Group [s/veh]	7.42	5.19	73.50	7.17	67.70	68.24
Lane Group LOS	A	A	E	A	E	E
Critical Lane Group	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	7.29	1.72	2.91	10.75	6.67	6.15
50th-Percentile Queue Length [ft]	182.22	42.89	72.77	268.77	166.66	153.64
95th-Percentile Queue Length [veh]	11.72	3.09	5.24	16.13	10.90	10.21
95th-Percentile Queue Length [ft]	292.91	77.20	130.99	403.21	272.52	255.29

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.42	5.19	73.50	7.17	67.90	68.24
Movement LOS	A	A	E	A	E	E
d_A, Approach Delay [s/veh]	7.11		9.35		67.95	
Approach LOS	A		A		E	
d_I, Intersection Delay [s/veh]	13.19					
Intersection LOS	B					
Intersection V/C	0.794					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 20: Willow Rd (SR 114)/Newbridge St

Control Type:	Signalized	Delay (sec / veh):	58.8
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.008

Intersection Setup

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	0	0	0
Pocket Length [ft]	390.00	100.00	100.00	185.00	100.00	100.00	100.00	100.00	175.00	100.00	100.00	100.00
Speed [mph]	40.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road (SR 114)			Willow Road (SR 114)			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	301	1484	263	74	2240	22	31	152	233	358	424	130
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.30	4.40	5.30	0.00	3.40	0.00	0.00	4.40	0.50	3.80	4.40	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	175	0	0	45
Total Hourly Volume [veh/h]	301	1484	263	74	2240	22	31	152	58	358	424	85
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	75	371	66	19	560	6	8	38	15	90	106	21
Total Analysis Volume [veh/h]	301	1484	263	74	2240	22	31	152	58	358	424	85
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	28			47			11			1		
Bicycle Volume [bicycles/h]	0			4			1			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	145
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	140.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	14.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	5	2	2	1	6	6	4	4	4	8	3	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	-	-	-
Minimum Green [s]	4	12	12	4	12	12	4	4	4	0	4	0
Maximum Green [s]	0	0	0	0	16	16	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0
Split [s]	24	67	67	14	57	57	32	32	32	0	32	0
Vehicle Extension [s]	2.0	4.0	4.0	2.0	4.0	4.0	2.0	2.0	2.0	0.0	2.0	0.0
Walk [s]	0	5	5	0	7	7	5	5	5	0	0	0
Pedestrian Clearance [s]	0	19	19	0	16	16	23	23	23	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	3.0	3.0	1.0	3.0	3.0	2.0	2.0	2.0	0.0	1.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	5.00	5.00	3.00	5.00	5.00	4.00	4.00	4.00	3.00	3.00	3.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	3.00	3.00	1.00	3.00	3.00	2.00	2.00	2.00	1.00	1.00	1.00
g_i, Effective Green Time [s]	21	79	79	7	66	66	14	14	14	29	29	29
g / C, Green / Cycle	0.14	0.55	0.55	0.05	0.45	0.45	0.10	0.10	0.10	0.20	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.17	0.34	0.34	0.04	0.42	0.43	0.02	0.08	0.04	0.11	0.23	0.05
s, saturation flow rate [veh/h]	1786	3465	1683	1810	3499	1826	1810	1820	1450	3385	1820	1572
c, Capacity [veh/h]	258	1898	922	93	1591	830	177	178	142	675	363	313
d1, Uniform Delay [s]	62.03	22.41	22.55	68.00	37.44	37.52	60.01	64.36	61.44	51.97	58.04	49.13
k, delay calibration	0.50	0.50	0.50	0.04	0.50	0.50	0.04	0.04	0.04	0.04	0.50	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	108.75	1.51	3.19	5.61	11.44	19.07	0.17	4.38	0.70	0.24	101.53	0.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.17	0.62	0.62	0.79	0.93	0.94	0.17	0.85	0.41	0.53	1.17	0.27
d, Delay for Lane Group [s/veh]	170.78	23.92	25.75	73.61	48.88	56.59	60.18	68.74	62.14	52.21	159.58	49.30
Lane Group LOS	F	C	C	E	D	E	E	E	E	D	F	D
Critical Lane Group	Yes	No	No	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	17.17	13.57	13.86	2.89	27.45	30.55	1.06	5.76	2.05	5.90	23.54	2.65
50th-Percentile Queue Length [ft]	429.35	339.27	346.58	72.19	686.21	763.73	26.58	144.10	51.21	147.44	588.38	66.31
95th-Percentile Queue Length [veh]	25.71	19.61	19.97	5.20	36.04	39.61	1.91	9.70	3.69	9.88	34.17	4.77
95th-Percentile Queue Length [ft]	642.73	490.30	499.24	129.94	901.02	990.34	47.85	242.54	92.17	247.01	854.13	119.35

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	170.78	24.31	25.75	73.61	51.48	56.59	60.18	68.74	62.14	52.21	159.58	49.30
Movement LOS	F	C	C	E	D	E	E	E	E	D	F	D
d_A, Approach Delay [s/veh]	46.02			52.23			66.05			104.43		
Approach LOS	D			D			E			F		
d_I, Intersection Delay [s/veh]	58.76											
Intersection LOS	E											
Intersection V/C	1.008											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 21: Willow Rd/Bay Rd

Control Type:	Signalized	Delay (sec / veh):	13.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.810

Intersection Setup

Name	Willow Road		Willow Road		Bay Road	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	80.00	100.00	100.00	100.00	100.00	175.00
Speed [mph]	30.00		35.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

volumes

Name	Willow Road		Willow Road		Bay Road	
Base Volume Input [veh/h]	35	1276	996	282	504	68
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.60	2.20	0.00	1.00	1.50
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	223	0	47
Total Hourly Volume [veh/h]	35	1276	996	59	504	21
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	319	249	15	126	5
Total Analysis Volume [veh/h]	35	1276	996	59	504	21
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		7	
Bicycle Volume [bicycles/h]	8		7		3	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	48
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	8.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	6	4	4
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lag	-
Minimum Green [s]	4	10	20	20	4	4
Maximum Green [s]	16	36	36	36	36	36
Amber [s]	3.0	4.5	4.5	4.5	3.2	3.2
All red [s]	0.5	1.0	1.0	1.0	1.0	1.0
Split [s]	30	30	30	30	30	30
Vehicle Extension [s]	2.0	4.0	4.0	4.0	2.0	2.0
Walk [s]	0	0	7	7	0	0
Pedestrian Clearance [s]	0	0	18	18	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	1.5	3.5	3.5	3.5	2.2	2.2
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	6.0	6.0	6.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	R	L	R
L, Total Lost Time per Cycle [s]	3.50	5.50	5.50	5.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	3.50	3.50	3.50	2.20	2.20
g_i, Effective Green Time [s]	2	27	22	22	17	17
g / C, Green / Cycle	0.03	0.50	0.41	0.41	0.32	0.32
(v / s)_i Volume / Saturation Flow Rate	0.02	0.36	0.28	0.04	0.28	0.01
s, saturation flow rate [veh/h]	1810	3526	3540	1572	1792	1554
c, Capacity [veh/h]	55	1768	1434	637	569	493
d1, Uniform Delay [s]	25.62	10.42	13.17	9.83	17.34	12.63
k, delay calibration	0.04	0.15	0.15	0.15	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	4.33	0.81	0.87	0.09	1.91	0.01
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.63	0.72	0.69	0.09	0.89	0.04
d, Delay for Lane Group [s/veh]	29.96	11.23	14.04	9.92	19.25	12.65
Lane Group LOS	C	B	B	A	B	B
Critical Lane Group	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.48	4.70	4.13	0.37	5.38	0.16
50th-Percentile Queue Length [ft]	11.91	117.57	103.16	9.13	134.43	3.90
95th-Percentile Queue Length [veh]	0.86	8.26	7.43	0.66	9.18	0.28
95th-Percentile Queue Length [ft]	21.44	206.48	185.69	16.44	229.51	7.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	29.96	11.23	14.04	9.92	19.25	12.65
Movement LOS	C	B	B	A	B	B
d_A, Approach Delay [s/veh]	11.73		13.81		18.99	
Approach LOS	B		B		B	
d_I, Intersection Delay [s/veh]	13.81					
Intersection LOS	B					
Intersection V/C	0.810					

Sequence

Ring 1	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 22: Willow Rd/Durham St-VA Med Entrance

Control Type:	Signalized	Delay (sec / veh):	25.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.771

Intersection Setup

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	90.00	100.00	100.00	170.00	100.00	100.00	100.00	100.00	100.00	50.00	100.00	100.00
Speed [mph]	25.00			25.00			10.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			VA Medical Center			Durham Street		
Base Volume Input [veh/h]	8	935	10	72	961	39	117	2	28	38	4	177
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	50.00	2.10	0.00	0.00	2.60	27.60	4.30	0.00	17.90	0.00	0.00	6.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	18	0	0	0
Total Hourly Volume [veh/h]	8	935	10	72	961	39	117	2	10	38	4	177
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	2	234	3	18	240	10	29	1	3	10	1	44
Total Analysis Volume [veh/h]	8	935	10	72	961	39	117	2	10	38	4	177
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			17			10			19		
Bicycle Volume [bicycles/h]	5			3			1			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	2	1	6	6	4	4	4	8	8	8
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lag	-	-	Lag	-	-
Minimum Green [s]	4	30	30	4	30	30	4	4	4	4	4	4
Maximum Green [s]	30	100	100	20	100	100	30	30	30	30	30	30
Amber [s]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	30	30	0	30	30	30	30	30	30	30	30
Vehicle Extension [s]	3.0	5.0	5.0	3.0	5.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	7	7	7	7	7	7
Pedestrian Clearance [s]	0	11	11	0	15	15	15	15	15	15	15	15
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	R	L	C
L, Total Lost Time per Cycle [s]	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
g_i, Effective Green Time [s]	1	64	64	6	69	30	30	30	30
g / C, Green / Cycle	0.01	0.57	0.57	0.05	0.61	0.26	0.26	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.01	0.25	0.25	0.04	0.54	0.17	0.01	0.03	0.12
s, saturation flow rate [veh/h]	1206	1861	1852	1810	1837	691	1340	1437	1570
c, Capacity [veh/h]	10	1052	1047	95	1120	245	353	114	414
d1, Uniform Delay [s]	56.37	14.41	14.42	53.22	19.03	45.56	31.09	54.40	34.88
k, delay calibration	0.11	0.23	0.23	0.11	0.29	0.19	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	88.82	0.65	0.65	11.75	6.76	2.59	0.03	1.70	0.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.45	0.45	0.76	0.89	0.49	0.03	0.33	0.44
d, Delay for Lane Group [s/veh]	145.19	15.06	15.07	64.97	25.79	48.15	31.12	56.10	35.61
Lane Group LOS	F	B	B	E	C	D	C	E	D
Critical Lane Group	Yes	No	No	No	Yes	Yes	No	No	No
50th-Percentile Queue Length [veh]	0.47	7.22	7.20	2.35	23.35	3.46	0.22	1.14	4.30
50th-Percentile Queue Length [ft]	11.75	180.46	179.88	58.86	583.63	86.42	5.44	28.48	107.42
95th-Percentile Queue Length [veh]	0.85	11.62	11.59	4.24	31.27	6.22	0.39	2.05	7.70
95th-Percentile Queue Length [ft]	21.16	290.62	289.85	105.95	781.73	155.55	9.78	51.27	192.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	145.19	15.06	15.07	64.97	25.79	25.79	48.15	48.15	31.12	56.10	35.61	35.61
Movement LOS	F	B	B	E	C	C	D	D	C	E	D	D
d_A, Approach Delay [s/veh]	16.15			28.42			46.83			39.16		
Approach LOS	B			C			D			D		
d_I, Intersection Delay [s/veh]	25.49											
Intersection LOS	C											
Intersection V/C	0.771											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 23: Willow Rd/Coleman Ave

Control Type:	Signalized	Delay (sec / veh):	8.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.563

Intersection Setup

Name	Willow Road			Willow Road			Coleman Avenue					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	115.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Coleman Avenue					
Base Volume Input [veh/h]	11	738	3	5	680	84	110	4	34	1	1	4
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.10	0.00	0.00	3.70	2.40	3.90	0.00	3.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	738	3	5	680	84	110	4	34	1	1	4
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	185	1	1	170	21	28	1	9	0	0	1
Total Analysis Volume [veh/h]	11	738	3	5	680	84	110	4	34	1	1	4
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	12			3			1			9		
Bicycle Volume [bicycles/h]	16			10			7			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	80.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	10	10	10	10	10	4	4	4	0	4	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	73	73	73	73	73	73	27	27	27	0	27	0
Vehicle Extension [s]	6.0	6.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	11	11	11	13	13	13	15	15	15	0	15	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	6.0	6.0	6.0	0.0	6.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	80	80	80	80	12	12
g / C, Green / Cycle	0.80	0.80	0.80	0.80	0.12	0.12
(v / s)_i Volume / Saturation Flow Rate	0.02	0.40	0.01	0.43	0.10	0.00
s, saturation flow rate [veh/h]	714	1841	729	1791	1519	1719
c, Capacity [veh/h]	517	1470	537	1431	244	247
d1, Uniform Delay [s]	7.21	3.40	6.61	3.54	42.66	38.90
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.08	1.24	0.03	1.43	2.41	0.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.02	0.50	0.01	0.53	0.61	0.02
d, Delay for Lane Group [s/veh]	7.28	4.63	6.64	4.97	45.07	38.93
Lane Group LOS	A	A	A	A	D	D
Critical Lane Group	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.10	4.14	0.04	4.17	3.69	0.13
50th-Percentile Queue Length [ft]	2.45	103.39	1.02	104.20	92.35	3.35
95th-Percentile Queue Length [veh]	0.18	7.44	0.07	7.50	6.65	0.24
95th-Percentile Queue Length [ft]	4.41	186.11	1.84	187.57	166.23	6.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.28	4.63	4.63	6.64	4.97	4.97	45.07	45.07	45.07	38.93	38.93	38.93
Movement LOS	A	A	A	A	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	4.67			4.98			45.07			38.93		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	8.51											
Intersection LOS	A											
Intersection V/C	0.563											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 24: Willow Rd/Gilbert Ave

Control Type:	Signalized	Delay (sec / veh):	13.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.527

Intersection Setup

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	1	0	0
Pocket Length [ft]	75.00	100.00	100.00	90.00	100.00	100.00	55.00	100.00	100.00	90.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Gilbert Avenue			Gilbert Avenue		
Base Volume Input [veh/h]	32	707	14	26	597	6	82	68	93	56	43	28
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	0.00	2.70	0.00	3.30	2.00	10.10	0.00	2.30	3.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	32	707	14	26	597	6	82	68	93	56	43	28
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	177	4	7	149	2	21	17	23	14	11	7
Total Analysis Volume [veh/h]	32	707	14	26	597	6	82	68	93	56	43	28
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			4			3			3		
Bicycle Volume [bicycles/h]	15			12			5			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	6	6	4	4	4	8	4	8
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lag	-	-	Lag	-	-	-	-	-
Minimum Green [s]	12	12	12	12	12	12	5	5	5	0	5	0
Maximum Green [s]	60	60	60	60	60	60	24	24	24	0	24	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	73	73	73	73	73	73	27	27	27	0	27	0
Vehicle Extension [s]	4.0	4.0	4.0	4.0	4.0	4.0	3.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	7	7	7	7	7	7	7	7	7	0	7	0
Pedestrian Clearance [s]	14	14	14	14	14	14	15	15	15	0	15	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	0.0	2.1	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	L	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	2.00	0.00	2.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	74	74	74	74	18	18	18	18
g / C, Green / Cycle	0.74	0.74	0.74	0.74	0.18	0.18	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.04	0.39	0.03	0.33	0.06	0.10	0.05	0.04
s, saturation flow rate [veh/h]	829	1837	743	1846	1296	1653	1241	1707
c, Capacity [veh/h]	562	1350	480	1357	234	302	161	312
d1, Uniform Delay [s]	8.70	5.78	10.54	5.21	40.87	36.97	45.10	34.82
k, delay calibration	0.50	0.50	0.50	0.50	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	1.52	0.21	1.06	0.90	1.45	1.28	0.37
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.53	0.05	0.44	0.35	0.53	0.35	0.23
d, Delay for Lane Group [s/veh]	8.90	7.29	10.75	6.27	41.77	38.43	46.37	35.19
Lane Group LOS	A	A	B	A	D	D	D	D
Critical Lane Group	No	Yes	No	No	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.32	6.15	0.29	4.61	1.95	3.70	1.41	1.52
50th-Percentile Queue Length [ft]	8.00	153.67	7.36	115.18	48.83	92.40	35.33	37.90
95th-Percentile Queue Length [veh]	0.58	10.21	0.53	8.13	3.52	6.65	2.54	2.73
95th-Percentile Queue Length [ft]	14.40	255.32	13.25	203.18	87.90	166.33	63.59	68.23

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	8.90	7.29	7.29	10.75	6.27	6.27	41.77	38.43	38.43	46.37	35.19	35.19
Movement LOS	A	A	A	B	A	A	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	7.36			6.45			39.55			40.12		
Approach LOS	A			A			D			D		
d_I, Intersection Delay [s/veh]	13.88											
Intersection LOS	B											
Intersection V/C	0.527											

Sequence

Ring 1	-	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 25: Middlefield Rd-Willow Rd

Control Type:	Signalized	Delay (sec / veh):	68.9
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.585

Intersection Setup

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	0
Pocket Length [ft]	75.00	100.00	215.00	155.00	100.00	160.00	125.00	100.00	70.00	270.00	100.00	100.00
Speed [mph]	30.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Willow Road			Willow Road			Middlefield Road			Middlefield Road		
Base Volume Input [veh/h]	56	114	310	415	108	387	92	429	216	266	511	33
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.20	1.10	0.00	1.70	0.00	2.40	1.10	0.50	2.30	6.40	0.00	3.40
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	120	0	0	1000	0	0	1000	0	0	0
Total Hourly Volume [veh/h]	56	114	190	415	108	0	92	429	216	266	511	33
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	14	29	48	104	27	0	23	107	54	67	128	8
Total Analysis Volume [veh/h]	56	114	190	415	108	0	92	429	216	266	511	33
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			0			0			6		
Bicycle Volume [bicycles/h]	51			1			5			16		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split	Split
Signal group	8	1	8	4	4	4	6	3	6	2	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	Lag	-	-
Minimum Green [s]	0	5	0	5	5	5	0	5	0	5	5	5
Maximum Green [s]	0	33	0	46	46	46	0	32	0	39	39	39
Amber [s]	0.0	3.3	0.0	3.7	3.7	3.7	0.0	3.7	0.0	3.7	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	0	33	0	46	46	46	0	32	0	39	39	39
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0
Walk [s]	0	8	0	8	8	8	0	8	0	8	8	8
Pedestrian Clearance [s]	0	20	0	22	22	22	0	17	0	18	18	18
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	2.3	0.0	2.7	2.7	2.7	0.0	2.7	0.0	2.7	2.7	2.7
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	C	R	L	C	C
L, Total Lost Time per Cycle [s]	4.30	4.30	4.30	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.30	2.30	2.30	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
g_i, Effective Green Time [s]	22	22	22	25	25	25	22	22	22	22	27	27	27
g / C, Green / Cycle	0.15	0.15	0.15	0.17	0.17	0.17	0.15	0.15	0.15	0.15	0.18	0.18	0.18
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.13	0.14	0.14	0.00	0.05	0.12	0.12	0.13	0.15	0.15	0.15
s, saturation flow rate [veh/h]	1771	1879	1471	1779	1845	1577	1790	1891	1848	1527	1701	1898	1674
c, Capacity [veh/h]	259	275	215	294	305	261	263	278	271	224	304	339	299
d1, Uniform Delay [s]	56.42	58.17	62.75	61.06	61.06	0.00	57.56	62.10	62.14	62.47	59.73	59.72	59.84
k, delay calibration	0.11	0.11	0.15	0.11	0.11	0.11	0.11	0.13	0.13	0.14	0.15	0.15	0.15
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.41	1.00	14.40	7.96	7.70	0.00	0.80	6.94	7.38	11.71	9.20	8.25	10.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.22	0.41	0.88	0.87	0.87	0.00	0.35	0.82	0.83	0.86	0.86	0.86	0.87
d, Delay for Lane Group [s/veh]	56.84	59.16	77.15	69.01	68.75	0.00	58.35	69.03	69.52	74.18	68.93	67.96	69.93
Lane Group LOS	E	E	E	E	E	A	E	E	E	E	E	E	E
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	No	Yes	No	No	Yes
50th-Percentile Queue Length [veh]	1.92	4.04	7.99	10.29	10.65	0.00	3.23	9.02	8.90	7.92	10.42	11.53	10.44
50th-Percentile Queue Length [ft]	47.99	101.07	199.82	257.30	266.25	0.00	80.67	225.4	222.4	197.9	260.53	288.14	260.96
95th-Percentile Queue Length [veh]	3.46	7.28	12.63	15.55	16.00	0.00	5.81	13.94	13.79	12.53	15.72	17.09	15.74
95th-Percentile Queue Length [ft]	86.39	181.92	315.74	388.83	400.05	0.00	145.2	348.5	344.7	313.3	392.89	427.33	393.42

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	56.84	59.16	77.15	68.92	68.75	0.00	58.35	69.26	74.15	68.93	68.83	69.93
Movement LOS	E	E	E	E	E	A	E	E	E	E	E	E
d_A, Approach Delay [s/veh]	68.29			68.88			69.19			68.90		
Approach LOS	E			E			E			E		
d_I, Intersection Delay [s/veh]	68.89											
Intersection LOS	E											
Intersection V/C	0.585											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 26: Ravenswood Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	24.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	0	0	0	0
Pocket Length [ft]	85.00	100.00	100.00	75.00	100.00	100.00	95.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Ravenswood Avenue			Ravenswood Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	58	607	127	34	552	25	274	221	66	54	139	27
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.00	0.00	0.00	2.10	4.20	0.40	0.50	0.00	13.50	0.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	58	607	127	34	552	25	274	221	66	54	139	27
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	15	152	32	9	138	6	69	55	17	14	35	7
Total Analysis Volume [veh/h]	58	607	127	34	552	25	274	221	66	54	139	27
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	35			40			67			58		
Bicycle Volume [bicycles/h]	1			5			20			7		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	2	2	6	2	6	8	3	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	4	4	4	0	4	0	0	4	0	4	4	4
Maximum Green [s]	56	56	56	0	56	0	0	31	0	31	31	31
Amber [s]	3.1	3.1	3.1	0.0	3.1	0.0	0.0	3.1	0.0	3.1	3.1	3.1
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	0	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0	2.0	2.0	2.0
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	14	0	14	14	14
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.1	2.1	2.1	0.0	2.1	0.0	0.0	2.1	0.0	2.1	2.1	2.1
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	L	C	C
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	41	41	41	41	17	17	12
g / C, Green / Cycle	0.50	0.50	0.50	0.50	0.20	0.20	0.14
(v / s)_i Volume / Saturation Flow Rate	0.07	0.41	0.05	0.31	0.15	0.17	0.12
s, saturation flow rate [veh/h]	849	1792	734	1839	1802	1737	1825
c, Capacity [veh/h]	302	902	186	926	365	351	264
d1, Uniform Delay [s]	24.70	17.20	32.35	14.80	30.92	31.41	34.27
k, delay calibration	0.11	0.17	0.11	0.11	0.11	0.11	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.31	2.88	0.47	0.69	3.13	4.66	2.62
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

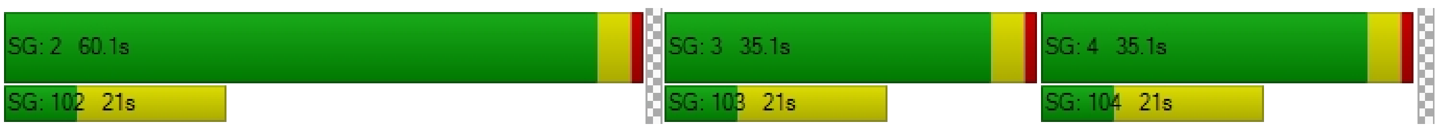
X, volume / capacity	0.19	0.81	0.18	0.62	0.75	0.82	0.83
d, Delay for Lane Group [s/veh]	25.00	20.09	32.81	15.49	34.06	36.07	36.88
Lane Group LOS	C	C	C	B	C	D	D
Critical Lane Group	No	Yes	No	No	No	Yes	Yes
50th-Percentile Queue Length [veh]	0.91	11.25	0.63	7.30	5.28	5.73	4.42
50th-Percentile Queue Length [ft]	22.75	281.13	15.67	182.39	131.92	143.29	110.41
95th-Percentile Queue Length [veh]	1.64	16.74	1.13	11.73	9.04	9.66	7.86
95th-Percentile Queue Length [ft]	40.95	418.62	28.21	293.13	226.10	241.45	196.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	25.00	20.09	20.09	32.81	15.49	15.49	34.06	36.07	36.07	36.88	36.88	36.88
Movement LOS	C	C	C	C	B	B	C	D	D	D	D	D
d_A, Approach Delay [s/veh]	20.45			16.46			35.09			36.88		
Approach LOS	C			B			D			D		
d_I, Intersection Delay [s/veh]	24.75											
Intersection LOS	C											
Intersection V/C	0.731											

Sequence

Ring 1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 28: Oak Grove Ave/Laurel St

Control Type:	Signalized	Delay (sec / veh):	8.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.611

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration	✢			✢			✢			✢		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			Laurel Street			Laurel Street		
Base Volume Input [veh/h]	17	438	123	32	280	51	78	232	38	30	126	31
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.30	7.40	0.00	0.80	0.00	0.00	0.40	2.60	0.00	0.00	6.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	17	438	123	32	280	51	78	232	38	30	126	31
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	4	110	31	8	70	13	20	58	10	8	32	8
Total Analysis Volume [veh/h]	17	438	123	32	280	51	78	232	38	30	126	31
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	13			1			18			5		
Bicycle Volume [bicycles/h]	16			12			20			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	2	2	2	6	2	6	8	4	8	4	4	4
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lag	-	-
Minimum Green [s]	8	8	8	0	8	0	0	4	0	4	4	4
Maximum Green [s]	30	30	30	0	30	0	0	30	0	30	30	30
Amber [s]	3.2	3.2	3.2	0.0	3.2	0.0	0.0	3.2	0.0	3.2	3.2	3.2
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	1.0
Split [s]	30	30	30	0	30	0	0	30	0	30	30	30
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	0.0	2.5	0.0	2.5	2.5	2.5
Walk [s]	7	7	7	0	7	0	0	7	0	7	7	7
Pedestrian Clearance [s]	14	14	14	0	14	0	0	12	0	12	12	12
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.2	2.2	2.2	0.0	2.2	0.0	0.0	2.2	0.0	2.2	2.2	2.2
Minimum Recall		Yes			Yes			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	C	C
L, Total Lost Time per Cycle [s]	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	2.00	2.00
l2, Clearance Lost Time [s]	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	14	14	8	8
g / C, Green / Cycle	0.45	0.45	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.33	0.20	0.20	0.11
s, saturation flow rate [veh/h]	1736	1783	1758	1771
c, Capacity [veh/h]	904	932	626	622
d1, Uniform Delay [s]	6.88	5.75	9.91	8.96
k, delay calibration	0.11	0.11	0.08	0.08
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.76	0.27	0.57	0.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.64	0.39	0.56	0.30
d, Delay for Lane Group [s/veh]	7.64	6.01	10.48	9.16
Lane Group LOS	A	A	B	A
Critical Lane Group	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.90	0.97	1.59	0.71
50th-Percentile Queue Length [ft]	47.59	24.19	39.72	17.78
95th-Percentile Queue Length [veh]	3.43	1.74	2.86	1.28
95th-Percentile Queue Length [ft]	85.66	43.54	71.50	32.00

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	7.64	7.64	7.64	6.01	6.01	6.01	10.48	10.48	10.48	9.16	9.16	9.16
Movement LOS	A	A	A	A	A	A	B	B	B	A	A	A
d_A, Approach Delay [s/veh]	7.64			6.01			10.48			9.16		
Approach LOS	A			A			B			A		
d_I, Intersection Delay [s/veh]	8.10											
Intersection LOS	A											
Intersection V/C	0.611											

Sequence

Ring 1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 29: El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance

Control Type:	Signalized	Delay (sec / veh):	37.4
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	12.363

Intersection Setup

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	140.00	100.00	150.00	135.00	100.00	100.00
Speed [mph]	15.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo College			Encinal Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	24	19	40	107	9	238	25	1794	103	78	1464	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	0.00	1.30	0.00	1.40	0.00	1.50	1.20	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	101	0	0	0
Total Hourly Volume [veh/h]	24	19	40	107	9	238	25	1794	2	78	1464	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	5	10	27	2	60	6	449	1	20	366	4
Total Analysis Volume [veh/h]	24	19	40	107	9	238	25	1794	2	78	1464	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			12			0			17		
Bicycle Volume [bicycles/h]	3			3			14			3		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	15.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	10	0	0	10	0	10	10	0	10	10	0
Maximum Green [s]	0	30	0	0	30	0	25	35	0	25	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	0	40	0	0	40	0	25	85	0	25	85	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	1.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	2.00	2.00
g_i, Effective Green Time [s]	37	37	37	37	6	93	93	10	97	97
g / C, Green / Cycle	0.25	0.25	0.25	0.25	0.04	0.62	0.62	0.06	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.52	0.03	11.49	0.15	0.01	0.50	0.00	0.04	0.27	0.27
s, saturation flow rate [veh/h]	82	1591	10	1539	1810	3568	1554	1783	3575	1866
c, Capacity [veh/h]	58	391	49	378	78	2224	969	114	2303	1202
d1, Uniform Delay [s]	58.16	43.75	73.38	50.45	68.57	8.04	4.77	67.11	4.40	4.40
k, delay calibration	0.50	0.11	0.50	0.19	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	60.17	0.11	681.85	3.08	2.33	3.26	0.00	6.98	0.57	1.09
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.75	0.10	2.39	0.63	0.32	0.81	0.00	0.68	0.42	0.42
d, Delay for Lane Group [s/veh]	118.33	43.86	755.23	53.53	70.90	11.29	4.78	74.09	4.97	5.49
Lane Group LOS	F	D	F	D	E	B	A	E	A	A
Critical Lane Group	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	2.66	1.21	11.10	8.35	0.97	9.75	0.01	3.10	2.77	3.07
50th-Percentile Queue Length [ft]	66.49	30.26	277.38	208.85	24.34	243.76	0.31	77.42	69.26	76.70
95th-Percentile Queue Length [veh]	4.79	2.18	19.97	13.09	1.75	14.87	0.02	5.57	4.99	5.52
95th-Percentile Queue Length [ft]	119.69	54.46	499.28	327.35	43.82	371.79	0.57	139.36	124.66	138.06

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	118.33	118.33	43.86	755.23	755.23	53.53	70.90	11.29	4.78	74.09	5.14	5.49
Movement LOS	F	F	D	F	F	D	E	B	A	E	A	A
d_A, Approach Delay [s/veh]	82.44			283.47			12.10			8.60		
Approach LOS	F			F			B			A		
d_I, Intersection Delay [s/veh]	37.38											
Intersection LOS	D											
Intersection V/C	12.363											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 30: El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave

Control Type:	Signalized	Delay (sec / veh):	47.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.852

Intersection Setup

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	205.00	100.00	130.00	120.00	100.00	100.00	190.00	100.00	105.00	180.00	100.00	100.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Valparaiso Avenue			Glenwood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	461	183	100	88	256	61	105	1571	47	67	1195	366
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	5.60	0.00	0.00	0.60	0.00	1.00	0.50	0.00	1.80	1.70	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	59	0	0	0	0	0	45	0	0	274
Total Hourly Volume [veh/h]	461	183	41	88	256	61	105	1571	2	67	1195	92
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	115	46	10	22	64	15	26	393	1	17	299	23
Total Analysis Volume [veh/h]	461	183	41	88	256	61	105	1571	2	67	1195	92
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2			9			17			3		
Bicycle Volume [bicycles/h]	6			5			4			9		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	26.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	3	0	0	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	8	10	0	8	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.5	0.5	0.0	0.5	0.5	0.0
Split [s]	0	54	0	0	34	0	27	50	0	12	35	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	1.5	0.0	0.0	1.5	0.0	2.0	2.2	0.0	2.0	2.2	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.50	3.50	3.50	3.50	3.50	4.00	4.20	4.20	4.00	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.50	1.50	1.50	1.50	1.50	2.00	2.20	2.20	2.00	2.20	2.20
g_i, Effective Green Time [s]	31	31	31	28	28	11	68	68	8	65	65
g / C, Green / Cycle	0.21	0.21	0.21	0.19	0.19	0.07	0.45	0.45	0.05	0.43	0.43
(v / s)_i Volume / Saturation Flow Rate	0.18	0.18	0.03	0.05	0.17	0.06	0.44	0.00	0.04	0.34	0.06
s, saturation flow rate [veh/h]	1810	1762	1585	1810	1819	1792	3600	1577	1778	3557	1570
c, Capacity [veh/h]	376	366	329	339	340	128	1634	716	89	1539	679
d1, Uniform Delay [s]	57.47	57.41	48.33	52.09	60.01	66.91	28.36	16.18	69.07	26.17	18.86
k, delay calibration	0.11	0.11	0.11	0.11	0.36	0.11	0.50	0.50	0.16	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.28	6.26	0.17	0.40	27.20	12.14	14.81	0.01	17.06	3.91	0.41
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.87	0.87	0.12	0.26	0.93	0.82	0.96	0.00	0.75	0.78	0.14
d, Delay for Lane Group [s/veh]	63.75	63.67	48.50	52.49	87.21	79.05	43.17	16.18	86.13	30.09	19.27
Lane Group LOS	E	E	D	D	F	E	D	B	F	C	B
Critical Lane Group	Yes	No	No	No	Yes	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	12.68	12.28	1.28	2.92	14.54	4.29	26.53	0.03	2.93	15.80	1.57
50th-Percentile Queue Length [ft]	317.00	307.00	32.08	73.07	363.60	107.29	663.32	0.75	73.24	394.88	39.27
95th-Percentile Queue Length [veh]	18.52	18.03	2.31	5.26	20.80	7.69	34.98	0.05	5.27	22.31	2.83
95th-Percentile Queue Length [ft]	463.00	450.67	57.75	131.52	519.96	192.22	874.51	1.34	131.83	557.83	70.69

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.73	63.67	48.50	52.49	87.21	87.21	79.05	43.17	16.18	86.13	30.09	19.27
Movement LOS	E	E	D	D	F	F	E	D	B	F	C	B
d_A, Approach Delay [s/veh]	62.80			79.66			45.38			32.12		
Approach LOS	E			E			D			C		
d_I, Intersection Delay [s/veh]	47.29											
Intersection LOS	D											
Intersection V/C	0.852											

Sequence

Ring 1	1	2	4	3	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 31: El Camino Real (SR 82)/Oak Grove Ave

Control Type:	Signalized	Delay (sec / veh):	26.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.740

Intersection Setup

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	110.00	115.00	100.00	110.00	280.00	100.00	110.00	200.00	100.00	140.00
Speed [mph]	25.00			25.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Oak Grove Avenue			Oak Grove Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	157	268	176	142	236	84	91	1493	98	137	1262	117
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.00	1.60	1.40	1.30	0.00	1.70	0.00	2.60	1.20	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	77	0	0	82	0	0	77	0	0	116
Total Hourly Volume [veh/h]	157	268	99	142	236	2	91	1493	21	137	1262	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	39	67	25	36	59	1	23	373	5	34	316	0
Total Analysis Volume [veh/h]	157	268	99	142	236	2	91	1493	21	137	1262	1
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			7			37			17		
Bicycle Volume [bicycles/h]	10			10			4			6		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	147.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	3	8	0	7	4	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	4	0	4	4	0	4	10	0	4	10	0
Maximum Green [s]	16	25	0	16	25	0	18	20	0	18	20	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.5	3.7	0.0	3.5	3.7	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	53	58	0	26	31	0	33	44	0	22	33	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	1.5	0.0	1.0	1.5	0.0	1.5	2.2	0.0	1.5	2.2	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	3.00	3.50	3.50	3.00	3.50	3.50	3.50	4.20	4.20	3.50	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.50	1.50	1.00	1.50	1.50	1.50	2.20	2.20	1.50	2.20	2.20
g_i, Effective Green Time [s]	15	26	26	14	24	24	9	83	83	13	87	87
g / C, Green / Cycle	0.10	0.17	0.17	0.09	0.16	0.16	0.06	0.55	0.55	0.09	0.58	0.58
(v / s)_i Volume / Saturation Flow Rate	0.09	0.14	0.07	0.08	0.13	0.00	0.05	0.42	0.01	0.08	0.35	0.00
s, saturation flow rate [veh/h]	1810	1872	1473	1781	1874	1505	1810	3557	1568	1764	3575	1546
c, Capacity [veh/h]	182	318	250	164	303	243	112	1969	868	158	2077	898
d1, Uniform Delay [s]	66.26	60.13	55.23	66.96	60.12	52.62	66.21	3.22	2.60	65.00	9.60	7.07
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.17	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	11.42	6.03	1.01	12.51	4.33	0.01	13.01	2.80	0.05	19.50	1.33	0.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

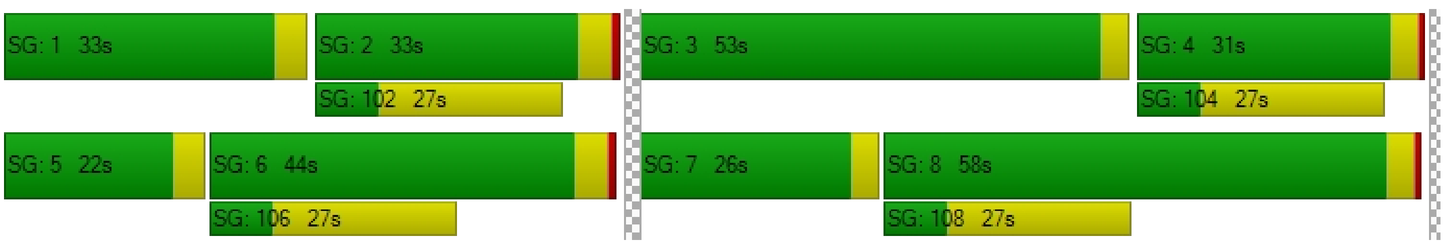
X, volume / capacity	0.86	0.84	0.40	0.86	0.78	0.01	0.81	0.76	0.02	0.87	0.61	0.00
d, Delay for Lane Group [s/veh]	77.68	66.16	56.25	79.47	64.45	52.63	79.22	6.01	2.65	84.51	10.93	7.07
Lane Group LOS	E	E	E	E	E	D	E	A	A	F	B	A
Critical Lane Group	No	Yes	No	Yes	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	6.55	10.50	3.45	5.99	9.06	0.07	3.71	3.01	0.07	5.87	7.03	0.01
50th-Percentile Queue Length [ft]	163.75	262.46	86.30	149.64	226.52	1.63	92.68	75.19	1.77	146.66	175.77	0.21
95th-Percentile Queue Length [veh]	10.75	15.81	6.21	10.00	14.00	0.12	6.67	5.41	0.13	9.84	11.38	0.02
95th-Percentile Queue Length [ft]	268.69	395.30	155.34	249.95	349.94	2.94	166.82	135.34	3.19	245.97	284.48	0.38

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	77.68	66.16	56.25	79.47	64.45	52.63	79.22	6.01	2.65	84.51	10.93	7.07
Movement LOS	E	E	E	E	E	D	E	A	A	F	B	A
d_A, Approach Delay [s/veh]		67.74			70.00			10.12			18.13	
Approach LOS		E			E			B			B	
d_I, Intersection Delay [s/veh]						26.53						
Intersection LOS						C						
Intersection V/C						0.740						

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 32: El Camino Real (SR 82)/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	33.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.920

Intersection Setup

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	1	0	0	0	0	1	0	0	1
Pocket Length [ft]	140.00	100.00	140.00	50.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00	105.00
Speed [mph]	30.00			25.00			35.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Santa Cruz Avenue			Santa Cruz Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	222	64	176	143	166	123	0	1441	42	0	1782	107
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.70	10.00	0.70	2.00	5.20	7.00	0.00	1.40	2.40	0.00	1.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	73	0	0	99
Total Hourly Volume [veh/h]	222	64	176	143	166	123	0	1441	0	0	1782	8
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	56	16	44	36	42	31	0	360	0	0	446	2
Total Analysis Volume [veh/h]	222	64	176	143	166	123	0	1441	0	0	1782	8
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	20			27			66			41		
Bicycle Volume [bicycles/h]	14			12			4			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	142.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	3	0	0	4	0	0	6	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	10	0	0	10	0
Maximum Green [s]	0	24	0	0	24	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.7	0.0	0.0	3.7	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.5	0.0	0.0	0.5	0.0
Split [s]	0	45	0	0	45	0	0	60	0	0	60	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.2	0.0	0.0	2.2	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		No			No			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	R	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.20	4.20	4.20
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.20	2.20	2.20
g_i, Effective Green Time [s]	24	24	24	32	32	81	81	81	81
g / C, Green / Cycle	0.16	0.16	0.16	0.22	0.22	0.54	0.54	0.54	0.54
(v / s)_i Volume / Saturation Flow Rate	0.14	0.04	0.14	0.09	0.20	0.45	0.00	0.55	0.01
s, saturation flow rate [veh/h]	1601	1555	1231	1597	1454	3211	1419	3217	1403
c, Capacity [veh/h]	260	252	200	345	314	1735	767	1739	758
d1, Uniform Delay [s]	61.04	54.84	61.35	50.55	57.44	4.73	0.00	7.43	3.42
k, delay calibration	0.11	0.11	0.11	0.11	0.11	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.91	0.52	11.91	0.80	10.93	4.78	0.00	28.15	0.03
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.67	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

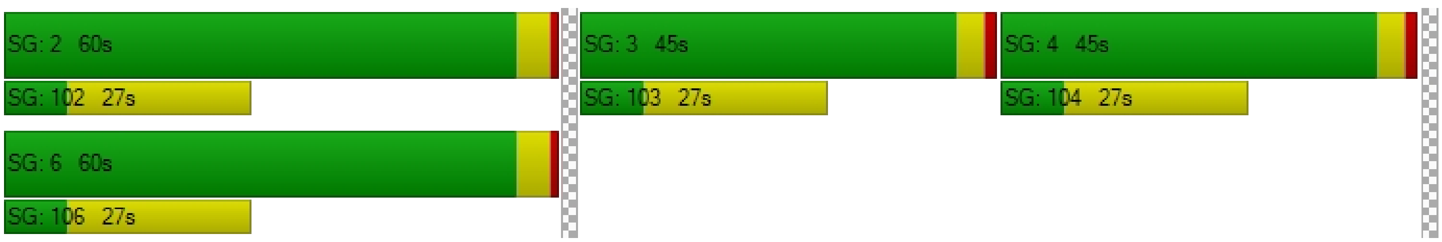
X, volume / capacity	0.86	0.25	0.88	0.41	0.92	0.83	0.00	1.02	0.01
d, Delay for Lane Group [s/veh]	68.95	55.36	73.26	51.35	68.37	9.51	0.00	35.59	3.45
Lane Group LOS	E	E	E	D	E	A	A	F	A
Critical Lane Group	No	No	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	8.82	2.17	7.23	4.78	11.76	3.95	0.00	10.30	0.03
50th-Percentile Queue Length [ft]	220.38	54.30	180.74	119.56	294.03	98.72	0.00	257.48	0.84
95th-Percentile Queue Length [veh]	13.68	3.91	11.64	8.37	17.39	7.11	0.00	15.84	0.06
95th-Percentile Queue Length [ft]	342.11	97.74	290.99	209.22	434.64	177.70	0.00	395.95	1.52

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	68.95	55.36	73.26	51.35	68.37	68.37	0.00	9.51	0.00	0.00	35.59	3.45
Movement LOS	E	E	E	D	E	E		A	A		F	A
d_A, Approach Delay [s/veh]	68.71			62.74			9.51			35.44		
Approach LOS	E			E			A			D		
d_I, Intersection Delay [s/veh]	32.97											
Intersection LOS	C											
Intersection V/C	0.920											

Sequence

Ring 1	-	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 33: El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave

Control Type:	Signalized	Delay (sec / veh):	82.8
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.000

Intersection Setup

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	240.00	100.00	135.00	320.00	100.00	100.00	240.00	100.00	65.00
Speed [mph]	30.00			30.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Menlo Avenue			Ravenswood Avenue			El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	51	400	124	799	441	142	134	1596	703	217	1391	47
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.50	1.10	0.00	0.40	0.40	1.30	0.90	1.80	1.70	0.60	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	80	0	0	454	0	0	33
Total Hourly Volume [veh/h]	51	400	124	799	441	62	134	1596	249	217	1391	14
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	13	100	31	200	110	16	34	399	62	54	348	4
Total Analysis Volume [veh/h]	51	400	124	799	441	62	134	1596	249	217	1391	14
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	31			12			0			37		
Bicycle Volume [bicycles/h]	13			14			5			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	3	8	4	4	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	7	0	4	4	4	8	10	10	8	10	10
Maximum Green [s]	0	30	0	16	16	16	4	16	16	4	16	16
Amber [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.2	3.7	3.7	3.2	3.7	3.7
All red [s]	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	0	29	0	38	38	38	16	65	65	18	67	67
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	0	0	7	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	0	0	20	20	20	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	2.0	2.2	2.7	2.7	2.2	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	6.0	0.0	20.0	20.0	20.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.20	4.70	4.70	4.20	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.20	2.70	2.70	2.20	2.70	2.70
g_i, Effective Green Time [s]	25	25	34	34	34	12	60	60	14	62	62
g / C, Green / Cycle	0.17	0.17	0.23	0.23	0.23	0.08	0.40	0.40	0.09	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	0.17	0.17	0.23	0.23	0.04	0.07	0.45	0.16	0.12	0.39	0.01
s, saturation flow rate [veh/h]	1864	1556	3500	1892	1478	1793	3554	1551	1799	3568	1555
c, Capacity [veh/h]	311	259	791	428	334	141	1432	625	165	1484	647
d1, Uniform Delay [s]	62.39	62.44	58.00	58.00	46.86	66.80	34.69	23.99	63.48	21.26	13.48
k, delay calibration	0.44	0.46	0.11	0.48	0.11	0.34	0.50	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	46.84	59.51	17.47	50.78	0.27	51.33	61.90	1.90	178.16	12.54	0.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33	1.67	1.67	1.67
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

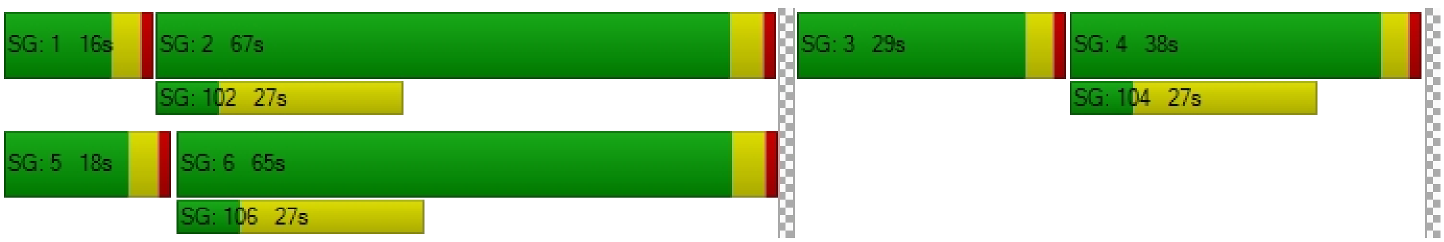
X, volume / capacity	1.00	1.02	1.01	1.03	0.19	0.95	1.11	0.40	1.32	0.94	0.02
d, Delay for Lane Group [s/veh]	109.23	121.95	75.47	108.78	47.13	118.13	96.58	25.89	241.64	33.80	13.54
Lane Group LOS	F	F	F	F	D	F	F	C	F	C	B
Critical Lane Group	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	15.86	14.20	16.90	22.24	1.92	6.96	35.74	5.13	14.02	17.70	0.17
50th-Percentile Queue Length [ft]	396.42	354.95	422.61	555.91	48.08	173.96	893.55	128.33	350.59	442.58	4.20
95th-Percentile Queue Length [veh]	22.39	20.62	23.79	30.53	3.46	11.28	49.22	8.85	22.18	24.60	0.30
95th-Percentile Queue Length [ft]	559.68	515.40	594.77	763.25	86.54	282.11	1230.45	221.22	554.53	615.09	7.56

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	109.23	113.72	121.95	75.47	108.78	47.13	118.13	96.58	25.89	241.64	33.80	13.54
Movement LOS	F	F	F	F	F	D	F	F	C	F	C	B
d_A, Approach Delay [s/veh]	115.10			85.40			89.15			61.43		
Approach LOS	F			F			F			E		
d_I, Intersection Delay [s/veh]	82.78											
Intersection LOS	F											
Intersection V/C	1.000											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 34: El Camino Real (SR 82)/Roble Ave

Control Type:	Signalized	Delay (sec / veh):	9.1
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.638

Intersection Setup

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	1	0	0	1	0	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	115.00	100.00	210.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name	Roble Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	67	6	37	58	45	48	74	1891	21	94	2186	75
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.20	0.00	0.00	1.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	39	0	0	0	0	0	0
Total Hourly Volume [veh/h]	67	6	37	58	45	9	74	1891	21	94	2186	75
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	17	2	9	15	11	2	19	473	5	24	547	19
Total Analysis Volume [veh/h]	67	6	37	58	45	9	74	1891	21	94	2186	75
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	11			8			16			0		
Bicycle Volume [bicycles/h]	9			16			5			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	19.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	8	8	8	4	8	4	1	6	6	5	2	2
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	8	8	0	8	0	4	10	10	4	10	10
Maximum Green [s]	30	30	30	0	30	0	20	40	40	20	40	40
Amber [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.7	3.7	3.0	3.7	3.7
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	1.0	1.0	1.0
Split [s]	35	35	35	0	35	0	60	54	54	61	55	55
Vehicle Extension [s]	3.0	3.0	3.0	0.0	3.0	0.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	7	7	7	0	7	0	0	7	7	0	7	7
Pedestrian Clearance [s]	20	20	20	0	20	0	0	20	20	0	20	20
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	2.0	2.0	2.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.7	2.7	2.0	2.7	2.7
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	6.0	0.0	6.0	0.0	20.0	6.0	6.0	20.0	6.0	6.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.70	4.70	4.00	4.70	4.70
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.70	2.70	2.00	2.70	2.70
g_i, Effective Green Time [s]	24	24	24	8	103	103	10	105	105
g / C, Green / Cycle	0.16	0.16	0.16	0.05	0.69	0.69	0.06	0.70	0.70
(v / s)_i Volume / Saturation Flow Rate	0.13	0.07	0.01	0.04	0.35	0.35	0.05	0.42	0.42
s, saturation flow rate [veh/h]	816	1394	1560	1810	3575	1865	1810	3582	1844
c, Capacity [veh/h]	172	265	254	95	2458	1282	117	2507	1290
d1, Uniform Delay [s]	65.45	56.33	52.82	68.91	2.29	2.29	67.58	1.81	1.82
k, delay calibration	0.20	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	7.04	0.93	0.06	13.01	0.76	1.46	11.99	1.04	2.06
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

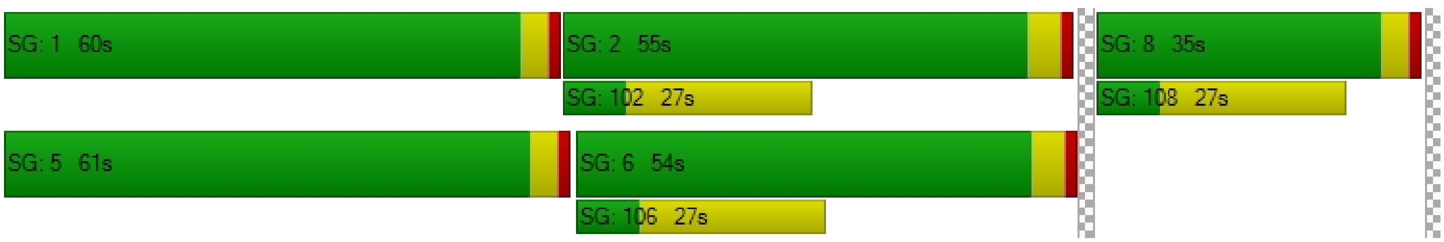
X, volume / capacity	0.64	0.39	0.04	0.78	0.51	0.51	0.80	0.59	0.60
d, Delay for Lane Group [s/veh]	72.49	57.26	52.88	81.92	3.05	3.76	79.57	2.86	3.88
Lane Group LOS	E	E	D	F	A	A	E	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	4.53	3.69	0.30	3.09	2.07	2.41	3.86	2.05	2.50
50th-Percentile Queue Length [ft]	113.15	92.29	7.50	77.36	51.73	60.30	96.46	51.34	62.45
95th-Percentile Queue Length [veh]	8.01	6.65	0.54	5.57	3.72	4.34	6.94	3.70	4.50
95th-Percentile Queue Length [ft]	200.37	166.13	13.49	139.24	93.11	108.54	173.62	92.41	112.41

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.49	72.49	72.49	57.26	57.26	52.88	81.92	3.29	3.76	79.57	3.18	3.88
Movement LOS	E	E	E	E	E	D	F	A	A	E	A	A
d_A, Approach Delay [s/veh]	72.49			56.91			6.22			6.25		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	9.08											
Intersection LOS	A											
Intersection V/C	0.638											

Sequence

Ring 1	1	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 35: El Camino Real (SR 82)/Middle Ave

Control Type:	Signalized	Delay (sec / veh):	17.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.788

Intersection Setup

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound				Northwestbound			Southeastbound		
Lane Configuration													
Turning Movement	Left	Thru	Right	U-tu	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	55.00	100.0	100.0	100.0	100.0	275.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00				30.00			35.00		
Grade [%]	0.00			0.00				0.00			0.00		
Crosswalk	Yes			Yes				No			Yes		

volumes

Name	Middle Avenue							El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	249	0	182	0	0	0	0	331	1965	0	0	1853	119
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.40	0.00	1.60	0.00	0.00	0.00	0.00	0.90	1.70	0.00	0.00	1.60	1.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	211	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	249	0	0	0	0	0	0	331	1965	0	0	1853	119
Peak Hour Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.000	1.000	1.000	1.000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	62	0	0	0	0	0	0	83	491	0	0	463	30
Total Analysis Volume [veh/h]	249	0	0	0	0	0	0	331	1965	0	0	1853	119
Presence of On-Street Parking	No		No	No			No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	27			0				0			17		
Bicycle Volume [bicycles/h]	2			0				7			4		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	34.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Permi	Permi	Permi	Permi	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	4	0	0	0	0	4	0	1	6	0	0	2	0
Auxiliary Signal Groups													
Lead / Lag	Lead	-	-	-	-	-	-	Lead	-	-	-	-	-
Minimum Green [s]	10	0	0	0	0	10	0	10	10	0	0	10	0
Maximum Green [s]	25	0	0	0	0	25	0	30	45	0	0	45	0
Amber [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Split [s]	35	0	0	0	0	35	0	51	115	0	0	64	0
Vehicle Extension [s]	3.0	0.0	0.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	0	0	0	7	0	0	7	0	0	0	0
Pedestrian Clearance [s]	25	0	0	0	0	25	0	0	20	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	1.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No					No		No	No			No	
Maximum Recall	No					No		No	No			No	
Pedestrian Recall	No					No		No	No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	L	C	C	C
L, Total Lost Time per Cycle [s]	3.00	3.00	3.00	3.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	1.00	1.00	1.00	1.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	31	31	31	30	112	79	79
g / C, Green / Cycle	0.21	0.21	0.21	0.20	0.75	0.53	0.53
(v / s)_i Volume / Saturation Flow Rate	0.18	0.00	0.00	0.18	0.39	0.37	0.36
s, saturation flow rate [veh/h]	1373	1590	1900	1793	5089	3561	1803
c, Capacity [veh/h]	316	331	420	357	3791	1872	948
d1, Uniform Delay [s]	59.33	0.00	0.00	53.99	0.13	15.52	15.40
k, delay calibration	0.36	0.11	0.11	0.16	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	13.44	0.00	0.00	14.09	0.51	2.23	4.17
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.00	0.00	0.93	0.52	0.70	0.69
d, Delay for Lane Group [s/veh]	72.76	0.00	0.00	68.08	0.64	17.75	19.57
Lane Group LOS	E	A	A	E	A	B	B
Critical Lane Group	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	10.50	0.00	0.00	13.14	0.31	11.33	11.71
50th-Percentile Queue Length [ft]	262.61	0.00	0.00	328.55	7.67	283.21	292.83
95th-Percentile Queue Length [veh]	15.82	0.00	0.00	19.09	0.55	16.85	17.33
95th-Percentile Queue Length [ft]	395.49	0.00	0.00	477.18	13.80	421.21	433.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.76	0.00	0.00	0.00	0.00	0.00	0.00	68.08	0.64	0.00	0.00	18.28	19.57
Movement LOS	E		A	A	A	A	A	E	A			B	B
d_A, Approach Delay [s/veh]	72.76			0.00			10.36			18.36		
Approach LOS	E			A			B			B		
d_I, Intersection Delay [s/veh]	17.29											
Intersection LOS	B											
Intersection V/C	0.788											

Sequence

Ring 1	1	2	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 36: El Camino Real (SR 82)/Cambridge Ave

Control Type:	Signalized	Delay (sec / veh):	8.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	370.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			15.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	Cambridge Avenue						El Camino Real (SR 82)			El Camino Real (SR 82)		
Base Volume Input [veh/h]	26	0	39	4	3	0	355	2665	7	36	2000	5
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	2.85	0.00	0.00	0.00	0.00	1.20	0.00	0.00	0.90	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	35	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	26	0	4	4	3	0	355	2665	7	36	2000	5
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	0	1	1	1	0	89	666	2	9	500	1
Total Analysis Volume [veh/h]	26	0	4	4	3	0	355	2665	7	36	2000	5
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			2			0			3		
Bicycle Volume [bicycles/h]	0			0			17			1		

Intersection Settings

Located in CBD	No
Signal Coordination Group	1 - ECR
Cycle Length [s]	150
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	89.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	8	0	1	6	0	5	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	11	0	0	11	0	4	10	0	4	10	0
Maximum Green [s]	0	29	0	0	29	0	26	35	0	26	35	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0
Split [s]	0	31	0	0	31	0	71	26	0	93	48	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	3.0	0.0	3.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	20	0	0	20	0	0	15	0	0	15	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall		No			No		No	No		No	No	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	50.0	0.0	0.0	50.0	0.0	50.0	50.0	0.0	50.0	50.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	10	10	10	32	124	124	4	96	96
g / C, Green / Cycle	0.07	0.07	0.07	0.21	0.83	0.83	0.03	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.02	0.00	0.01	0.20	0.49	0.49	0.02	0.37	0.37
s, saturation flow rate [veh/h]	1277	1570	1116	1810	3575	1874	1810	3585	1880
c, Capacity [veh/h]	131	103	111	385	2960	1552	48	2300	1206
d1, Uniform Delay [s]	66.96	65.65	65.76	52.45	0.00	0.00	71.82	5.01	5.01
k, delay calibration	0.11	0.11	0.11	0.11	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.73	0.15	0.24	9.33	0.88	1.67	20.72	1.04	1.97
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.33	1.33	1.33	1.33	1.33	1.33
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

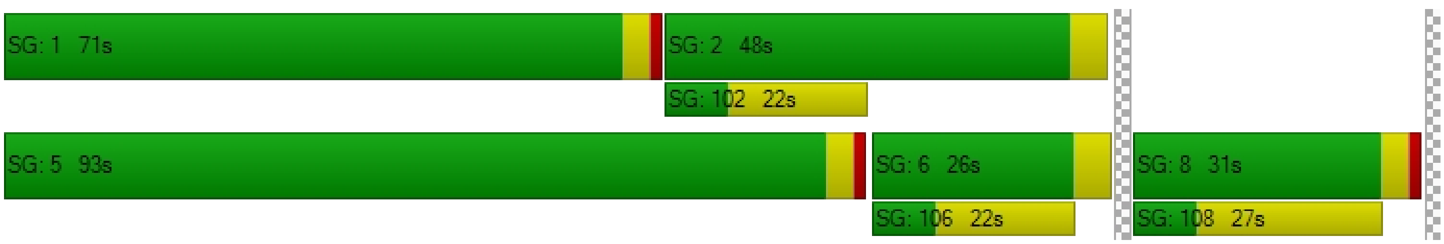
X, volume / capacity	0.20	0.04	0.06	0.92	0.59	0.59	0.75	0.57	0.57
d, Delay for Lane Group [s/veh]	67.69	65.80	65.99	61.77	0.88	1.67	92.54	6.04	6.98
Lane Group LOS	E	E	E	E	A	A	F	A	A
Critical Lane Group	Yes	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.99	0.15	0.27	13.34	0.36	0.72	1.64	4.01	4.52
50th-Percentile Queue Length [ft]	24.78	3.75	6.63	333.42	9.02	18.03	40.96	100.33	113.11
95th-Percentile Queue Length [veh]	1.78	0.27	0.48	19.33	0.65	1.30	2.95	7.22	8.01
95th-Percentile Queue Length [ft]	44.60	6.74	11.94	483.15	16.23	32.45	73.72	180.60	200.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	67.69	67.69	65.80	65.99	65.99	65.99	61.77	1.15	1.67	92.54	6.36	6.98
Movement LOS	E	E	E	E	E	E	E	A	A	F	A	A
d_A, Approach Delay [s/veh]	67.44			65.99			8.26			7.89		
Approach LOS	E			E			A			A		
d_I, Intersection Delay [s/veh]	8.54											
Intersection LOS	A											
Intersection V/C	0.625											

Sequence

Ring 1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 38: Santa Cruz Ave/University Dr (S)

Control Type:	Signalized	Delay (sec / veh):	11.8
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.615

Intersection Setup

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Approach	Northeastbound		Southwestbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	100.00	60.00	100.00	100.00	100.00
Speed [mph]	30.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Santa Cruz Avenue		Santa Cruz Avenue		University Drive	
Base Volume Input [veh/h]	462	433	112	505	363	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.60	0.90	0.50	2.30	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	462	433	112	505	363	165
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	116	108	28	126	91	41
Total Analysis Volume [veh/h]	462	433	112	505	363	165
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		31	
Bicycle Volume [bicycles/h]	10		15		8	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	40
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Permissive	Permissive	Protected	Permissive	Split	Split
Signal group	2	2	1	6	4	8
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	Lead	-
Minimum Green [s]	10	10	4	10	4	0
Maximum Green [s]	30	30	15	40	25	0
Amber [s]	3.1	3.1	3.1	3.1	3.1	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0
Split [s]	30	30	0	30	0	0
Vehicle Extension [s]	2.0	2.0	2.0	2.0	2.0	0.0
Walk [s]	7	7	0	0	7	0
Pedestrian Clearance [s]	10	10	0	0	12	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.1	2.1	2.1	2.1	0.0
Minimum Recall	Yes		Yes	Yes	No	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	6.0	6.0	20.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.10	4.10	4.10	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.10	2.10	2.10	2.10	2.10
g_i, Effective Green Time [s]	14	14	3	22	10	10
g / C, Green / Cycle	0.36	0.36	0.08	0.54	0.26	0.26
(v / s)_i Volume / Saturation Flow Rate	0.25	0.29	0.06	0.27	0.20	0.11
s, saturation flow rate [veh/h]	1852	1485	1801	1857	1810	1555
c, Capacity [veh/h]	664	532	147	1005	465	399
d1, Uniform Delay [s]	11.13	11.79	18.23	5.86	14.02	12.53
k, delay calibration	0.04	0.04	0.04	0.04	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.50	1.17	3.05	0.15	1.10	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

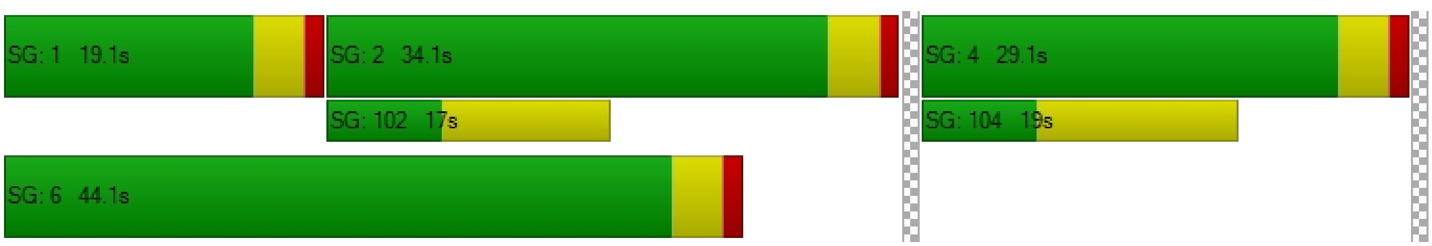
X, volume / capacity	0.70	0.81	0.76	0.50	0.78	0.41
d, Delay for Lane Group [s/veh]	11.62	12.96	21.28	6.01	15.11	12.79
Lane Group LOS	B	B	C	A	B	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	2.76	2.82	1.04	1.77	2.63	1.04
50th-Percentile Queue Length [ft]	68.88	70.45	25.98	44.36	65.64	25.95
95th-Percentile Queue Length [veh]	4.96	5.07	1.87	3.19	4.73	1.87
95th-Percentile Queue Length [ft]	123.99	126.81	46.77	79.84	118.15	46.70

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	11.62	12.96	21.28	6.01	15.11	12.79
Movement LOS	B	B	C	A	B	B
d_A, Approach Delay [s/veh]	12.27		8.78		14.39	
Approach LOS	B		A		B	
d_I, Intersection Delay [s/veh]	11.76					
Intersection LOS	B					
Intersection V/C	0.615					

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 39: Sand Hill Rd/Santa Cruz Ave

Control Type:	Signalized	Delay (sec / veh):	46.0
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.781

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	210.00	100.00	240.00	135.00	100.00	140.00	100.00	100.00	100.00	150.00	100.00	180.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Santa Cruz Avenue			Santa Cruz Avenue		
Base Volume Input [veh/h]	361	611	215	534	1306	262	180	789	215	122	635	215
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.10	0.80	0.90	0.00	0.80	1.00	1.90	0.70	0.50	0.00	0.20	1.70
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	361	611	215	534	1306	262	180	789	215	122	635	215
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	90	153	54	134	327	66	45	197	54	31	159	54
Total Analysis Volume [veh/h]	361	611	215	534	1306	262	180	789	215	122	635	215
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	1			12			5			3		
Bicycle Volume [bicycles/h]	28			9			33			20		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	133
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	2	1	6	6	3	8	8	7	4	4
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	4	8	8	4	8	8	8	8	8	8	8	8
Maximum Green [s]	30	60	60	30	60	60	25	30	30	25	30	30
Amber [s]	3.0	3.6	3.6	3.0	3.6	3.6	3.1	3.6	3.6	3.1	3.6	3.6
All red [s]	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0	1.0	2.0	2.0
Split [s]	20	41	41	40	61	61	14	39	39	13	38	38
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Walk [s]	0	7	7	0	7	7	0	7	7	0	7	7
Pedestrian Clearance [s]	0	24	24	0	24	24	0	24	24	0	24	24
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	2.0	3.6	3.6	2.0	3.6	3.6	2.1	3.6	3.6	2.1	3.6	3.6
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	20.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	R	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	5.60	5.60	4.00	5.60	5.60	4.10	5.60	5.60	4.10	5.60	5.60
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	3.60	3.60	2.00	3.60	3.60	2.10	3.60	3.60	2.10	3.60	3.60
g_i, Effective Green Time [s]	16	51	51	23	58	58	9	32	32	8	31	31
g / C, Green / Cycle	0.12	0.38	0.38	0.18	0.44	0.44	0.07	0.24	0.24	0.06	0.23	0.23
(v / s)_i Volume / Saturation Flow Rate	0.10	0.17	0.14	0.15	0.36	0.17	0.05	0.22	0.14	0.03	0.18	0.14
s, saturation flow rate [veh/h]	3476	3589	1549	3514	3589	1569	3449	3592	1516	3514	3610	1536
c, Capacity [veh/h]	411	1367	590	619	1575	689	232	855	361	211	833	354
d1, Uniform Delay [s]	57.75	30.75	29.62	53.28	32.96	25.17	61.10	49.52	45.03	60.93	47.80	45.80
k, delay calibration	0.11	0.50	0.50	0.11	0.50	0.50	0.11	0.11	0.11	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	6.14	1.06	1.74	3.73	5.20	1.60	5.50	4.77	1.58	2.51	1.48	1.74
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

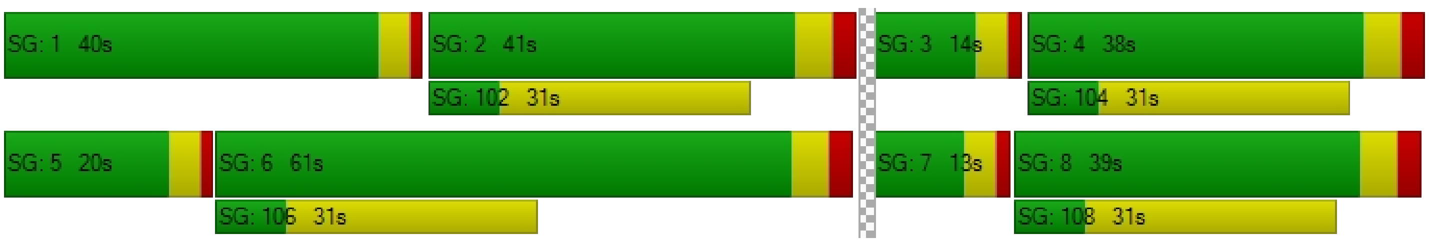
X, volume / capacity	0.88	0.45	0.36	0.86	0.83	0.38	0.78	0.92	0.60	0.58	0.76	0.61
d, Delay for Lane Group [s/veh]	63.89	31.81	31.36	57.00	38.16	26.76	66.60	54.29	46.61	63.44	49.27	47.54
Lane Group LOS	E	C	C	E	D	C	E	D	D	E	D	D
Critical Lane Group	Yes	No	No	No	Yes	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	6.29	7.48	5.22	8.93	19.24	5.85	3.16	13.22	6.43	2.07	9.92	6.50
50th-Percentile Queue Length [ft]	157.26	187.04	130.53	223.29	481.03	146.29	78.91	330.55	160.75	51.83	247.98	162.42
95th-Percentile Queue Length [veh]	10.40	11.97	8.97	13.83	26.44	9.82	5.68	19.19	10.59	3.73	15.08	10.68
95th-Percentile Queue Length [ft]	260.09	299.19	224.22	345.82	660.88	245.47	142.04	479.63	264.72	93.29	377.11	266.92

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	63.89	31.81	31.36	57.00	38.16	26.76	66.60	54.29	46.61	63.44	49.27	47.54
Movement LOS	E	C	C	E	D	C	E	D	D	E	D	D
d_A, Approach Delay [s/veh]	41.48			41.53			54.76			50.67		
Approach LOS	D			D			D			D		
d_I, Intersection Delay [s/veh]	46.03											
Intersection LOS	D											
Intersection V/C	0.781											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 58: University Avenue and Adams Drive

Control Type:	Two-way stop	Delay (sec / veh):	3,546.1
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.000

Intersection Setup

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	270.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Adams Drive			Adams Drive		
Base Volume Input [veh/h]	11	2248	0	0	1016	32	178	0	186	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	2.40	2.00	2.00	2.50	2.00	4.00	0.00	0.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	2248	0	0	1016	32	178	0	186	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	562	0	0	254	8	45	0	47	0	0	0
Total Analysis Volume [veh/h]	11	2248	0	0	1016	32	178	0	186	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.02	0.02	0.00	0.00	0.01	0.00	7.35	0.00	0.37	0.00	0.00	0.00
d_M, Delay for Movement [s/veh]	10.45	0.00	0.00	0.00	0.00	0.00	3261.13	3546.14	3119.70	0.00	0.00	0.00
Movement LOS	B	A			A	A	F	F	F			
95th-Percentile Queue Length [veh]	0.05	0.00	0.00	0.00	0.00	0.00	42.79	42.79	42.79	0.00	0.00	0.00
95th-Percentile Queue Length [ft]	1.25	0.00	0.00	0.00	0.00	0.00	1069.83	1069.83	1069.83	0.00	0.00	0.00
d_A, Approach Delay [s/veh]	0.05			0.00			3188.86			0.00		
Approach LOS	A			A			F			A		
d_I, Intersection Delay [s/veh]	316.22											
Intersection LOS	F											

Intersection Level Of Service Report
Intersection 71: Chilco Street/Terminal Avenue

Control Type:	All-way stop	Delay (sec / veh):	16.5
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street		Chilco Street		Chilco Street	
Approach	Eastbound		Northwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00		25.00		25.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Chilco Street		Chilco Street		Chilco Street	
Base Volume Input [veh/h]	40	14	21	112	502	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	40	14	21	112	502	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	10	4	5	28	126	41
Total Analysis Volume [veh/h]	40	14	21	112	502	162
Pedestrian Volume [ped/h]	0		0		0	

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.28	0.64	7.32
95th-Percentile Queue Length [ft]	6.89	15.95	183.10
Approach Delay [s/veh]	9.15	8.80	18.65
Approach LOS	A	A	C
Intersection Delay [s/veh]	16.51		
Intersection LOS	C		

Intersection Level Of Service Report
Intersection 74: University Ave/O'Brien Dr

Control Type:	Signalized	Delay (sec / veh):	18.7
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.903

Intersection Setup

Name	University Avenue				O'Brien Drive	
Approach	Northbound		Southbound		Eastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	1	0
Pocket Length [ft]	90.00	100.00	100.00	100.00	45.00	100.00
Speed [mph]	25.00		25.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue				O'Brien Drive	
Base Volume Input [veh/h]	11	2052	1142	23	385	174
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	9.10	2.40	2.50	0.00	4.70	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	2052	1142	23	385	174
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	513	286	6	96	44
Total Analysis Volume [veh/h]	11	2052	1142	23	385	174
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	6		0		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	94.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Protected	Permissive
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	8	8	0	6	0
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.0	4.0	4.0	0.0	3.0	0.0
All red [s]	0.0	0.0	0.0	0.0	1.0	0.0
Split [s]	8	49	57	0	43	0
Vehicle Extension [s]	2.0	4.0	4.0	0.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00
g_i, Effective Green Time [s]	5	66	70	70	24	24
g / C, Green / Cycle	0.05	0.66	0.70	0.70	0.24	0.24
(v / s)_i Volume / Saturation Flow Rate	0.01	0.58	0.31	0.32	0.22	0.11
s, saturation flow rate [veh/h]	1659	3533	1854	1841	1728	1574
c, Capacity [veh/h]	89	2323	1294	1285	418	381
d1, Uniform Delay [s]	48.95	14.00	6.65	6.67	36.95	32.29
k, delay calibration	0.50	0.50	0.50	0.50	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.86	5.33	1.13	1.16	3.62	0.32
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.12	0.88	0.45	0.45	0.92	0.46
d, Delay for Lane Group [s/veh]	51.81	19.33	7.79	7.83	40.58	32.61
Lane Group LOS	D	B	A	A	D	C
Critical Lane Group	Yes	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	0.35	18.57	5.30	5.32	9.41	3.58
50th-Percentile Queue Length [ft]	8.63	464.25	132.46	132.98	235.20	89.57
95th-Percentile Queue Length [veh]	0.62	25.64	9.07	9.10	14.44	6.45
95th-Percentile Queue Length [ft]	15.54	640.93	226.84	227.54	360.96	161.23

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	51.81	19.33	7.81	7.83	40.58	32.61
Movement LOS	D	B	A	A	D	C
d_A, Approach Delay [s/veh]	19.50		7.81		38.10	
Approach LOS	B		A		D	
d_I, Intersection Delay [s/veh]	18.65					
Intersection LOS	B					
Intersection V/C	0.903					

Sequence

Ring 1	5	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 77: University Avenue/Donohoe Street

Control Type:	Signalized	Delay (sec / veh):	149.0
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.120

Intersection Setup

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	1	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	150.00	100.00	70.00	200.00	100.00	100.00	200.00	100.00	200.00	200.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	430	533	750	105	1025	314	11	119	216	313	777	691
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	0.00	2.00	2.00	2.00	0.00	0.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	430	533	750	105	1025	314	11	119	216	313	777	691
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	108	133	188	26	256	79	3	30	54	78	194	173
Total Analysis Volume [veh/h]	430	533	750	105	1025	314	11	119	216	313	777	691
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			46			35			0		
Bicycle Volume [bicycles/h]	5			3			3			5		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	6	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	4	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	30	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	1.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	15	43	43	9	37	0	0	16	0	0	32	0
Vehicle Extension [s]	3.0	3.0	3.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	7	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	26	26	0	20	0	0	0	0	0	19	0
I1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No	No	No	No			No			No	
Maximum Recall	No	Yes	Yes	No	Yes			No			No	
Pedestrian Recall	No	No	No	No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	C	L	C	R	L	C	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	11	39	39	5	33	33	12	12	12	28	28	28	28
g / C, Green / Cycle	0.11	0.39	0.39	0.05	0.33	0.33	0.12	0.12	0.12	0.28	0.28	0.28	0.28
(v / s)_i Volume / Saturation Flow Rate	0.14	0.17	0.53	0.07	0.40	0.42	0.01	0.07	0.15	0.19	0.37	0.32	0.35
s, saturation flow rate [veh/h]	3101	3192	1404	1597	1710	1537	1597	1676	1428	1629	1676	1278	1273
c, Capacity [veh/h]	341	1245	547	80	564	507	192	201	171	456	469	358	356
d1, Uniform Delay [s]	44.50	22.33	30.50	47.50	33.50	33.50	38.99	41.68	44.00	32.09	36.00	36.00	36.00
k, delay calibration	0.13	0.50	0.50	0.45	0.50	0.50	0.11	0.11	0.50	0.22	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	123.82	1.08	177.84	201.74	115.96	139.68	0.12	2.90	155.54	3.68	157.2	92.55	128.0
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

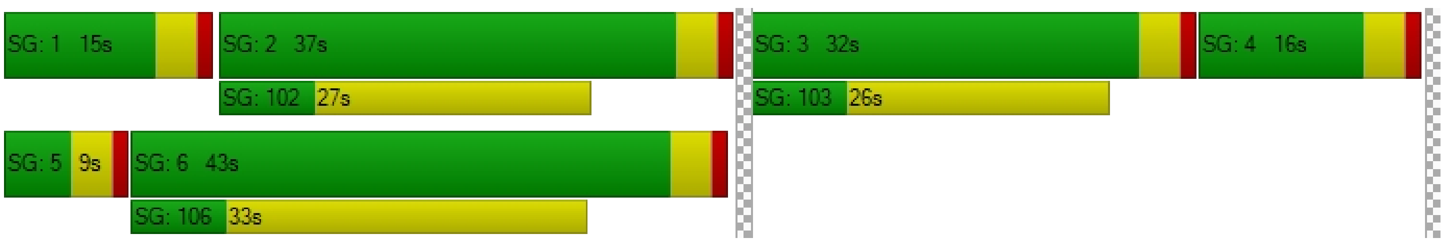
X, volume / capacity	1.26	0.43	1.37	1.32	1.22	1.28	0.06	0.59	1.26	0.69	1.32	1.14	1.24
d, Delay for Lane Group [s/veh]	168.32	23.41	208.34	249.24	149.46	173.18	39.11	44.57	199.54	35.76	193.2	128.5	164.0
Lane Group LOS	F	C	F	F	F	F	D	D	F	D	F	F	F
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	10.05	4.68	39.67	6.45	31.42	31.59	0.25	2.92	11.60	7.10	31.66	17.70	21.15
50th-Percentile Queue Length [ft]	251.25	117.11	991.64	161.22	785.56	789.77	6.13	73.09	290.05	177.4	791.5	442.5	528.8
95th-Percentile Queue Length [veh]	16.58	8.23	60.26	11.37	45.93	47.12	0.44	5.26	18.77	11.47	47.49	26.56	32.22
95th-Percentile Queue Length [ft]	414.51	205.85	1506.56	284.30	1148.33	1178.04	11.04	131.56	469.23	286.6	1187.	664.1	805.6

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	168.32	23.41	208.34	249.24	157.20	173.18	39.11	44.57	199.54	35.76	180.03	154.21
Movement LOS	F	C	F	F	F	F	D	D	F	D	F	F
d_A, Approach Delay [s/veh]	140.75			167.37			141.14			143.48		
Approach LOS	F			F			F			F		
d_I, Intersection Delay [s/veh]	148.97											
Intersection LOS	F											
Intersection V/C	1.120											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 88: Valparaiso Ave/ University Dr

Control Type:	Signalized	Delay (sec / veh):	25.6
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.751

Intersection Setup

Name	Valparaiso Ave						University Drive (North)					
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00	35.00	100.00	100.00
Speed [mph]	35.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

volumes

Name	Valparaiso Ave						University Drive (North)					
Base Volume Input [veh/h]	25	478	107	50	520	33	271	36	85	45	41	72
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.90	0.00	0.00	1.80	0.00	0.50	8.30	1.80	0.00	7.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	25	478	107	50	520	33	271	36	85	45	41	72
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	6	120	27	13	130	8	68	9	21	11	10	18
Total Analysis Volume [veh/h]	25	478	107	50	520	33	271	36	85	45	41	72
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			11		
Bicycle Volume [bicycles/h]	11			7			1			8		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	4.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	25	30	0	25	30	0	0	30	0	0	30	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0	0	0	0	0	0	0
Vehicle Extension [s]	3.0	5.0	0.0	3.0	5.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	14	0	0	0	0	0	0	0	0	13	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	L	C	C	L	C
L, Total Lost Time per Cycle [s]	5.00	5.00	5.00	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	3.00	0.00	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	32	25	32	26	27	27	27
g / C, Green / Cycle	0.47	0.37	0.47	0.39	0.40	0.40	0.40
(v / s)_i Volume / Saturation Flow Rate	0.03	0.33	0.05	0.30	0.36	0.03	0.07
s, saturation flow rate [veh/h]	973	1794	979	1843	1076	1291	1562
c, Capacity [veh/h]	389	673	364	717	517	122	620
d1, Uniform Delay [s]	12.06	19.66	13.11	18.10	21.63	33.77	13.29
k, delay calibration	0.23	0.32	0.11	0.29	0.32	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.15	9.87	0.17	4.77	6.61	1.85	0.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.06	0.87	0.14	0.77	0.76	0.37	0.18
d, Delay for Lane Group [s/veh]	12.20	29.53	13.28	22.87	28.24	35.62	13.43
Lane Group LOS	B	C	B	C	C	D	B
Critical Lane Group	No	Yes	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	0.19	9.36	0.37	7.58	6.53	0.79	1.08
50th-Percentile Queue Length [ft]	4.75	233.90	9.25	189.51	163.21	19.73	27.01
95th-Percentile Queue Length [veh]	0.34	14.37	0.67	12.10	10.72	1.42	1.94
95th-Percentile Queue Length [ft]	8.54	359.31	16.65	302.39	267.97	35.52	48.61

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	12.20	29.53	29.53	13.28	22.87	22.87	28.24	28.24	28.24	35.62	13.43	13.43
Movement LOS	B	C	C	B	C	C	C	C	C	D	B	B
d_A, Approach Delay [s/veh]	28.82			22.07			28.24			19.75		
Approach LOS	C			C			C			B		
d_I, Intersection Delay [s/veh]	25.57											
Intersection LOS	C											
Intersection V/C	0.751											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 103: Addison Wesley/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	15.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.690

Intersection Setup

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	230.00	100.00	230.00	240.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	Addsion Wesley			Addison Wesley			Sand Hill Rd			Sand Hill Rd		
Base Volume Input [veh/h]	209	3	108	19	3	66	21	919	108	71	1804	16
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.50	33.30	3.70	5.30	0.00	0.00	11.10	1.50	3.20	7.20	1.40	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	209	3	108	19	3	66	21	919	108	71	1804	16
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	52	1	27	5	1	17	5	230	27	18	451	4
Total Analysis Volume [veh/h]	209	3	108	19	3	66	21	919	108	71	1804	16
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			3		
Bicycle Volume [bicycles/h]	1			0			17			19		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	60.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	8	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lag	-	-	Lead	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	30	0	0	30	0	30	60	0	30	60	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	13	0	0	13	0	12	52	0	12	52	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	3.0	0.0	3.0	6.0	0.0	2.0	6.0	0.0
Walk [s]	0	7	0	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	30	0	0	0	0	0	24	0	0	19	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	R	L	C	L	C	R	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	10	10	10	7	7	4	57	57	7	61	61
g / C, Green / Cycle	0.12	0.12	0.12	0.08	0.08	0.04	0.64	0.64	0.08	0.67	0.67
(v / s)_i Volume / Saturation Flow Rate	0.07	0.07	0.07	0.01	0.04	0.01	0.26	0.07	0.04	0.49	0.49
s, saturation flow rate [veh/h]	1801	1360	1524	1718	1626	1629	3564	1518	1688	1874	1867
c, Capacity [veh/h]	209	158	177	142	135	68	2267	966	129	1257	1252
d1, Uniform Delay [s]	37.80	37.80	37.95	38.41	39.67	42.00	8.06	6.44	40.21	9.53	9.56
k, delay calibration	0.10	0.10	0.12	0.11	0.11	0.11	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	2.39	3.15	3.61	0.42	3.00	2.53	0.54	0.23	1.37	3.66	3.71
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

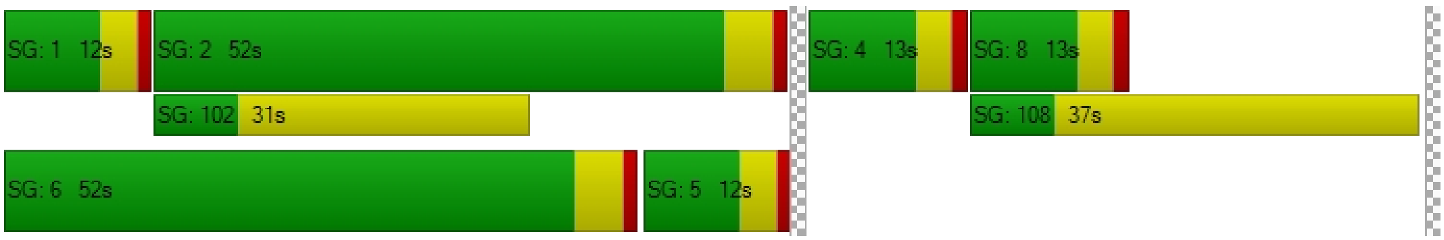
X, volume / capacity	0.58	0.58	0.61	0.13	0.51	0.31	0.41	0.11	0.55	0.72	0.73
d, Delay for Lane Group [s/veh]	40.19	40.95	41.56	38.83	42.67	44.53	8.60	6.67	41.58	13.18	13.27
Lane Group LOS	D	D	D	D	D	D	A	A	D	B	B
Critical Lane Group	No	No	Yes	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	2.66	2.04	2.44	0.41	1.58	0.49	3.73	0.73	1.52	9.93	9.97
50th-Percentile Queue Length [ft]	66.50	51.04	61.01	10.18	39.42	12.19	93.23	18.28	37.94	248.15	249.15
95th-Percentile Queue Length [veh]	4.79	3.67	4.39	0.73	2.84	0.88	6.71	1.32	2.73	15.09	15.14
95th-Percentile Queue Length [ft]	119.69	91.87	109.83	18.32	70.96	21.94	167.81	32.91	68.29	377.32	378.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	40.51	40.95	41.56	38.83	42.67	42.67	44.53	8.60	6.67	41.58	13.23	13.27
Movement LOS	D	D	D	D	D	D	D	A	A	D	B	B
d_A, Approach Delay [s/veh]	40.87			41.84			9.12			14.29		
Approach LOS	D			D			A			B		
d_I, Intersection Delay [s/veh]	15.94											
Intersection LOS	B											
Intersection V/C	0.690											

Sequence

Ring 1	1	2	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 107: Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd

Control Type:	Signalized	Delay (sec / veh):	48.3
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.771

Intersection Setup

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Approach	Southbound		Westbound		Northeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Left	Right	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0
Pocket Length [ft]	210.00	100.00	300.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	Santa Cruz Avenue		Junipero Serra Blvd		Alpine Road	
Base Volume Input [veh/h]	446	763	441	415	546	102
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.30	1.10	0.00	0.80
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	446	763	441	415	546	102
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	112	191	110	104	137	26
Total Analysis Volume [veh/h]	446	763	441	415	546	102
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	29		41		20	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	136
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Split	Split	Split	Split	Split	Split
Signal group	0	4	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	-	-	Lead	-	-	-
Minimum Green [s]	0	10	7	0	8	0
Maximum Green [s]	0	40	30	0	50	0
Amber [s]	0.0	3.6	3.1	0.0	3.9	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	79	23	0	34	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.6	2.1	0.0	2.9	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R	C	R
L, Total Lost Time per Cycle [s]	4.60	4.60	4.60	4.10	4.10	4.90	4.90
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.60	2.60	2.60	2.10	2.10	2.90	2.90
g_i, Effective Green Time [s]	38	38	38	58	58	26	26
g / C, Green / Cycle	0.28	0.28	0.28	0.43	0.43	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.25	0.25	0.25	0.27	0.30	0.17	0.07
s, saturation flow rate [veh/h]	1629	1701	1556	1624	1390	3256	1392
c, Capacity [veh/h]	458	479	438	691	591	629	269
d1, Uniform Delay [s]	46.68	46.64	46.63	30.83	32.02	53.15	47.74
k, delay calibration	0.11	0.11	0.11	0.50	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.68	5.36	5.80	4.48	6.83	3.80	0.88
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.88	0.88	0.88	0.64	0.70	0.87	0.38
d, Delay for Lane Group [s/veh]	52.35	52.00	52.44	35.31	38.85	56.96	48.62
Lane Group LOS	D	D	D	D	D	E	D
Critical Lane Group	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	13.74	14.27	13.10	12.25	12.25	9.39	3.10
50th-Percentile Queue Length [ft]	343.49	356.67	327.43	306.26	306.35	234.67	77.60
95th-Percentile Queue Length [veh]	19.82	20.46	19.03	17.99	17.99	14.41	5.59
95th-Percentile Queue Length [ft]	495.46	511.53	475.81	449.76	449.87	360.29	139.69

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	52.32	52.22	35.31	38.85	56.96	48.62
Movement LOS	D	D	D	D	E	D
d_A, Approach Delay [s/veh]	52.26		37.03		55.64	
Approach LOS	D		D		E	
d_I, Intersection Delay [s/veh]	48.26					
Intersection LOS	D					
Intersection V/C	0.771					

Sequence

Ring 1	-	6	4	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 110: Marsh Road/101 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	13.1
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.896

Intersection Setup

Name	Marsh Road		Marsh Road		101 NB Ramps	
Approach	Northbound		Southbound		Northwestbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	1
Pocket Length [ft]	100.00	100.00	100.00	100.00	500.00	360.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		Yes		Yes	

volumes

Name	Marsh Road		Marsh Road		101 NB Ramps	
Base Volume Input [veh/h]	2269	0	0	869	544	258
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.40	0.00	0.00	3.00	5.10	12.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2269	0	0	869	544	258
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	567	0	0	217	136	65
Total Analysis Volume [veh/h]	2269	0	0	869	544	258
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	1		2		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	80
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	76.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	7.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Protected	Overlap
Signal group	2	0	0	6	8	1
Auxiliary Signal Groups						1,6,8
Lead / Lag	-	-	-	-	Lag	-
Minimum Green [s]	8	0	0	8	6	4
Maximum Green [s]	0	0	0	0	0	0
Amber [s]	3.6	0.0	0.0	3.6	3.2	3.2
All red [s]	0.5	0.0	0.0	0.5	1.0	0.0
Split [s]	55	0	0	55	25	17
Vehicle Extension [s]	3.0	0.0	0.0	3.0	2.0	2.0
Walk [s]	7	0	0	0	5	0
Pedestrian Clearance [s]	12	0	0	0	15	0
l1, Start-Up Lost Time [s]	2.0	0.0	0.0	2.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	Yes			Yes	No	No
Maximum Recall	No			No	No	No
Pedestrian Recall	No			No	No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	0.0	0.0	20.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	58	58	18	78
g / C, Green / Cycle	0.73	0.73	0.22	0.97
(v / s)_i Volume / Saturation Flow Rate	0.65	0.25	0.16	0.18
s, saturation flow rate [veh/h]	3465	3512	3344	1441
c, Capacity [veh/h]	2530	2565	735	1365
d1, Uniform Delay [s]	8.42	3.86	29.04	0.13
k, delay calibration	0.50	0.50	0.04	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	5.52	0.36	0.56	0.31
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.90	0.34	0.74	0.19
d, Delay for Lane Group [s/veh]	13.94	4.22	29.59	0.44
Lane Group LOS	B	A	C	A
Critical Lane Group	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	12.18	1.93	4.74	0.12
50th-Percentile Queue Length [ft]	304.55	48.18	118.61	2.91
95th-Percentile Queue Length [veh]	17.91	3.47	8.32	0.21
95th-Percentile Queue Length [ft]	447.66	86.72	207.91	5.24

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.94	0.00	0.00	4.22	29.59	0.44
Movement LOS	B			A	C	A
d_A, Approach Delay [s/veh]	13.94		4.22		20.22	
Approach LOS	B		A		C	
d_I, Intersection Delay [s/veh]	13.07					
Intersection LOS	B					
Intersection V/C	0.896					

Sequence

Ring 1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	6	-	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report

Intersection 111: University Avenue/Woodland Avenue

Control Type:	Signalized	Delay (sec / veh):	53.8
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.798

Intersection Setup

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	1	0	0	0
Pocket Length [ft]	170.00	100.00	100.00	220.00	100.00	100.00	100.00	100.00	40.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			No			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Woodland Avenue			Woodland Avenue		
Base Volume Input [veh/h]	28	834	18	278	802	421	13	73	318	439	92	49
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	834	18	278	802	421	13	73	318	439	92	49
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	209	5	70	201	105	3	18	80	110	23	12
Total Analysis Volume [veh/h]	28	834	18	278	802	421	13	73	318	439	92	49
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	58			0			6			37		
Bicycle Volume [bicycles/h]	10			7			4			6		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	7	0	0	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	8	26	0	19	37	0	0	24	0	0	31	0
Vehicle Extension [s]	2.0	3.0	0.0	2.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	15	0	0	15	0	0	0	0	0	20	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	C	R	L	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	2	32	32	15	45	45	20	20	17	17
g / C, Green / Cycle	0.02	0.32	0.32	0.15	0.45	0.45	0.20	0.20	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.02	0.26	0.26	0.17	0.25	0.32	0.05	0.23	0.14	0.09
s, saturation flow rate [veh/h]	1597	1676	1661	1597	3192	1331	1664	1402	3101	1502
c, Capacity [veh/h]	35	535	530	239	1427	595	333	280	530	257
d1, Uniform Delay [s]	48.69	31.13	31.16	42.50	20.42	22.36	33.74	40.00	40.02	37.92
k, delay calibration	0.04	0.50	0.50	0.50	0.50	0.50	0.11	0.50	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	14.28	11.88	12.08	108.52	1.61	6.96	0.41	95.00	3.37	1.82
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.80	0.80	0.80	1.16	0.56	0.71	0.26	1.13	0.83	0.55
d, Delay for Lane Group [s/veh]	62.97	43.01	43.24	151.02	22.03	29.32	34.15	135.00	43.40	39.74
Lane Group LOS	E	D	D	F	C	C	C	F	D	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	0.83	10.96	10.91	13.06	6.99	8.83	1.79	14.17	5.40	3.27
50th-Percentile Queue Length [ft]	20.78	274.05	272.87	326.49	174.83	220.63	44.78	354.34	135.03	81.64
95th-Percentile Queue Length [veh]	1.50	16.39	16.33	20.28	11.33	13.70	3.22	21.68	9.21	5.88
95th-Percentile Queue Length [ft]	37.40	409.79	408.32	507.09	283.26	342.42	80.61	541.88	230.31	146.96

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	62.97	43.12	43.24	151.02	22.03	29.32	34.15	34.15	135.00	43.40	39.74	39.74
Movement LOS	E	D	D	F	C	C	C	C	F	D	D	D
d_A, Approach Delay [s/veh]	43.76			47.96			113.54			42.51		
Approach LOS	D			D			F			D		
d_I, Intersection Delay [s/veh]	53.80											
Intersection LOS	D											
Intersection V/C	0.798											

Sequence

Ring 1	1	2	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 131: Chilco Street/Hamilton Avenue

Control Type:	All-way stop	Delay (sec / veh):	48.7
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			25.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Hamilton Avenue			Hamilton Avenue		
Base Volume Input [veh/h]	21	71	20	102	582	52	22	127	22	15	34	99
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	21	71	20	102	582	52	22	127	22	15	34	99
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	5	18	5	26	146	13	6	32	6	4	9	25
Total Analysis Volume [veh/h]	21	71	20	102	582	52	22	127	22	15	34	99
Pedestrian Volume [ped/h]	3			4			2			5		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.67	19.05	1.26	0.98
95th-Percentile Queue Length [ft]	16.84	476.36	31.53	24.60
Approach Delay [s/veh]	10.29	70.66	12.05	11.11
Approach LOS	B	F	B	B
Intersection Delay [s/veh]	48.72			
Intersection LOS	E			

Intersection Level Of Service Report
Intersection 132: Oak Ave/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	6.5
Analysis Method:	HCM 2000	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.578

Intersection Setup

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	95.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		No		Yes	

volumes

Name	Sand Hill Road		Sand Hill Road		Oak Avenue	
Base Volume Input [veh/h]	0	912	1605	101	42	127
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	1.10	0.80	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	912	1605	101	42	127
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	228	401	25	11	32
Total Analysis Volume [veh/h]	0	912	1605	101	42	127
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	23		0		2	
Bicycle Volume [bicycles/h]	16		34		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	89
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	3.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Split	Split
Signal group	0	2	6	0	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lead	-
Minimum Green [s]	0	8	8	0	4	0
Maximum Green [s]	0	64	64	0	32	0
Amber [s]	0.0	3.6	3.6	0.0	3.1	0.0
All red [s]	0.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	73	73	0	16	0
Vehicle Extension [s]	0.0	3.0	3.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	0.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.6	0.6	0.0	2.1	0.0
Minimum Recall		No	No		No	
Maximum Recall		No	No		No	
Pedestrian Recall		No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	R
L, Total Lost Time per Cycle [s]	2.60	2.60	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.60	0.60	2.10	2.10
g_i, Effective Green Time [s]	70	70	12	12
g / C, Green / Cycle	0.79	0.79	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.25	0.48	0.02	0.08
Total Saturation Flow Adjustment	0.94	0.94	0.95	0.85
s, saturation flow rate [veh/h]	3578	3557	1805	1615
c, Capacity [veh/h]	2830	2814	241	216
d1, Uniform Delay [s]	2.61	3.73	34.19	36.25
k, delay calibration	0.50	0.50	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.30	0.98	1.56	11.22
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.32	0.61	0.17	0.59
d, Delay for Lane Group [s/veh]	2.91	4.71	35.76	47.47
Lane Group LOS	A	A	D	D
Critical Lane Group	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	4.03	11.12	1.01	3.48
50th-Percentile Queue Length [ft]	100.71	278.05	25.22	87.01
95th-Percentile Queue Length [veh]	8.25	19.00	2.44	7.30
95th-Percentile Queue Length [ft]	206.13	474.95	60.97	182.59

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	2.91	4.71	4.71	35.76	47.47
Movement LOS		A	A	A	D	D
d_A, Approach Delay [s/veh]	2.91		4.71		44.56	
Approach LOS	A		A		D	
d_I, Intersection Delay [s/veh]	6.54					
Intersection LOS	A					
Intersection V/C	0.578					

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 156: Saga Ln/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	42.1
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	50.579

Intersection Setup

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	230.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Saga Ln			Saga Ln			Sand Hill Road			Sand Hill Road		
Base Volume Input [veh/h]	108	0	113	90	0	103	74	1077	7	28	1307	20
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.60	0.00	2.70	2.20	0.00	1.90	3.10	0.50	0.00	14.30	0.50	5.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	0	113	90	0	103	74	1077	7	28	1307	20
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	0	28	23	0	26	19	269	2	7	327	5
Total Analysis Volume [veh/h]	108	0	113	90	0	103	74	1077	7	28	1307	20
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	3			16			3			0		
Bicycle Volume [bicycles/h]	12			0			22			22		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	20.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	0	12	0	0	12	0	4	10	0	6	10	0
Maximum Green [s]	0	25	0	0	25	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	42	0	0	42	0	8	32	0	16	40	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	5.0	0.0	3.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	27	0	0	27	0	0	20	0	0	15	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	R	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	40	40	40	40	6	39	39	5	38	38
g / C, Green / Cycle	0.44	0.44	0.44	0.44	0.07	0.43	0.43	0.06	0.42	0.42
(v / s)_i Volume / Saturation Flow Rate	50.18	0.07	42.65	0.07	0.04	0.29	0.29	0.02	0.35	0.35
s, saturation flow rate [veh/h]	2	1544	2	1582	1755	1891	1885	1583	1891	1876
c, Capacity [veh/h]	81	684	81	701	117	821	819	88	801	795
d1, Uniform Delay [s]	45.00	15.06	45.00	14.93	40.92	20.19	20.20	40.84	23.07	23.11
k, delay calibration	0.50	0.11	0.50	0.11	0.46	0.50	0.50	0.11	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	213.01	0.11	133.67	0.10	21.52	4.16	4.18	2.03	9.77	9.98
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.33	0.17	1.11	0.15	0.63	0.66	0.66	0.32	0.83	0.83
d, Delay for Lane Group [s/veh]	258.01	15.17	178.67	15.02	62.45	24.35	24.37	42.87	32.84	33.08
Lane Group LOS	F	B	F	B	E	C	C	D	C	C
Critical Lane Group	Yes	No	No	No	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	6.60	1.39	4.81	1.26	2.24	9.18	9.17	0.64	14.01	14.01
50th-Percentile Queue Length [ft]	164.97	34.82	120.33	31.44	56.11	229.53	229.18	16.01	350.37	350.26
95th-Percentile Queue Length [veh]	11.88	2.51	8.66	2.26	4.04	14.15	14.13	1.15	20.15	20.15
95th-Percentile Queue Length [ft]	296.94	62.67	216.60	56.60	101.00	353.76	353.32	28.82	503.86	503.73

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	258.01	258.01	15.17	178.67	178.67	15.02	62.45	24.36	24.37	42.87	32.96	33.08
Movement LOS	F	F	B	F	F	B	E	C	C	D	C	C
d_A, Approach Delay [s/veh]	133.84			91.33			26.79			33.17		
Approach LOS	F			F			C			C		
d_I, Intersection Delay [s/veh]	42.08											
Intersection LOS	D											
Intersection V/C	50.579											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 157: Branner Dr/Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	5.5
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.467

Intersection Setup

Name	Branner Drive						Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	╋			╋			┓║┣			┓║┣		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	160.00	100.00	100.00	155.00	100.00	100.00
Speed [mph]	25.00			25.00			40.00			40.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Branner Drive						Sand Hill Road					
Base Volume Input [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	5.00	0.00	2.30	4.50	1.10	0.00	5.90	2.00	4.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	0	4	5	0	11	6	269	2	4	330	6
Total Analysis Volume [veh/h]	2	0	17	20	0	43	22	1076	7	17	1321	24
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	4			2			0			5		
Bicycle Volume [bicycles/h]	2			0			35			15		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	58.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	0	4	0	0	4	0	5	2	0	1	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	Lead	-	-	Lag	-	-
Minimum Green [s]	0	6	0	0	6	0	4	10	0	4	10	0
Maximum Green [s]	0	15	0	0	15	0	20	45	0	20	45	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	0.0
Split [s]	0	39	0	0	39	0	8	43	0	8	43	0
Vehicle Extension [s]	0.0	2.9	0.0	0.0	2.9	0.0	2.0	5.0	0.0	2.0	5.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	28	0	0	28	0	0	20	0	0	20	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No		No	Yes		No	Yes	
Maximum Recall		No			No		No	No		No	No	
Pedestrian Recall		No			No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	20.0	20.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	L	C	C	L	C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	9	9	4	71	71	3	71	71
g / C, Green / Cycle	0.10	0.10	0.04	0.79	0.79	0.04	0.79	0.79
(v / s)_i Volume / Saturation Flow Rate	0.01	0.04	0.01	0.29	0.29	0.01	0.36	0.36
s, saturation flow rate [veh/h]	1578	1595	1732	1879	1874	1709	1863	1849
c, Capacity [veh/h]	204	215	74	1490	1485	67	1470	1459
d1, Uniform Delay [s]	36.78	37.74	41.79	2.72	2.72	41.97	3.13	3.14
k, delay calibration	0.10	0.10	0.04	0.50	0.50	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.19	0.72	0.83	0.69	0.69	0.73	1.03	1.04
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

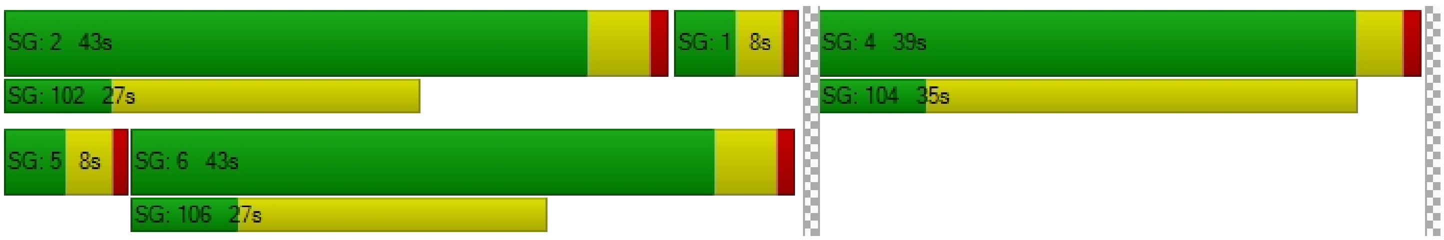
X, volume / capacity	0.09	0.29	0.30	0.36	0.36	0.25	0.46	0.46
d, Delay for Lane Group [s/veh]	36.97	38.46	42.62	3.41	3.41	42.70	4.17	4.18
Lane Group LOS	D	D	D	A	A	D	A	A
Critical Lane Group	No	Yes	Yes	No	No	No	No	Yes
50th-Percentile Queue Length [veh]	0.39	1.34	0.48	1.67	1.67	0.37	2.43	2.43
50th-Percentile Queue Length [ft]	9.79	33.49	11.91	41.75	41.69	9.23	60.81	60.65
95th-Percentile Queue Length [veh]	0.70	2.41	0.86	3.01	3.00	0.66	4.38	4.37
95th-Percentile Queue Length [ft]	17.62	60.27	21.44	75.15	75.05	16.61	109.46	109.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	36.97	36.97	36.97	38.46	38.46	38.46	42.62	3.41	3.41	42.70	4.17	4.18
Movement LOS	D	D	D	D	D	D	D	A	A	D	A	A
d_A, Approach Delay [s/veh]	36.97			38.46			4.19			4.65		
Approach LOS	D			D			A			A		
d_I, Intersection Delay [s/veh]	5.53											
Intersection LOS	A											
Intersection V/C	0.467											

Sequence

Ring 1	2	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 162: Sharon Park Dr/ Sand Hill Rd

Control Type:	Signalized	Delay (sec / veh):	47.9
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.449

Intersection Setup

Name				Sand Hill Road						Sharon Park Drive		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	1
Pocket Length [ft]	250.00	100.00	100.00	150.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	130.00
Speed [mph]	40.00			35.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name				Sand Hill Road						Sharon Park Drive		
Base Volume Input [veh/h]	164	916	1	17	1289	266	53	27	75	278	5	269
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.60	1.30	100.00	0.00	1.10	0.80	0.00	0.00	17.60	0.00	0.00	0.60
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	164	916	1	17	1289	266	53	27	75	278	5	269
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	229	0	4	322	67	13	7	19	70	1	67
Total Analysis Volume [veh/h]	164	916	1	17	1289	266	53	27	75	278	5	269
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			6			6			10		
Bicycle Volume [bicycles/h]	32			32			2			5		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	69.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	10.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	2	0	1	6	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	10	0	6	10	0	0	6	0	0	6	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	3.0	4.0	0.0	3.0	4.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	16	41	0	14	39	0	0	35	0	0	35	0
Vehicle Extension [s]	3.0	7.0	0.0	3.0	7.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	19	0	0	19	0	0	27	0	0	27	0
l1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall	No	Yes		No	Yes			No			No	
Maximum Recall	No	No		No	No			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	0.0	20.0	20.0	0.0	0.0	20.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.50	2.50	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.50	0.50	0.00	0.00	0.00
g_i, Effective Green Time [s]	12	47	47	4	39	39	33	33	33
g / C, Green / Cycle	0.13	0.52	0.52	0.05	0.43	0.43	0.37	0.37	0.37
(v / s)_i Volume / Saturation Flow Rate	0.09	0.24	0.24	0.01	0.42	0.44	0.76	0.43	0.17
s, saturation flow rate [veh/h]	1799	1876	1875	1810	1879	1729	205	659	1581
c, Capacity [veh/h]	235	981	980	82	812	747	129	320	577
d1, Uniform Delay [s]	37.42	13.55	13.55	41.39	25.07	25.54	27.16	31.04	21.85
k, delay calibration	0.25	0.50	0.50	0.11	0.50	0.50	0.50	0.50	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.44	1.60	1.60	1.24	26.13	38.38	144.68	27.95	0.59
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

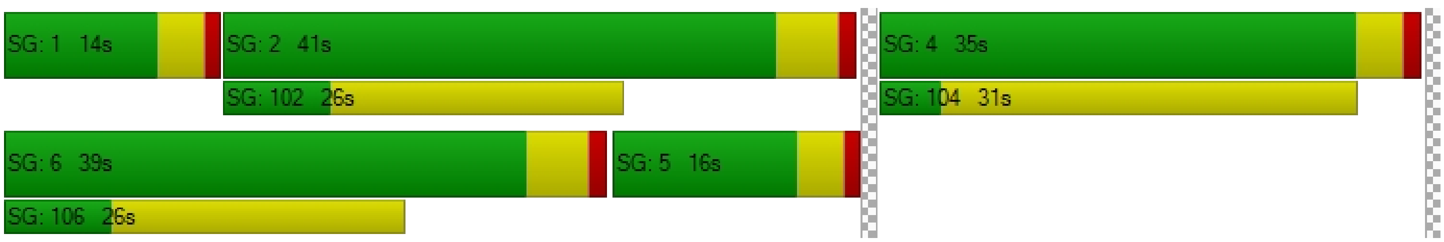
X, volume / capacity	0.70	0.47	0.47	0.21	0.98	1.02	1.20	0.88	0.47
d, Delay for Lane Group [s/veh]	45.86	15.15	15.15	42.63	51.21	63.92	171.85	58.99	22.43
Lane Group LOS	D	B	B	D	D	F	F	E	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No
50th-Percentile Queue Length [veh]	3.87	5.66	5.66	0.38	21.10	22.57	7.00	8.81	4.37
50th-Percentile Queue Length [ft]	96.72	141.50	141.46	9.61	527.48	564.36	175.06	220.16	109.24
95th-Percentile Queue Length [veh]	6.96	9.56	9.56	0.69	28.63	30.85	12.48	13.67	7.80
95th-Percentile Queue Length [ft]	174.10	239.04	238.99	17.30	715.81	771.14	312.10	341.82	194.95

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	45.86	15.15	15.15	42.63	56.11	63.92	171.85	171.85	171.85	58.99	58.99	22.43
Movement LOS	D	B	B	D	E	E	F	F	F	E	E	C
d_A, Approach Delay [s/veh]	19.81			57.29			171.85			41.17		
Approach LOS	B			E			F			D		
d_I, Intersection Delay [s/veh]	47.87											
Intersection LOS	D											
Intersection V/C	1.449											

Sequence

Ring 1	1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 163: Bayfront Expy/Marsh Rd

Control Type:	Signalized	Delay (sec / veh):	29.0
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.848

Intersection Setup

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			No		

volumes

Name				Marsh Road			Haven Avenue			Bayfront Expressway		
Base Volume Input [veh/h]	125	31	2131	16	25	3	8	477	136	2356	63	13
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	19.20	0.00	2.90	0.00	0.00	0.00	0.00	0.40	2.20	2.90	14.30	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	125	31	2131	16	25	3	8	477	136	2356	63	13
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	8	533	4	6	1	2	119	34	589	16	3
Total Analysis Volume [veh/h]	125	31	2131	16	25	3	8	477	136	2356	63	13
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			2			0			0		
Bicycle Volume [bicycles/h]	0			2			0			2		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	200
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	55.0
Offset Reference	LagCoordGreen
Permissive Mode	SingleBand
Lost time [s]	12.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Permiss	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	2	3	3	6	4	6	4	1	4	8	2	8
Auxiliary Signal Groups			2,3									
Lead / Lag	Lag	-	-	-	-	-	Lag	-	-	-	-	-
Minimum Green [s]	10	6	6	0	4	0	4	12	4	0	10	0
Maximum Green [s]	0	0	0	0	0	0	0	0	0	0	0	0
Amber [s]	4.7	3.6	3.6	0.0	3.6	0.0	3.6	3.6	3.6	0.0	4.7	0.0
All red [s]	1.0	1.0	1.0	0.0	0.5	0.0	0.5	0.0	0.5	0.0	1.0	0.0
Split [s]	108	14	14	0	32	0	32	46	32	0	108	0
Vehicle Extension [s]	4.5	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	4.5	0.0
Walk [s]	5	0	0	0	5	0	5	5	5	0	5	0
Pedestrian Clearance [s]	16	0	0	0	22	0	22	26	22	0	16	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No		No			No			Yes	
Maximum Recall		No	No		No			No			No	
Pedestrian Recall		No	No		No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	C	C	C	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
g_i, Effective Green Time [s]	22	162	8	8	34	34	34	128	128
g / C, Green / Cycle	0.11	0.81	0.04	0.04	0.17	0.17	0.17	0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.09	0.51	0.02	0.01	0.12	0.15	0.09	0.46	0.05
s, saturation flow rate [veh/h]	1827	4167	1269	1681	1889	1722	1580	5123	1606
c, Capacity [veh/h]	205	3304	80	63	319	291	267	3287	1031
d1, Uniform Delay [s]	86.21	8.79	94.77	93.93	78.43	81.41	75.61	23.77	13.47
k, delay calibration	0.38	0.50	0.04	0.04	0.10	0.24	0.04	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	18.26	0.98	0.63	1.34	2.54	18.18	0.56	1.37	0.14
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

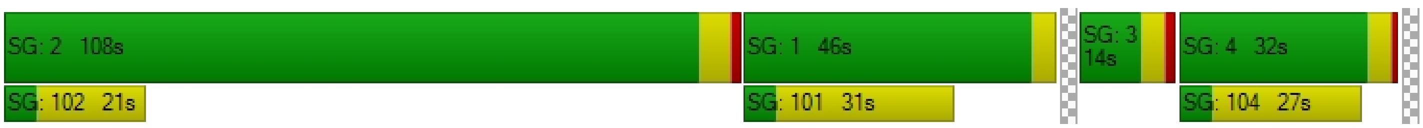
X, volume / capacity	0.76	0.65	0.26	0.37	0.70	0.90	0.51	0.72	0.07
d, Delay for Lane Group [s/veh]	104.47	9.77	95.40	95.28	80.97	99.60	76.17	25.14	13.61
Lane Group LOS	F	A	F	F	F	F	E	C	B
Critical Lane Group	No	Yes	Yes	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	8.96	12.84	1.08	1.22	11.26	14.75	6.48	25.14	1.40
50th-Percentile Queue Length [ft]	224.09	321.12	26.93	30.61	281.60	368.71	162.11	628.51	34.90
95th-Percentile Queue Length [veh]	13.87	18.72	1.94	2.20	16.77	21.05	10.66	33.36	2.51
95th-Percentile Queue Length [ft]	346.84	468.06	48.47	55.10	419.20	526.16	266.52	834.09	62.83

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	104.47	104.47	9.77	95.40	95.30	95.28	80.97	91.14	76.17	25.14	13.61	13.61
Movement LOS	F	F	A	F	F	F	F	F	E	C	B	B
d_A, Approach Delay [s/veh]	16.23			95.33			87.73			24.78		
Approach LOS	B			F			F			C		
d_I, Intersection Delay [s/veh]	28.99											
Intersection LOS	C											
Intersection V/C	0.848											

Sequence

Ring 1	-	2	1	3	4	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 181: Santa Cruz Ave/Elder Ave

Control Type:	Signalized	Delay (sec / veh):	7.9
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.643

Intersection Setup

Name	Santa Cruz Avenue				Elder Ave	
Approach	Northeastbound		Southwestbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	1
Pocket Length [ft]	60.00	100.00	100.00	100.00	100.00	105.00
Speed [mph]	25.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Santa Cruz Avenue				Elder Ave	
Base Volume Input [veh/h]	71	775	734	90	49	44
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	1.50	0.20	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	71	775	734	90	49	44
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	194	184	23	12	11
Total Analysis Volume [veh/h]	71	775	734	90	49	44
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		2		12	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	8.00

Phasing & Timing

Control Type	Protected	Permissive	Permissive	Permissive	Split	Split
Signal group	5	2	6	0	8	0
Auxiliary Signal Groups						
Lead / Lag	Lead	-	-	-	Lead	-
Minimum Green [s]	4	10	10	0	4	0
Maximum Green [s]	20	60	40	0	20	0
Amber [s]	3.1	3.5	3.5	0.0	3.1	0.0
All red [s]	1.0	1.0	1.0	0.0	1.0	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	4.0	4.0	0.0	3.0	0.0
Walk [s]	0	0	7	0	7	0
Pedestrian Clearance [s]	0	0	14	0	13	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	2.1	2.5	2.5	0.0	2.1	0.0
Minimum Recall	No	Yes	Yes		No	
Maximum Recall	No	No	No		No	
Pedestrian Recall	No	No	No		No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	20.0	20.0	20.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	R
L, Total Lost Time per Cycle [s]	4.10	4.50	4.50	4.10	4.10
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.10	2.50	2.50	2.10	2.10
g_i, Effective Green Time [s]	2	28	21	3	3
g / C, Green / Cycle	0.06	0.71	0.55	0.07	0.07
(v / s)_i Volume / Saturation Flow Rate	0.04	0.41	0.44	0.03	0.03
s, saturation flow rate [veh/h]	1810	1872	1858	1810	1615
c, Capacity [veh/h]	101	1335	1025	119	106
d1, Uniform Delay [s]	18.04	2.73	7.01	17.43	17.44
k, delay calibration	0.11	0.15	0.15	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.66	0.57	2.16	2.27	2.57
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00

Lane Group Results

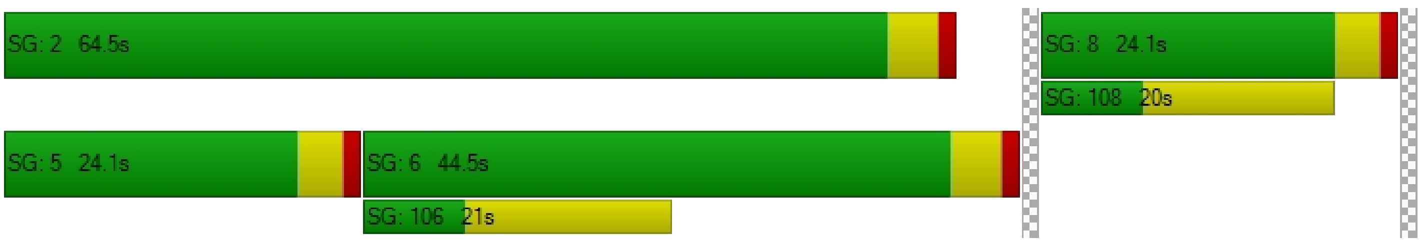
X, volume / capacity	0.70	0.58	0.80	0.41	0.41
d, Delay for Lane Group [s/veh]	26.70	3.31	9.18	19.70	20.00
Lane Group LOS	C	A	A	B	C
Critical Lane Group	Yes	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.80	0.79	3.50	0.44	0.40
50th-Percentile Queue Length [ft]	19.95	19.78	87.52	10.92	10.01
95th-Percentile Queue Length [veh]	1.44	1.42	6.30	0.79	0.72
95th-Percentile Queue Length [ft]	35.91	35.61	157.54	19.65	18.03

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.70	3.31	9.18	9.18	19.70	20.00
Movement LOS	C	A	A	A	B	C
d_A, Approach Delay [s/veh]	5.27		9.18		19.84	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	7.86					
Intersection LOS	A					
Intersection V/C	0.643					

Sequence

Ring 1	-	2	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 195: Bayfront Expy/Chilco St

Control Type:	Signalized	Delay (sec / veh):	47.5
Analysis Method:	HCM 2010	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.035

Intersection Setup

Name	Chilco Street		Bayfront Expressway (SR 84)		Bayfront Expy	
Approach	Northbound		Westbound		Southeastbound	
Lane Configuration						
Turning Movement	Left	Right	Left	Thru	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	1	0	0	1
Pocket Length [ft]	100.00	300.00	520.00	100.00	100.00	660.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chilco Street		Bayfront Expressway (SR 84)		Bayfront Expy	
Base Volume Input [veh/h]	386	576	137	1335	2416	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	5.50	3.10	21.10	4.80	3.10	1.30
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	386	576	137	1335	2416	156
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	97	144	34	334	604	39
Total Analysis Volume [veh/h]	386	576	137	1335	2416	156
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	2		11		0	
Bicycle Volume [bicycles/h]	5		1		1	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Protected	Permissive	Protected	Permissive	Permissive	Permissive
Signal group	4	0	5	2	6	0
Auxiliary Signal Groups						
Lead / Lag	Lag	-	Lead	-	-	-
Minimum Green [s]	10	0	4	10	10	0
Maximum Green [s]	36	0	20	50	50	0
Amber [s]	3.0	0.0	3.0	5.0	5.0	0.0
All red [s]	0.5	0.0	0.0	0.5	0.5	0.0
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	2.0	0.0	2.0	3.0	3.0	0.0
Walk [s]	5	0	0	5	5	0
Pedestrian Clearance [s]	38	0	0	38	38	0
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	0.0	1.0	3.5	3.5	0.0
Minimum Recall	No		No	Yes	Yes	
Maximum Recall	No		No	No	No	
Pedestrian Recall	No		No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	20.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	L	C	C	R
L, Total Lost Time per Cycle [s]	2.00	2.00	3.00	5.50	5.50	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	1.00	3.50	3.50	3.50
g_i, Effective Green Time [s]	38	38	12	65	50	50
g / C, Green / Cycle	0.35	0.35	0.11	0.59	0.46	0.46
(v / s)_i Volume / Saturation Flow Rate	0.12	0.38	0.09	0.27	0.48	0.10
s, saturation flow rate [veh/h]	3331	1528	1494	4939	5020	1558
c, Capacity [veh/h]	1152	529	161	2916	2285	709
d1, Uniform Delay [s]	26.58	35.93	48.12	12.63	29.93	18.12
k, delay calibration	0.04	0.50	0.04	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.06	65.78	4.72	0.11	28.67	0.15
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

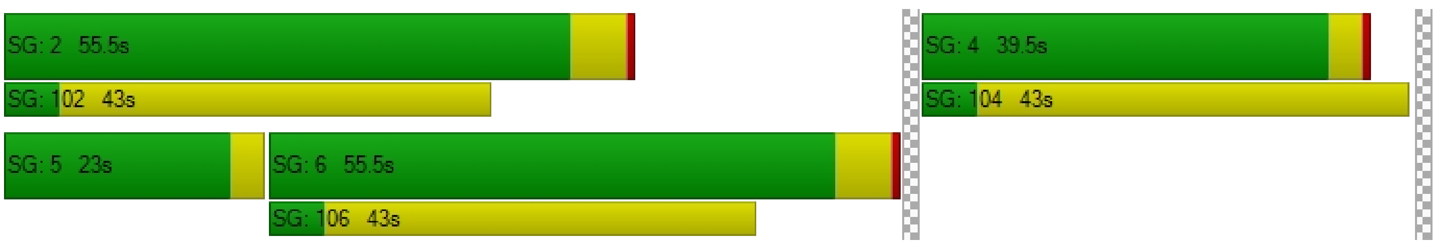
X, volume / capacity	0.34	1.09	0.85	0.46	1.06	0.22
d, Delay for Lane Group [s/veh]	26.64	101.71	52.84	12.74	58.60	18.28
Lane Group LOS	C	F	D	B	F	B
Critical Lane Group	No	Yes	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	3.74	23.45	3.88	5.89	25.26	2.41
50th-Percentile Queue Length [ft]	93.39	586.23	97.06	147.37	631.54	60.28
95th-Percentile Queue Length [veh]	6.72	33.23	6.99	9.88	34.93	4.34
95th-Percentile Queue Length [ft]	168.11	830.63	174.71	246.91	873.34	108.51

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	26.64	101.71	52.84	12.74	58.60	18.28
Movement LOS	C	F	D	B	F	B
d_A, Approach Delay [s/veh]	71.59		16.48		56.16	
Approach LOS	E		B		E	
d_I, Intersection Delay [s/veh]	47.46					
Intersection LOS	D					
Intersection V/C	1.035					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 196: Bayfront Expy/Chrysler Drive

Control Type:	Signalized	Delay (sec / veh):	18.0
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.859

Intersection Setup

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	0	1	1	0
Pocket Length [ft]	100.00	300.00	100.00	290.00	345.00	100.00
Speed [mph]	25.00		45.00		45.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chrysler Drive		Bayfront Expy		Bayfront Expy	
Base Volume Input [veh/h]	835	114	2516	167	26	1716
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.80	0.00	2.80	0.90	0.00	4.90
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	835	114	2516	167	26	1716
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	209	29	629	42	7	429
Total Analysis Volume [veh/h]	835	114	2516	167	26	1716
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		26	
Bicycle Volume [bicycles/h]	0		2		0	

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Free Running
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	9.00

Phasing & Timing

Control Type	Split	Split	Permissive	Permissive	Protected	Permissive
Signal group	4	0	6	0	5	2
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-
Minimum Green [s]	4	0	10	0	7	10
Maximum Green [s]	41	0	40	0	21	40
Amber [s]	3.0	0.0	5.0	0.0	3.0	5.0
All red [s]	0.5	0.0	0.5	0.0	0.0	0.5
Split [s]	0	0	0	0	0	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	2.0	3.0
Walk [s]	5	0	5	0	0	5
Pedestrian Clearance [s]	35	0	35	0	0	35
l1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	2.0	2.0
l2, Clearance Lost Time [s]	0.0	0.0	3.5	0.0	1.0	3.5
Minimum Recall	No		Yes		No	Yes
Maximum Recall	No		No		No	No
Pedestrian Recall	No		No		No	No
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	20.0	0.0	20.0	20.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	C	R	L	C
L, Total Lost Time per Cycle [s]	2.00	2.00	5.50	5.50	3.00	5.50
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	3.50	3.50	1.00	3.50
g_i, Effective Green Time [s]	24	24	39	39	3	45
g / C, Green / Cycle	0.31	0.31	0.51	0.51	0.04	0.59
(v / s)_i Volume / Saturation Flow Rate	0.24	0.07	0.50	0.11	0.01	0.35
s, saturation flow rate [veh/h]	3452	1575	5035	1566	1810	4934
c, Capacity [veh/h]	1084	494	2589	805	71	2927
d1, Uniform Delay [s]	23.39	19.12	17.77	9.95	35.28	9.56
k, delay calibration	0.11	0.11	0.11	0.11	0.04	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	1.19	0.24	3.96	0.13	1.17	0.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

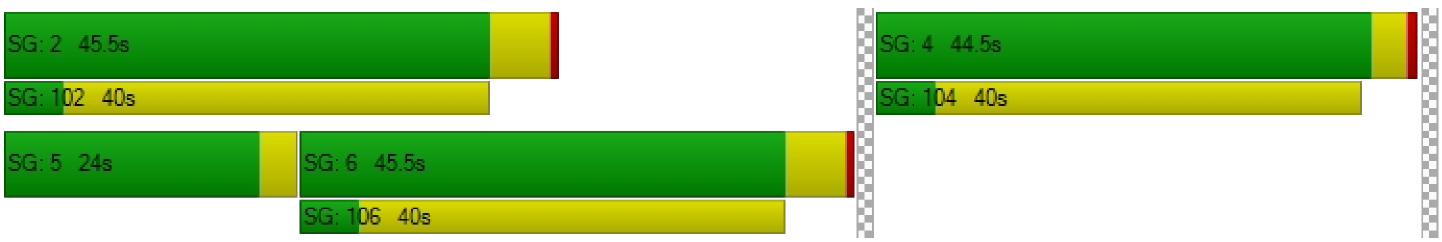
X, volume / capacity	0.77	0.23	0.97	0.21	0.37	0.59
d, Delay for Lane Group [s/veh]	24.58	19.35	21.73	10.08	36.46	9.75
Lane Group LOS	C	B	C	B	D	A
Critical Lane Group	Yes	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	6.61	1.47	11.99	1.26	0.46	4.38
50th-Percentile Queue Length [ft]	165.20	36.67	299.73	31.48	11.46	109.47
95th-Percentile Queue Length [veh]	10.82	2.64	17.67	2.27	0.83	7.81
95th-Percentile Queue Length [ft]	270.60	66.01	441.70	56.67	20.63	195.27

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	24.58	19.35	21.73	10.08	36.46	9.75
Movement LOS	C	B	C	B	D	A
d_A, Approach Delay [s/veh]	23.95		21.00		10.14	
Approach LOS	C		C		B	
d_I, Intersection Delay [s/veh]	18.00					
Intersection LOS	B					
Intersection V/C	0.859					

Sequence

Ring 1	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 204: Chilco Street/Newbridge Street

Control Type:	All-way stop	Delay (sec / veh):	9.2
Analysis Method:	HCM 2010	Level Of Service:	A
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Chilco Street			Chilco Street			Newbridge Street			Newbridge Street		
Base Volume Input [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	1	1	42	4	4	1	35	1	3	33	16
Total Analysis Volume [veh/h]	1	5	5	168	16	14	5	139	2	12	133	64
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.04	1.09	0.70	1.04
95th-Percentile Queue Length [ft]	1.12	27.33	17.62	26.06
Approach Delay [s/veh]	7.87	9.72	8.84	9.06
Approach LOS	A	A	A	A
Intersection Delay [s/veh]	9.21			
Intersection LOS	A			

Intersection Level Of Service Report
Intersection 206: Chilco Street/Ivy Drive

Control Type:	All-way stop	Delay (sec / veh):	11.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Ivy Drive			Ivy Drive		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration	╋			╋			╋			╋		
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Ivy Drive			Ivy Drive		
Base Volume Input [veh/h]	27	62	11	192	218	14	4	16	12	18	33	97
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	27	62	11	192	218	14	4	16	12	18	33	97
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	16	3	48	55	4	1	4	3	5	8	24
Total Analysis Volume [veh/h]	27	62	11	192	218	14	4	16	12	18	33	97
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	0.47	3.30	0.15	0.74
95th-Percentile Queue Length [ft]	11.73	82.53	3.64	18.58
Approach Delay [s/veh]	8.66	12.89	8.48	9.08
Approach LOS	A	B	A	A
Intersection Delay [s/veh]	11.29			
Intersection LOS	B			

Intersection Level Of Service Report
Intersection 207: Chilco St/Constitution Dr

Control Type:	All-way stop	Delay (sec / veh):	206.1
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes		

Intersection Setup

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Approach	Northbound			Southbound			Eastbound			Northwestbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chilco Street			Chilco Street			Constitution Drive			Constitution Drive		
Base Volume Input [veh/h]	31	196	27	131	53	109	173	21	257	239	101	585
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	21.40	1.50	20.00	11.80	3.80	0.00	3.60	50.00	2.60	2.50	50.00	1.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	31	196	27	131	53	109	173	21	257	239	101	585
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	8	49	7	33	13	27	43	5	64	60	25	146
Total Analysis Volume [veh/h]	31	196	27	131	53	109	173	21	257	239	101	585
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Lanes

Movement, Approach, & Intersection Results

95th-Percentile Queue Length [veh]	3.51	4.42	1.96	3.54	58.87
95th-Percentile Queue Length [ft]	87.75	110.41	49.01	88.59	1471.75
Approach Delay [s/veh]	21.49	23.93	18.63		405.81
Approach LOS	C	C	C		F
Intersection Delay [s/veh]	206.06				
Intersection LOS	F				

Intersection Level Of Service Report
Intersection 209: Jefferson Dr/Constitution Dr

Control Type:	Two-way stop	Delay (sec / veh):	22.3
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.221

Intersection Setup

Name							Constitution Drive			Jefferson Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name							Constitution Drive			Jefferson Drive		
Base Volume Input [veh/h]	11	0	4	2	381	103	30	196	15	74	0	156
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	0.00	0.00	0.00	1.70	0.00	0.00	16.70	0.00	7.70	0.00	7.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	11	0	4	2	381	103	30	196	15	74	0	156
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	3	0	1	1	95	26	8	49	4	19	0	39
Total Analysis Volume [veh/h]	11	0	4	2	381	103	30	196	15	74	0	156
Pedestrian Volume [ped/h]	0			0			0			0		

Intersection Settings

Priority Scheme	Stop	Free	Free	Stop
Flared Lane	No			No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance	No			No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.22	0.00	0.25
d_M, Delay for Movement [s/veh]	21.38	16.60	9.98	7.63	0.00	0.00	8.40	0.00	0.00	22.32	21.85	17.45
Movement LOS	C	C	A	A	A	A	A	A	A	C	C	C
95th-Percentile Queue Length [veh]	0.17	0.17	0.17	1.62	1.62	1.62	0.85	0.85	0.85	2.52	2.52	2.52
95th-Percentile Queue Length [ft]	4.15	4.15	4.15	40.57	40.57	40.57	21.14	21.14	21.14	63.01	63.01	63.01
d_A, Approach Delay [s/veh]	18.34			0.03			1.05			19.01		
Approach LOS	C			A			A			C		
d_I, Intersection Delay [s/veh]	5.06											
Intersection LOS	C											

Intersection Level Of Service Report
Intersection 213: Chrysler Dr/Independence Dr

Control Type:	Two-way stop	Delay (sec / veh):	13.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Chrysler Drive									Independence Drive		
Approach	Northbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive									Independence Drive		
Base Volume Input [veh/h]	0	139	0	1	28	30	0	0	15	293	3	6
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	5.70	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	139	0	1	28	30	0	0	15	293	3	6
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	35	0	0	7	8	0	0	4	73	1	2
Total Analysis Volume [veh/h]	0	139	0	1	28	30	0	0	15	293	3	6
Pedestrian Volume [ped/h]	0			0			5			0		

Intersection Settings

Priority Scheme	Free	Free	Stop	Stop
Flared Lane			No	No
Storage Area [veh]	0	0	0	0
Two-Stage Gap Acceptance			No	No
Number of Storage Spaces in Median	0	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.39	0.00	0.01
d_M, Delay for Movement [s/veh]	7.31	0.00	0.00	8.60	0.00	0.00	9.81	10.27	9.05	13.01	13.29	11.67
Movement LOS	A	A	A	A	A	A	A	B	A	B	B	B
95th-Percentile Queue Length [veh]	0.00	0.00	0.00	0.19	0.19	0.19	0.05	0.05	0.05	1.95	1.95	1.95
95th-Percentile Queue Length [ft]	0.00	0.00	0.00	4.68	4.68	4.68	1.26	1.26	1.26	48.78	48.78	48.78
d_A, Approach Delay [s/veh]	0.00			0.15			9.05			12.98		
Approach LOS	A			A			A			B		
d_I, Intersection Delay [s/veh]	7.89											
Intersection LOS	B											

Intersection Level Of Service Report
Intersection 214: Chrysler Dr/Jefferson Dr

Control Type:	Two-way stop	Delay (sec / veh):	14.9
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.004

Intersection Setup

Name	Chrysler Drive				Jefferson Drive	
Approach	Southbound		Northeastbound		Northwestbound	
Lane Configuration						
Turning Movement	Left	Thru	Thru	Right	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

volumes

Name	Chrysler Drive				Jefferson Drive	
Base Volume Input [veh/h]	35	60	428	7	2	172
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	22.20	42.90	0.80	71.40	0.00	2.20
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	60	428	7	2	172
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	15	107	2	1	43
Total Analysis Volume [veh/h]	35	60	428	7	2	172
Pedestrian Volume [ped/h]	1		0		1	

Intersection Settings

Priority Scheme	Free	Free	Stop
Flared Lane			No
Storage Area [veh]	0	0	0
Two-Stage Gap Acceptance			No
Number of Storage Spaces in Median	0	0	0

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.00	0.00	0.00	0.00	0.28
d_M, Delay for Movement [s/veh]	8.64	0.00	0.00	0.00	14.87	13.06
Movement LOS	A	A	A	A	B	B
95th-Percentile Queue Length [veh]	0.31	0.31	0.00	0.00	1.15	1.15
95th-Percentile Queue Length [ft]	7.66	7.66	0.00	0.00	28.76	28.76
d_A, Approach Delay [s/veh]	3.18		0.00		13.08	
Approach LOS	A		A		B	
d_I, Intersection Delay [s/veh]	3.66					
Intersection LOS	B					

Intersection Level Of Service Report
Intersection 215: Chrysler Dr/Constitution Dr

Control Type:	Signalized	Delay (sec / veh):	68.0
Analysis Method:	HCM 2010	Level Of Service:	E
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.858

Intersection Setup

Name	Chrysler Drive			Constitution Drive			Constitution Drive			Chrysler Drive		
Approach	Southbound			Eastbound			Westbound			Northeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	Chrysler Drive			Constitution Drive			Constitution Drive			Chrysler Drive		
Base Volume Input [veh/h]	334	78	17	324	285	9	2	2	283	1	395	147
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	1.60	0.00	100.00	1.50	1.80	11.10	50.00	50.00	5.10	0.00	0.00	0.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	334	78	17	324	285	9	2	2	283	1	395	147
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	84	20	4	81	71	2	1	1	71	0	99	37
Total Analysis Volume [veh/h]	334	78	17	324	285	9	2	2	283	1	395	147
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			5			5			5		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	90
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Split	Split	Split	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Split	Split	Split
Signal group	0	6	0	5	8	0	0	4	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	0	26	0	16	46	0	0	26	0	0	21	0
Amber [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	27	0	11	41	0	0	30	0	0	22	0
Vehicle Extension [s]	0.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	10	0	0	10	0	0	10	0	0	10	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No		No	No			No			No	
Maximum Recall		No		No	No			No			No	
Pedestrian Recall		No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	L	C	L	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	2.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	0.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	23	37	37	26	26	18	18
g / C, Green / Cycle	0.26	0.41	0.41	0.29	0.29	0.20	0.20
(v / s)_i Volume / Saturation Flow Rate	0.26	0.28	0.18	0.00	0.30	0.17	0.18
s, saturation flow rate [veh/h]	1635	1137	1670	661	965	1710	1397
c, Capacity [veh/h]	420	319	690	168	280	337	275
d1, Uniform Delay [s]	33.45	38.23	18.81	33.91	31.96	35.07	35.27
k, delay calibration	0.45	0.50	0.50	0.50	0.50	0.33	0.34
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	47.55	54.40	1.92	0.13	58.82	18.52	25.67
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

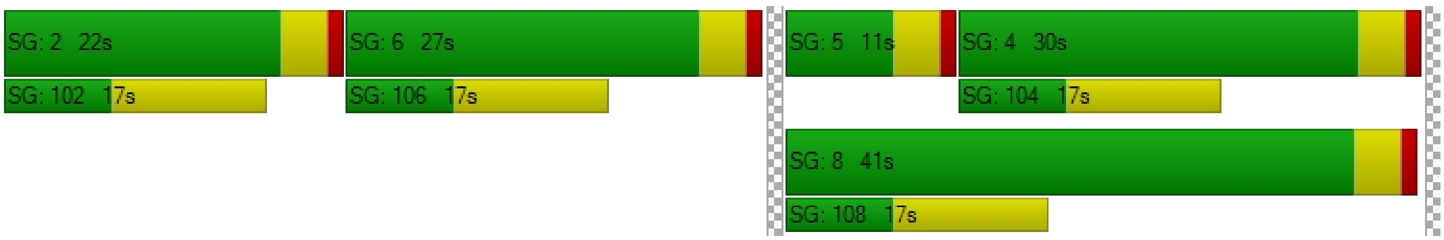
X, volume / capacity	1.02	1.02	0.43	0.01	1.02	0.88	0.90
d, Delay for Lane Group [s/veh]	81.00	92.63	20.74	34.04	90.78	53.59	60.95
Lane Group LOS	F	F	C	C	F	D	E
Critical Lane Group	Yes	Yes	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	14.39	9.52	4.58	0.04	10.43	7.87	7.14
50th-Percentile Queue Length [ft]	359.74	238.05	114.51	1.09	260.87	196.73	178.60
95th-Percentile Queue Length [veh]	20.88	14.73	8.09	0.08	15.91	12.47	11.53
95th-Percentile Queue Length [ft]	522.09	368.24	202.26	1.97	397.72	311.75	288.18

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	81.00	81.00	81.00	92.63	20.74	20.74	34.04	90.78	90.78	53.59	55.47	60.95
Movement LOS	F	F	F	F	C	C	C	F	F	D	E	E
d_A, Approach Delay [s/veh]	81.00			58.43			90.39			56.95		
Approach LOS	F			E			F			E		
d_I, Intersection Delay [s/veh]	68.05											
Intersection LOS	E											
Intersection V/C	0.858											

Sequence

Ring 1	2	6	4	5	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 233: Sand Hill Circle/Sand Hill Road

Control Type:	Signalized	Delay (sec / veh):	84.9
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.191

Intersection Setup

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			Yes		

volumes

Name	Sand Hill Road			Sand Hill Road			Sand Hill Circle			Sand Hill Circle		
Base Volume Input [veh/h]	2	52	0	0	98	239	0	0	0	8	2425	7
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	0.00	3.70	2.00	2.00	5.70	1.10	2.00	2.00	2.00	0.00	0.90	11.10
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2	52	0	0	98	239	0	0	0	8	2425	7
Peak Hour Factor	0.8900	0.8900	1.0000	1.0000	0.8900	0.8900	1.0000	1.0000	1.0000	0.8900	0.8900	0.8900
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	1	15	0	0	28	67	0	0	0	2	681	2
Total Analysis Volume [veh/h]	2	58	0	0	110	269	0	0	0	9	2725	8
Presence of On-Street Parking	No		No	No		No				No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	2			1			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	11.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Protecte	Protecte	Permiss	Split	Split	Split
Signal group	1	8	0	0	8	0	0	0	0	0	2	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	6	0	0	6	0	0	0	0	0	8	0
Maximum Green [s]	0	55	0	0	55	0	0	0	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0
All red [s]	0.0	0.5	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.5	0.0
Split [s]	0	55	0	0	55	0	0	0	0	0	30	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0
Walk [s]	0	0	0	0	0	0	0	0	0	0	7	0
Pedestrian Clearance [s]	0	0	0	0	0	0	0	0	0	0	14	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No			No						No	
Maximum Recall		No			No						Yes	
Pedestrian Recall		No			No						No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	C	R		C	C
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00		2.00	2.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00		0.00	0.00
l2, Clearance Lost Time [s]	0.00	0.00	0.00		0.00	0.00
g_i, Effective Green Time [s]	14	14	14		33	33
g / C, Green / Cycle	0.28	0.28	0.28		0.64	0.64
(v / s)_i Volume / Saturation Flow Rate	0.03	0.06	0.17		0.76	0.76
s, saturation flow rate [veh/h]	1789	1798	1577		1882	1712
c, Capacity [veh/h]	557	484	425		1224	1113
d1, Uniform Delay [s]	13.78	14.20	16.07		8.73	8.73
k, delay calibration	0.11	0.11	0.11		0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00		1.00	1.00
d2, Incremental Delay [s]	0.08	0.24	1.56		86.55	87.73
d3, Initial Queue Delay [s]	0.00	0.00	0.00		0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00		1.00	1.00
PF, progression factor	1.00	1.00	1.00		1.00	1.00

Lane Group Results

X, volume / capacity	0.11	0.23	0.63		1.17	1.17
d, Delay for Lane Group [s/veh]	13.87	14.44	17.64		95.29	96.46
Lane Group LOS	B	B	B		F	F
Critical Lane Group	No	No	Yes		No	Yes
50th-Percentile Queue Length [veh]	0.46	0.88	2.54		37.33	34.30
50th-Percentile Queue Length [ft]	11.58	22.04	63.44		933.13	857.57
95th-Percentile Queue Length [veh]	0.83	1.59	4.57		53.68	49.76
95th-Percentile Queue Length [ft]	20.84	39.68	114.19		1342.11	1244.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	13.87	13.87	0.00	0.00	14.44	17.64	0.00	0.00	0.00	95.29	95.85	96.46
Movement LOS	B	B			B	B				F	F	F
d_A, Approach Delay [s/veh]	13.87			16.71			0.00			95.85		
Approach LOS	B			B			A			F		
d_I, Intersection Delay [s/veh]	84.87											
Intersection LOS	F											
Intersection V/C	1.191											

Sequence

Ring 1	8	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 234: Sand Hill Rd/Hwy 280 NB Off-Ramp

Control Type:	Signalized	Delay (sec / veh):	10.3
Analysis Method:	HCM 2010	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.407

Intersection Setup

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	0	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	300.00	100.00	100.00	100.00	270.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	40.00			40.00			40.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

volumes

Name	Hwy 280 NB Off-Ramp			Sand Hill Road			Sand Hill Road					
Base Volume Input [veh/h]	0	23	193	129	0	0	40	738	0	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	0.00	4.30	0.00	2.00	2.00	5.30	1.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	23	193	129	0	0	40	738	0	0	0	0
Peak Hour Factor	1.0000	0.9300	0.9300	0.9300	1.0000	1.0000	0.9300	0.9300	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	6	52	35	0	0	11	198	0	0	0	0
Total Analysis Volume [veh/h]	0	25	208	139	0	0	43	794	0	0	0	0
Presence of On-Street Parking	No		No	No		No	No		No			
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			23			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	85
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Overlap	Split	Protecte	Permiss	Overlap	Permiss	Permiss	Protecte	Protecte	Permiss
Signal group	0	8	5	7	0	0	1	6	0	0	0	0
Auxiliary Signal Groups			5,8				1,6					
Lead / Lag	-	-	-	Lag	-	-	Lead	-	-	-	-	-
Minimum Green [s]	0	5	5	5	0	0	5	5	0	0	0	0
Maximum Green [s]	0	14	30	25	0	0	16	30	0	0	0	0
Amber [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	4.0	0.0	0.0	0.0	0.0
All red [s]	0.0	0.5	0.0	0.5	0.0	0.0	0.5	0.5	0.0	0.0	0.0	0.0
Split [s]	0	14	30	25	0	0	16	30	0	0	0	0
Vehicle Extension [s]	0.0	3.0	3.0	3.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0
Walk [s]	0	10	0	0	0	0	5	10	0	0	0	0
Pedestrian Clearance [s]	0	10	0	0	0	0	10	10	0	0	0	0
I1, Start-Up Lost Time [s]	0.0	2.0	2.0	2.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	0.0
I2, Clearance Lost Time [s]	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Minimum Recall		No	No	No			No	No				
Maximum Recall		No	No	No			No	No				
Pedestrian Recall		No	No	No			No	No				
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	20.0	20.0	20.0	0.0	0.0	20.0	20.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	L	C	
L, Total Lost Time per Cycle [s]	2.00	2.00	2.00	2.00	2.00	
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	
l2, Clearance Lost Time [s]	0.00	0.00	0.00	0.00	0.00	
g_i, Effective Green Time [s]	6	12	6	27	14	
g / C, Green / Cycle	0.17	0.32	0.16	0.74	0.38	
(v / s)_i Volume / Saturation Flow Rate	0.01	0.13	0.08	0.03	0.22	
s, saturation flow rate [veh/h]	1900	1548	1810	1718	3582	
c, Capacity [veh/h]	315	439	290	1162	1359	
d1, Uniform Delay [s]	12.94	10.88	14.02	1.97	9.08	
k, delay calibration	0.11	0.11	0.11	0.11	0.11	
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	
d2, Incremental Delay [s]	0.11	0.80	1.23	0.01	0.40	
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	
PF, progression factor	1.00	1.00	1.00	1.00	1.00	

Lane Group Results

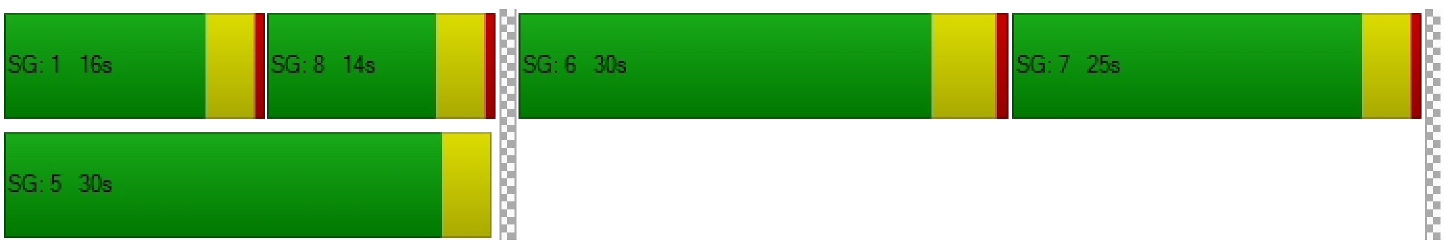
X, volume / capacity	0.08	0.47	0.48	0.04	0.58	
d, Delay for Lane Group [s/veh]	13.04	11.67	15.25	1.98	9.48	
Lane Group LOS	B	B	B	A	A	
Critical Lane Group	No	Yes	Yes	No	Yes	
50th-Percentile Queue Length [veh]	0.14	1.04	0.88	0.00	1.59	
50th-Percentile Queue Length [ft]	3.48	26.00	21.99	0.10	39.66	
95th-Percentile Queue Length [veh]	0.25	1.87	1.58	0.01	2.86	
95th-Percentile Queue Length [ft]	6.26	46.81	39.58	0.19	71.40	

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	0.00	13.04	11.67	15.25	0.00	0.00	1.98	9.48	0.00	0.00	0.00	0.00
Movement LOS		B	B	B			A	A				
d_A, Approach Delay [s/veh]	11.82			15.25			9.09			0.00		
Approach LOS	B			B			A			A		
d_I, Intersection Delay [s/veh]	10.33											
Intersection LOS	B											
Intersection V/C	0.407											

Sequence

Ring 1	8	1	6	7	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 243: University Avenue/US 101 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	87.1
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.048

Intersection Setup

Name	University Avenue		University Avenue		US 101 SB Ramps	
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	1	2	0	0	1
Pocket Length [ft]	100.00	160.00	230.00	100.00	100.00	220.00
Speed [mph]	30.00		30.00		30.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		No	

volumes

Name	University Avenue		University Avenue		US 101 SB Ramps	
Base Volume Input [veh/h]	1310	325	875	1422	400	1014
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	1310	325	875	1422	400	1014
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	328	81	219	356	100	254
Total Analysis Volume [veh/h]	1310	325	875	1422	400	1014
Presence of On-Street Parking	No	No	No	No	No	No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	9		7		0	

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	71.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permissive	Overlap	Protected	Permissive	Protected	Permissive
Signal group	6	7	5	2	7	0
Auxiliary Signal Groups		6,7				
Lead / Lag	-	-	Lead	-	Lag	-
Minimum Green [s]	10	6	4	10	6	0
Maximum Green [s]	30	30	30	30	30	0
Amber [s]	4.0	3.5	3.0	4.5	3.5	0.0
All red [s]	0.5	0.5	0.5	0.5	0.5	0.0
Split [s]	39	34	27	66	34	0
Vehicle Extension [s]	3.0	2.0	2.0	3.0	2.0	0.0
Walk [s]	0	0	0	0	0	0
Pedestrian Clearance [s]	0	0	0	0	0	0
l1, Start-Up Lost Time [s]	2.0	2.0	2.0	2.0	2.0	0.0
l2, Clearance Lost Time [s]	2.5	2.0	1.5	3.0	2.0	0.0
Minimum Recall	Yes	No	No	Yes	No	
Maximum Recall	No	No	No	No	No	
Pedestrian Recall	No	No	No	No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	C	R	L	C	L	C	R
L, Total Lost Time per Cycle [s]	4.50	4.00	3.50	5.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.50	0.00	1.50	3.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	35	69	24	61	30	30	30
g / C, Green / Cycle	0.35	0.69	0.24	0.61	0.30	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.41	0.13	0.28	0.45	0.25	0.36	0.36
s, saturation flow rate [veh/h]	3192	2460	3101	3192	1597	1425	1425
c, Capacity [veh/h]	1101	1697	729	1947	479	428	428
d1, Uniform Delay [s]	32.75	5.54	38.25	13.71	32.69	35.00	35.00
k, delay calibration	0.50	0.04	0.10	0.50	0.30	0.50	0.50
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	94.56	0.02	93.22	2.45	10.06	105.07	105.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	1.19	0.19	1.20	0.73	0.84	1.19	1.19
d, Delay for Lane Group [s/veh]	127.31	5.56	131.47	16.17	42.75	140.07	140.07
Lane Group LOS	F	A	F	B	D	F	F
Critical Lane Group	Yes	No	Yes	No	No	Yes	No
50th-Percentile Queue Length [veh]	27.33	1.08	18.18	10.86	10.18	22.59	22.59
50th-Percentile Queue Length [ft]	683.33	26.93	454.52	271.40	254.44	564.77	564.77
95th-Percentile Queue Length [veh]	40.01	1.94	27.69	16.26	15.41	33.57	33.57
95th-Percentile Queue Length [ft]	1000.22	48.47	692.34	406.49	385.24	839.30	839.30

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	127.31	5.56	131.47	16.17	42.75	140.07
Movement LOS	F	A	F	B	D	F
d_A, Approach Delay [s/veh]	103.11		60.09		112.54	
Approach LOS	F		E		F	
d_I, Intersection Delay [s/veh]	87.12					
Intersection LOS	F					
Intersection V/C	1.048					

Sequence

Ring 1	2	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 245: University Avenue/Runnymede Street

Control Type:	Signalized	Delay (sec / veh):	25.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.757

Intersection Setup

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	120.00	100.00	100.00	130.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Runnymede Street			Runnymede Street		
Base Volume Input [veh/h]	28	1124	50	47	1237	40	21	127	24	160	151	191
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	28	1124	50	47	1237	40	21	127	24	160	151	191
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	7	281	13	12	309	10	5	32	6	40	38	48
Total Analysis Volume [veh/h]	28	1124	50	47	1237	40	21	127	24	160	151	191
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	5			8			16			8		
Bicycle Volume [bicycles/h]	6			7			0			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	76.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	52	0	0	52	0	0	48	0	0	48	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
I1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	53	53	53	53	53	53	39	39
g / C, Green / Cycle	0.53	0.53	0.53	0.53	0.53	0.53	0.39	0.39
(v / s)_i Volume / Saturation Flow Rate	0.07	0.35	0.35	0.11	0.38	0.38	0.12	0.37
s, saturation flow rate [veh/h]	388	1676	1646	428	1676	1653	1473	1347
c, Capacity [veh/h]	143	886	870	167	886	873	617	575
d1, Uniform Delay [s]	35.99	17.19	17.22	34.07	18.02	18.07	20.68	29.51
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.11	0.35
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	3.04	3.97	4.09	4.18	5.13	5.28	0.24	12.40
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

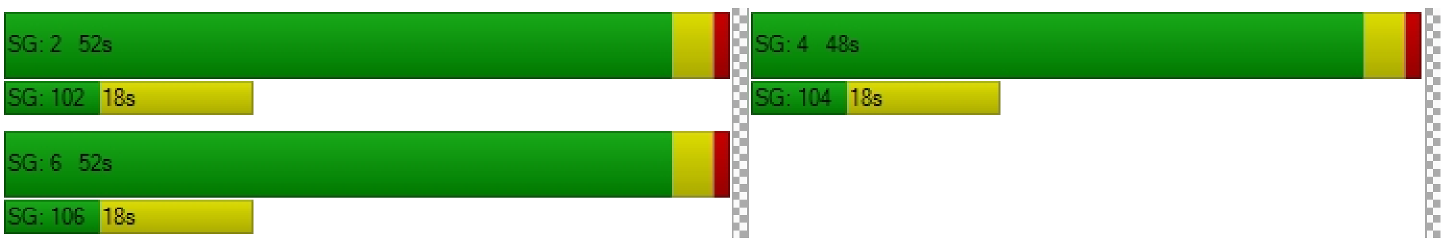
X, volume / capacity	0.20	0.67	0.67	0.28	0.72	0.73	0.28	0.87
d, Delay for Lane Group [s/veh]	39.04	21.16	21.32	38.26	23.15	23.35	20.92	41.91
Lane Group LOS	D	C	C	D	C	C	C	D
Critical Lane Group	No	No	No	No	No	Yes	No	Yes
50th-Percentile Queue Length [veh]	0.73	10.53	10.42	1.20	12.13	12.07	2.78	13.37
50th-Percentile Queue Length [ft]	18.15	263.15	260.59	29.91	303.23	301.84	69.41	334.33
95th-Percentile Queue Length [veh]	1.31	15.85	15.72	2.15	17.84	17.77	5.00	19.37
95th-Percentile Queue Length [ft]	32.67	396.17	392.96	53.83	446.02	444.30	124.94	484.26

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	39.04	21.24	21.32	38.26	23.25	23.35	20.92	20.92	20.92	41.91	41.91	41.91
Movement LOS	D	C	C	D	C	C	C	C	C	D	D	D
d_A, Approach Delay [s/veh]	21.65			23.79			20.92			41.91		
Approach LOS	C			C			C			D		
d_I, Intersection Delay [s/veh]	25.67											
Intersection LOS	C											
Intersection V/C	0.757											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 246: University Avenue/Bell Street

Control Type:	Signalized	Delay (sec / veh):	32.7
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.808

Intersection Setup

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	0	0	0	0	0	0
Pocket Length [ft]	60.00	100.00	100.00	110.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue			Bell Street			Bell Street		
Base Volume Input [veh/h]	48	1086	102	74	1320	36	66	359	175	93	96	22
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	48	1086	102	74	1320	36	66	359	175	93	96	22
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	12	272	26	19	330	9	17	90	44	23	24	6
Total Analysis Volume [veh/h]	48	1086	102	74	1320	36	66	359	175	93	96	22
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	15			17			19			7		
Bicycle Volume [bicycles/h]	3			4			1			2		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	61.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	0	6	0	0	2	0	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	0	4	0	0	4	0	0	4	0	0	4	0
Maximum Green [s]	0	30	0	0	30	0	0	30	0	0	30	0
Amber [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	0	52	0	0	52	0	0	48	0	0	48	0
Vehicle Extension [s]	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	11	0	0	11	0	0	11	0	0	11	0
l1, Start-Up Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
l2, Clearance Lost Time [s]	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall		No			No			No			No	
Maximum Recall		Yes			Yes			No			No	
Pedestrian Recall		No			No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	2.00	0.00	0.00	2.00	0.00	0.00	2.00	2.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	48	48	48	48	48	48	44	44
g / C, Green / Cycle	0.48	0.48	0.48	0.48	0.48	0.48	0.44	0.44
(v / s)_i Volume / Saturation Flow Rate	0.13	0.36	0.36	0.18	0.41	0.41	0.40	0.40
s, saturation flow rate [veh/h]	360	1676	1617	423	1676	1656	1498	531
c, Capacity [veh/h]	114	813	784	148	813	803	692	283
d1, Uniform Delay [s]	44.78	20.72	20.82	40.81	22.35	22.42	26.29	25.39
k, delay calibration	0.50	0.50	0.50	0.50	0.50	0.50	0.40	0.39
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	10.90	6.04	6.43	11.60	10.04	10.39	11.35	13.19
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

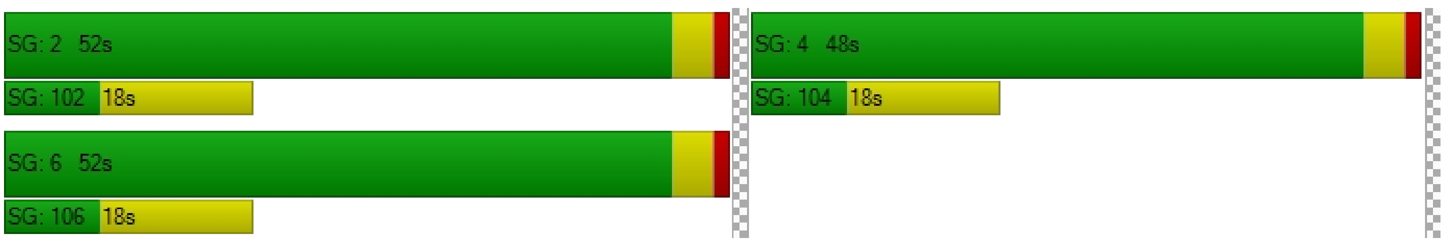
X, volume / capacity	0.42	0.74	0.75	0.50	0.84	0.84	0.87	0.75
d, Delay for Lane Group [s/veh]	55.68	26.76	27.25	52.41	32.39	32.81	37.64	38.58
Lane Group LOS	E	C	C	D	C	C	D	D
Critical Lane Group	No	No	No	No	No	Yes	Yes	No
50th-Percentile Queue Length [veh]	1.55	12.32	12.11	2.28	15.62	15.62	15.16	5.81
50th-Percentile Queue Length [ft]	38.81	308.10	302.69	57.08	390.51	390.46	378.96	145.20
95th-Percentile Queue Length [veh]	2.79	18.08	17.81	4.11	22.10	22.10	21.54	9.76
95th-Percentile Queue Length [ft]	69.86	452.03	445.35	102.74	552.56	552.49	538.59	244.01

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	55.68	26.98	27.25	52.41	32.59	32.81	37.64	37.64	37.64	38.58	38.58	38.58
Movement LOS	E	C	C	D	C	C	D	D	D	D	D	D
d_A, Approach Delay [s/veh]	28.12			33.63			37.64			38.58		
Approach LOS	C			C			D			D		
d_I, Intersection Delay [s/veh]	32.66											
Intersection LOS	C											
Intersection V/C	0.808											

Sequence

Ring 1	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 247: University Avenue/Bay Road

Control Type:	Signalized	Delay (sec / veh):	143.4
Analysis Method:	HCM 2010	Level Of Service:	F
Analysis Period:	15 minutes	Volume to Capacity (v/c):	1.148

Intersection Setup

Name	University Avenue			University Avenue						Bay Road		
Approach	Northeastbound			Southwestbound			Northwestbound			Southeastbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	0	1	0	1	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	150.00	100.00	100.00	170.00	100.00	170.00	170.00	100.00	100.00
Speed [mph]	25.00			25.00			25.00			25.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

volumes

Name	University Avenue			University Avenue						Bay Road		
Base Volume Input [veh/h]	35	1188	45	225	1006	85	188	275	636	171	282	130
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	35	1188	45	225	1006	85	188	275	636	171	282	130
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	9	297	11	56	252	21	47	69	159	43	71	33
Total Analysis Volume [veh/h]	35	1188	45	225	1006	85	188	275	636	171	282	130
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	60			27			12			35		
Bicycle Volume [bicycles/h]	1			5			2			7		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	120
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Split	Split	Split	Split	Split	Split
Signal group	1	6	0	5	2	0	0	4	0	0	3	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	-	-	-	-	-	-
Minimum Green [s]	4	4	0	4	4	0	0	4	0	0	4	0
Maximum Green [s]	30	30	0	30	30	0	0	30	0	0	30	0
Amber [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	1.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	15	45	0	15	45	0	0	30	0	0	30	0
Vehicle Extension [s]	3.0	3.0	0.0	3.0	3.0	0.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	0	7	0	0	7	0	0	4	0	0	4	0
Pedestrian Clearance [s]	0	23	0	0	17	0	0	27	0	0	26	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No	No		No	No			No			No	
Maximum Recall	No	Yes		No	Yes			No			No	
Pedestrian Recall	No	No		No	No			No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	C	L	C	R	L	C	R
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	3	41	41	11	49	49	29	29	29	23	23	23
g / C, Green / Cycle	0.03	0.34	0.34	0.09	0.40	0.40	0.24	0.24	0.24	0.19	0.19	0.19
(v / s)_i Volume / Saturation Flow Rate	0.02	0.37	0.37	0.14	0.33	0.33	0.12	0.16	0.47	0.11	0.17	0.10
s, saturation flow rate [veh/h]	1597	1676	1652	1597	1676	1610	1597	1676	1359	1597	1676	1263
c, Capacity [veh/h]	43	570	561	145	677	650	386	405	329	298	313	236
d1, Uniform Delay [s]	58.55	39.93	39.93	55.00	32.07	32.33	39.42	41.60	45.87	44.81	48.10	44.60
k, delay calibration	0.11	0.50	0.50	0.50	0.50	0.50	0.11	0.21	0.50	0.11	0.29	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	28.69	63.88	65.33	278.61	10.45	11.65	0.95	3.86	432.01	1.74	20.41	2.00
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

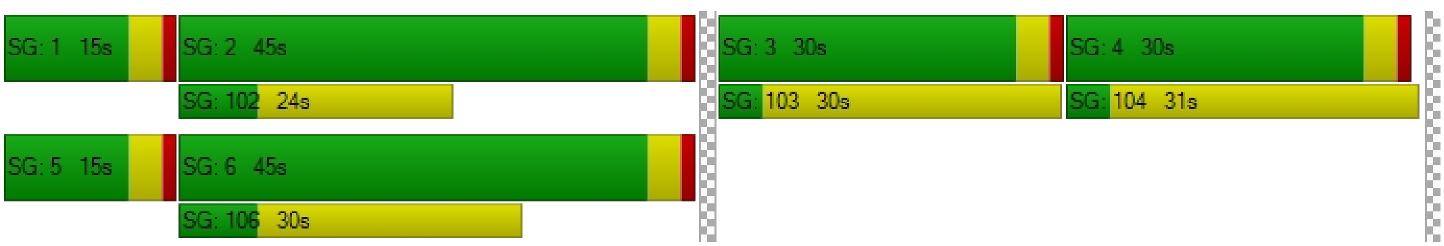
X, volume / capacity	0.81	1.09	1.09	1.55	0.82	0.83	0.49	0.68	1.94	0.57	0.90	0.55
d, Delay for Lane Group [s/veh]	87.24	103.82	105.27	333.61	42.51	43.98	40.37	45.46	477.87	46.54	68.51	46.60
Lane Group LOS	F	F	F	F	D	D	D	D	F	D	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	No	No	Yes	No	Yes	No
50th-Percentile Queue Length [veh]	1.42	26.99	26.81	15.69	16.28	16.19	4.96	7.94	49.32	4.87	10.14	3.71
50th-Percentile Queue Length [ft]	35.49	674.65	670.35	392.19	406.98	404.80	124.04	198.43	1232.94	121.73	253.54	92.67
95th-Percentile Queue Length [veh]	2.56	37.57	37.43	25.39	22.90	22.79	8.61	12.56	78.49	8.49	15.36	6.67
95th-Percentile Queue Length [ft]	63.89	939.21	935.75	634.71	572.41	569.78	215.37	313.93	1962.36	212.21	384.11	166.81

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	87.24	104.51	105.27	333.61	43.18	43.98	40.37	45.46	477.87	46.54	68.51	46.60
Movement LOS	F	F	F	F	D	D	D	D	F	D	E	D
d_A, Approach Delay [s/veh]	104.06			92.88			294.83			57.18		
Approach LOS	F			F			F			E		
d_I, Intersection Delay [s/veh]	143.35											
Intersection LOS	F											
Intersection V/C	1.148											

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Intersection Level Of Service Report
Intersection 249: Donohoe Street/US 101 NB Off-ramp/Capitol Avenue

Control Type:	Signalized	Delay (sec / veh):	31.9
Analysis Method:	HCM 2010	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.791

Intersection Setup

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	400.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			Yes		

volumes

Name	US 101 NB Off-Ramp			Capitol Avenue			Donohoe Street			Donohoe Street		
Base Volume Input [veh/h]	965	0	728	0	0	0	0	893	0	0	687	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	965	0	728	0	0	0	0	893	0	0	687	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9500	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	241	0	182	0	0	0	0	223	0	0	172	0
Total Analysis Volume [veh/h]	965	0	728	0	0	0	0	893	0	0	687	0
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrian Volume [ped/h]	0			23			0			2		
Bicycle Volume [bicycles/h]	0			0			1			3		

Intersection Settings

Located in CBD	Yes
Signal Coordination Group	-
Cycle Length [s]	100
Coordination Type	Time of Day Pattern Coordinated
Actuation Type	Semi-actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Protecte	Protecte	Permiss	Protecte	Protecte	Permiss	Permiss	Permiss	Permiss	Permiss	Permiss
Signal group	5	0	5	0	0	6	0	4	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	-	-	-	-	-	-	-	-	-
Minimum Green [s]	4	0	4	0	0	4	0	4	0	0	4	0
Maximum Green [s]	30	0	30	0	0	30	0	30	0	0	30	0
Amber [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
All red [s]	1.0	0.0	1.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	1.0	0.0
Split [s]	58	0	58	0	0	8	0	34	0	0	34	0
Vehicle Extension [s]	3.0	0.0	3.0	0.0	0.0	3.0	0.0	3.0	0.0	0.0	3.0	0.0
Walk [s]	7	0	7	0	0	0	0	7	0	0	7	0
Pedestrian Clearance [s]	26	0	26	0	0	0	0	19	0	0	19	0
I1, Start-Up Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
I2, Clearance Lost Time [s]	2.0	0.0	2.0	0.0	0.0	2.0	0.0	2.0	0.0	0.0	2.0	0.0
Minimum Recall	No		No			No		No			No	
Maximum Recall	No		No			Yes		No			No	
Pedestrian Recall	No		No			No		No			No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	R	R	C	C	C
L, Total Lost Time per Cycle [s]	4.00	4.00	4.00	4.00	4.00	4.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	2.00	2.00	2.00	2.00	2.00	2.00
g_i, Effective Green Time [s]	53	53	5	30	30	30
g / C, Green / Cycle	0.53	0.53	0.05	0.30	0.30	0.30
(v / s)_i Volume / Saturation Flow Rate	0.31	0.51	0.00	0.28	0.14	0.14
s, saturation flow rate [veh/h]	3101	1423	1425	3192	3192	1676
c, Capacity [veh/h]	1644	755	74	950	950	499
d1, Uniform Delay [s]	16.02	22.58	0.00	34.24	28.80	28.57
k, delay calibration	0.11	0.43	0.50	0.11	0.11	0.11
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	0.34	22.97	0.00	5.34	0.38	0.66
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

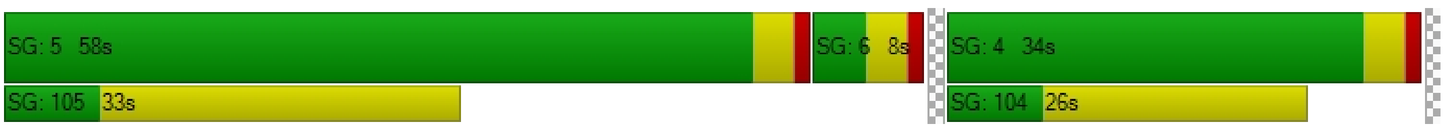
X, volume / capacity	0.59	0.96	0.00	0.94	0.48	0.46
d, Delay for Lane Group [s/veh]	16.35	45.55	0.00	39.59	29.18	29.22
Lane Group LOS	B	D	A	D	C	C
Critical Lane Group	No	Yes	No	Yes	No	No
50th-Percentile Queue Length [veh]	7.21	19.98	0.00	11.02	4.50	4.50
50th-Percentile Queue Length [ft]	180.14	499.51	0.00	275.41	112.43	112.57
95th-Percentile Queue Length [veh]	11.61	27.31	0.00	16.46	7.98	7.98
95th-Percentile Queue Length [ft]	290.20	682.78	0.00	411.49	199.38	199.58

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	16.35	0.00	45.55	0.00	0.00	0.00	0.00	39.59	0.00	0.00	29.19	29.22
Movement LOS	B		D			A		D			C	C
d_A, Approach Delay [s/veh]	28.91			0.00			39.59			29.19		
Approach LOS	C			A			D			C		
d_I, Intersection Delay [s/veh]	31.88											
Intersection LOS	C											
Intersection V/C	0.791											

Sequence

Ring 1	5	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



General Plan & Facebook Expansion

Vistro File: J:\...\2040(c)_PM.vistro

Scenario 1: Proposed General Plan Conditions PM

Report File: J:\...\Cumulative 2040 Proposed General Plan Conditions PM.pdf

5/19/2016

Turning Movement Volume: Summary

ID	Intersection Name	Northeastbound	Southwestbound	Southeastbound		Total Volume
		Thru	Thru	Left	Right	
1	Marsh Rd (SR 84)/US 101 SB Offramp	984	944	1567	401	3896

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
2	Marsh Rd/Rolison Rd-Scott Dr	29	1083	4	66	1014	203	27	9	467	257	15	1	3175

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
3	Marsh Rd/Florence St-Bohannon Dr	185	720	84	30	697	377	475	15	130	138	58	102	3011

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
4	Marsh Rd/Bay Rd	2	681	108	194	841	54	78	50	10	86	19	147	2270

ID	Intersection Name	Southbound		Eastbound		Westbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
5	Middlefield Rd/Marsh Rd	426	399	324	288	502	393	2332

ID	Intersection Name	Northeastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
9	Middlefield Rd/Ravenswood Ave	205	629	528	777	494	83	2716

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
10	Middlefield Rd/Ringwood Ave	83	100	55	76	1	327	11	816	102	472	708	6	2757

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
13	Middlefield Rd/Lytton Ave	241	181	69	2	67	8	84	445	16	16	512	179	1820

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
14	Middlefield Rd/University Ave	66	338	35	81	374	86	27	319	87	101	370	55	1939

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
15	Bayfront Expy (SR 84)/University Ave (SR 109)	4202	574	504	813	111	2326	8530

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
16	Bayfront Expy (SR 84)/Willow Rd (SR 114)	28	54	1645	316	591	165	43	2938	935	359	880	10	7964

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
17	Willow Rd (SR 114)/Hamilton Ave	50	1299	3	17	1829	39	367	34	88	139	17	61	3943

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
18	Willow Rd (SR 114)/Ivy Dr	68	1339	2037	0	64	274	3782

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
19	Willow Rd (SR 114)/O'Brien Dr	1368	217	76	2235	281	57	4234

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
20	Willow Rd (SR 114)/Newbridge St	301	1484	263	74	2240	22	31	152	233	358	424	130	5712

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
21	Willow Rd/Bay Rd	35	1276	996	282	504	68	3161

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
22	Willow Rd/Durham St-VA Med Entrance	8	935	10	72	961	39	117	2	28	38	4	177	2391

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
23	Willow Rd/Coleman Ave	11	738	3	5	680	84	110	4	34	1	1	4	1675

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
24	Willow Rd/Gilbert Ave	32	707	14	26	597	6	82	68	93	56	43	28	1752

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
25	Middlefield Rd-Willow Rd	56	114	310	415	108	387	92	429	216	266	511	33	2937

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
26	Ravenswood Ave/Laurel St	58	607	127	34	552	25	274	221	66	54	139	27	2184

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
28	Oak Grove Ave/Laurel St	17	438	123	32	280	51	78	232	38	30	126	31	1476

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
29	El Camino Real (SR 82)/Encinal Ave-Menlo College Entrance	24	19	40	107	9	238	25	1794	103	78	1464	16	3917

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
30	El Camino Real (SR 82)/Glenwood Ave-Valparaiso Ave	461	183	100	88	256	61	105	1571	47	67	1195	366	4500

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
31	El Camino Real (SR 82)/Oak Grove Ave	157	268	176	142	236	84	91	1493	98	137	1262	117	4261

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound		Southeastbound		Total Volume
		Left	Thru	Right	Left	Thru	Right	Thru	Right	Thru	Right	
32	El Camino Real (SR 82)/Santa Cruz Ave	222	64	176	143	166	123	1441	42	1782	107	4266

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
33	El Camino Real (SR 82)/Ravenswood Ave-Menlo Ave	51	400	124	799	441	142	134	1596	703	217	1391	47	6045

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
34	El Camino Real (SR 82)/Roble Ave	67	6	37	58	45	48	74	1891	21	94	2186	75	4602

ID	Intersection Name	Northeastbound		Southwestbound				Northwestbound		Southeastbound		Total Volume
		Left	Right	U-T	Left	Thru	Right	Left	Thru	Thru	Right	
35	El Camino Real (SR 82)/Middle Ave	249	182	0	0	0	0	331	1965	1853	119	4699

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
36	El Camino Real (SR 82)/Cambridge Ave	26	0	39	4	3	0	355	2665	7	36	2000	5	5140

ID	Intersection Name	Northeastbound		Southwestbound		Northwestbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
38	Santa Cruz Ave/University Dr (S)	462	433	112	505	363	165	2040

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
39	Sand Hill Rd/Santa Cruz Ave	361	611	215	534	1306	262	180	789	215	122	635	215	5445

ID	Intersection Name	Northbound		Southbound		Eastbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
58	University Avenue and Adams Drive	11	2248	1016	32	178	0	186	3671

ID	Intersection Name	Eastbound		Northwestbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
71	Chilco Street/Terminal Avenue	40	14	21	112	502	162	851

ID	Intersection Name	Northbound		Southbound		Eastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
74	University Ave/O'Brien Dr	11	2052	1142	23	385	174	3787

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
77	University Avenue/Donohoe Street	430	533	750	105	1025	314	11	119	216	313	777	691	5284

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
88	Valparaiso Ave/ University Dr	25	478	107	50	520	33	271	36	85	45	41	72	1763

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
103	Addison Wesley/Sand Hill Rd	209	3	108	19	3	66	21	919	108	71	1804	16	3347

ID	Intersection Name	Southbound		Westbound		Northeastbound		Total Volume
		Left	Thru	Left	Right	Thru	Right	
107	Alpine Rd/Santa Cruz Ave&Junipero Serra Blvd	446	763	441	415	546	102	2713

ID	Intersection Name	Northbound	Southbound	Northwestbound		Total Volume
		Thru	Thru	Left	Right	
110	Marsh Road/101 NB Ramps	2269	869	544	258	3940

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
111	University Avenue/Woodland Avenue	28	834	18	278	802	421	13	73	318	439	92	49	3365

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
131	Chilco Street/Hamilton Avenue	21	71	20	102	582	52	22	127	22	15	34	99	1167

ID	Intersection Name	Northeastbound	Southwestbound		Southeastbound		Total Volume
		Thru	Thru	Right	Left	Right	
132	Oak Ave/Sand Hill Rd	912	1605	101	42	127	2787

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
156	Saga Ln/Sand Hill Rd	108	0	113	90	0	103	74	1077	7	28	1307	20	2927

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
157	Branner Dr/Sand Hill Rd	2	0	17	20	0	43	22	1076	7	17	1321	24	2549

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
162	Sharon Park Dr/ Sand Hill Rd	164	916	1	17	1289	266	53	27	75	278	5	269	3360

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
163	Bayfront Expy/Marsh Rd	125	31	2131	16	25	3	8	477	136	2356	63	13	5384

ID	Intersection Name	Northeastbound		Southwestbound		Southeastbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
181	Santa Cruz Ave/Elder Ave	71	775	734	90	49	44	1763

ID	Intersection Name	Northbound		Westbound		Southeastbound		Total Volume
		Left	Right	Left	Thru	Thru	Right	
195	Bayfront Expy/Chilco St	386	576	137	1335	2416	156	5006

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
196	Bayfront Expy/Chrysler Drive	835	114	2516	167	26	1716	5374

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
199	Bafront Expwy/Bldg 21	319	556	2933	65	97	1160	5130

ID	Intersection Name	Northbound		Eastbound		Westbound		Total Volume
		Left	Right	Thru	Right	Left	Thru	
201	Bayfront Expwy/Bldg 20	278	487	3429	60	92	979	5325

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
204	Chilco Street/Newbridge Street	1	5	5	168	16	14	5	139	2	12	133	64	564

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
206	Chilco Street/Ivy Drive	27	62	11	192	218	14	4	16	12	18	33	97	704

ID	Intersection Name	Northbound			Southbound			Eastbound			Northwestbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
207	Chilco St/Constitution Dr	31	196	27	131	53	109	173	21	257	239	101	585	1923

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
209	Jefferson Dr/Constitution Dr	11	0	4	2	381	103	30	196	15	74	0	156	972

ID	Intersection Name	Northbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
213	Chrysler Dr/Independence Dr	0	139	0	1	28	30	0	0	15	293	3	6	515

ID	Intersection Name	Southbound		Northeastbound		Northwestbound		Total Volume
		Left	Thru	Thru	Right	Left	Right	
214	Chrysler Dr/Jefferson Dr	35	60	428	7	2	172	704

ID	Intersection Name	Southbound			Eastbound			Westbound			Northeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
215	Chrysler Dr/Constitution Dr	334	78	17	324	285	9	2	2	283	1	395	147	1877

ID	Intersection Name	Northbound		Southbound		Westbound			Total Volume
		Left	Thru	Thru	Right	Left	Thru	Right	
233	Sand Hill Circle/Sand Hill Road	2	52	98	239	8	2425	7	2831

ID	Intersection Name	Northbound		Southbound	Eastbound		Total Volume
		Thru	Right	Left	Left	Thru	
234	Sand Hill Rd/Hwy 280 NB Off-Ramp	23	193	129	40	738	1123

ID	Intersection Name	Northbound		Southbound		Westbound		Total Volume
		Thru	Right	Left	Thru	Left	Right	
243	University Avenue/US 101 SB Ramps	1310	325	875	1422	400	1014	5346

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
245	University Avenue/Runnymede Street	28	1124	50	47	1237	40	21	127	24	160	151	191	3200

ID	Intersection Name	Northbound			Southbound			Eastbound			Westbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
246	University Avenue/Bell Street	48	1086	102	74	1320	36	66	359	175	93	96	22	3477

ID	Intersection Name	Northeastbound			Southwestbound			Northwestbound			Southeastbound			Total Volume
		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
247	University Avenue/Bay Road	35	1188	45	225	1006	85	188	275	636	171	282	130	4266

ID	Intersection Name	Northbound		Southbound	Eastbound	Westbound		Total Volume
		Left	Right	Right	Thru	Thru	Right	
249	Donohoe Street/US 101 NB Off-ramp/Capitol Avenue	965	728	0	893	687	0	3273